



Analysis

China: PLA Training Emphasizes Countermeasures Against Imagery Reconnaissance

A variety of Chinese open source reporting suggests that China is developing an increasingly sophisticated understanding of US imagery collection capabilities and is steadily taking steps to evade both Western intelligence and commercial satellite and aerial reconnaissance. While Chinese military units for the past several years have carried out counter-reconnaissance drills during major exercises, this year reconnaissance and surveillance evasion emerged as a major training theme in Chinese military media and top level training guidance. Thus far, evasion methods are primarily passive -- emphasizing camouflage and deception -- but a PRC commercial military magazine suggests that some "experts" in the field are advocating an ambitious future goal of developing active countermeasures that may include telemetry jamming and signals hacking.

The Chinese military leadership has elevated detection evasion as one of the main topics for future military training, suggesting a growing awareness of and a commitment to countering US intelligence and commercial imagery satellites (see box). In the authoritative 2007 Training Directives published in the Central Military Commission's daily, the People's Liberation Army (PLA) General Staff Department, for example, specifically made training in a "complex electromagnetic environment" -- China's characterization of a future battlefield that includes essential elements such as reconnaissance, surveillance, electronic warfare, and their countermeasures -- a priority task (*Jiefangjun Bao*, 12 January 2007, 12 December 2006). As a result, the PLA appears to be increasing the frequency of detection evasion drills in this year's training and will probably continue to do so.

- A deputy chief of staff of the Jinan Military Region's 54th Group Army stressed that failure to evade enemy sensors spells doom on today's battlefield since "detection means destruction" in warfighting that relies on information technologies and sensors, according to the military region's official newspaper (*Qianwei Bao*, 22 January 2007).

China Aware of US Satellite Imagery Threats

PRC domestic and military media clearly indicate that China is well aware of US intelligence's imagery satellite reconnaissance activities, including some key specifications. Much of the knowledge could come from observation of US military operations or from authorized and unauthorized disclosure in US media.

- A PLA Air Force (PLAAF) camouflage expert commented that "foreign satellites" that were deployed against Chinese military targets included "the Keyhole series reconnaissance satellites, which have a space resolution of upwards of 0.1 meters, as well as commercial satellites such as QuickBird (0.61 meters) and Ikonos (1 meter)." He also said that the surface measurement precision of Quickbird can "attain a circular error of 23 meters and a linear error of 17 meters under conditions in which there are no ground-control points" while military satellites could be even more precise (*Kongjun Bao*, 19 April 2007).
- Two "experts" of unspecified affiliation spoke extensively about the working principles of and countermeasures against US signals and imagery intelligence satellites (electro-optical, infrared, and radar) during an interview with a PRC commercial military magazine sponsored by the Chinese Ordnance Society (*Bingqi Zhishi*, December 2006).
- PRC media, at times, publish articles on specifications and characteristics of US imagery reconnaissance and commercial satellites, including KH-12 (Keyhole), Quickbird-2, Ikonos-2, and Orbview-4. Examples include articles published by a newspaper affiliated with national S&T and defense industry commissions and a monthly aerospace magazine published by the China Aerospace Corporation's Science and Technology Information Office (*Keji Ribao*, 26 May 2004; *Zhongguo Hangtian*, August 2002).
- A PRC-owned Hong Kong daily, citing a US newspaper, reported that a US intelligence official revealed that "spy satellites" discovered "frequent vehicular activities" at China's Lop Nur nuclear testing facility in preparation for a "miniaturized nuclear warhead" test "before the end" of May 2001 (*Hsiang Kang Shang Pao*, 15 May 2001).
- A Chinese official newspaper, citing a named US newspaper reporter's "generous" disclosure, warned its readership to "stay vigilant" against US commercial satellites since "they have increasingly been employed by US military intelligence agencies as tools for tapping...classified intelligence" (*Qingnian Cankao*, 22 February 2006).

Indicating that this commitment to improve evasion methods is being put into practice, the military press has cited exercises that successfully employed counter-reconnaissance evasion techniques as harbingers of the PLA's efforts to transform itself into a force better able to survive in modern warfare. Recent key PLA exercises that were hailed as tests of future

capabilities apparently took at least notional adversarial satellite and aerial reconnaissance into account and featured detection evasion drills.¹

- The Jinan Military Region's Military Training and Arms Department stressed the importance of camouflage training and the use of "technical camouflage measures" against "high-tech reconnaissance means" as a field survival skill in the military region's Winter Field Training, according to *Qianwei Bao* (16 February 2007). This year's event was particularly significant because it was the "crystallization of the practical experience...over three years." All three group armies (20th, 26th, and 54th) under the military region also reportedly held counter-reconnaissance drills during the training cycle, according to a separate article published on the same day.
- *Jiefangjun Bao* highlighted the 54th Group Army's alertness to an "enemy's" reconnaissance capabilities and the need to minimize its signature during its command post exercise in January 2007. The article boasted that the training demonstrated that the Group's units had changed their methods of maneuver and raised their awareness of sources of enemy threats in modern warfare (27 January 2007).
- In the PLA's first long-distance, trans-regional exercise of "historical milestone significance," the Shenyang Military Region's 190th Mechanized Infantry Brigade of the 39th Group Army reportedly camouflaged and dispersed its vehicles despite being electronically jammed when the exercise directorate warned of an "enemy satellite" overpass, according to both China's official news agency Xinhua (14 September 2006) and *Qianjin Bao*, the military region's newspaper (13 September 2006).
- The commander of a motorized infantry regiment participating in the Jinan Military Region's "Queshan 2006" Exercise told a China Central TV military reporter that the unit used the weather and "natural objects" to "ward off enemy reconnaissance and surveillance" (CCTV-7 Military Report, 13 October 2006). The same segment also reported that other units "flexibly responded to enemy's aerial reconnaissance" during the exercise, which Xinhua called a representation of "historic transformation of military training" and "real mission" of what the participating units "will shoulder in a future war" (17 October 2006).

Denial, Deception Methods Mostly Passive

Judging from media reporting, the PLA apparently seems intent on perfecting passive measures -- probably because it has the technology to do so -- and is emphasizing proficiency in applying advanced camouflage to defeat advanced Western reconnaissance systems. Most of the countermeasures described in PLA media as being carried out against satellite and aerial imagery reconnaissance relied on techniques such as camouflage, dispersal, decoys, the use of terrain features, and hiding.

- Soldiers of the "Tiger Company" under a Guangzhou Military Region 41st Group Army's artillery brigade, according to the military region's official newspaper, used "conventional" means such as thick branches and camouflage netting, which resulted in

¹ OSC has not determined if these exercises are synchronized with actual passes by Western satellites.

"easy" discovery by an "enemy" unmanned aerial vehicle. To remedy this vulnerability, the brigade "seriously" carried out monthly deceptive equipment training using shape-distorting camouflage and decoys and developed a software system to design deceptive measures for different seasons and terrains (*Zhanshi Bao*, 16 January 2007).

- During its exercise in January 2007, a Jinan Military Region 54th Group Army command post reportedly carried out countermeasures including dispersing on both sides of the road, applying camouflage, hiding in "forested ravines, and using smoke screen." The unit also disguised and mixed in with civilian traffic on highways when it traveled in daylight hours (*Jiefangjun Bao*, 27 January 2007).

While not commenting directly on China's countermeasures, an "expert" of unidentified background said during an interview with a Chinese Ordnance Society magazine that traditional covering material such as camouflage netting would remain a "primary means" for countering imagery satellites (*Bingqi Zhishi*, December 2006).

PLA Critique of Evasion Capabilities

PLA media and counter-reconnaissance specialist's critiques of current methods suggest a recognition that passive evasion doctrines and techniques leave its military open to detection and targeting. A PLA Air Force (PLAAF) Logistics Department "camouflage expert," for example, said during an interview with the service's official newspaper that the PLA's current standard-issued camouflage netting, paint, and camouflage for construction projects were "still far from being able" to defeat foreign countries' "high resolution imagery satellites" (*Kongjun Bao*, 19 April 2007).² He indicated, however, that some achievements from camouflage development were applied in construction projects and brought "important results" in countering high resolution reconnaissance satellites.

- He stressed that the PLA needed to review its camouflage efforts and must use defeating high resolution satellites as an objective when it develops camouflage material. To do so, he claimed the Chinese must combine various technologies³ and continue to develop new countermeasures as reconnaissance, surveillance, and countermeasure technologies evolve.

PLA media suggested that some units are using "satellite imagery"⁴ and reconnaissance aircraft for feedback to help them understand their vulnerability to potential enemy systems.

- A Jinan Military Region regiment deployed an unmanned aerial reconnaissance aircraft to test the result of the unit's intensified detection evasion training. The new emphasis

² For a profile on PRC camouflage nets, see 4 March 2004 OSC Translation, **PRC Magazine Showcases Indigenous Anti-IR, Anti-Radar Camouflage Nets** (CPP20040407000168).

³ The Chinese phrase "tuyang jiehe"(土洋结合) could mean "combing domestic and foreign technologies" or "combining traditional and modern methods."

⁴ OSC cannot determine whether the satellite imagery is real or whether the source of the imagery is foreign or domestic.

was prompted by the unit commander, who reportedly found "clear high resolution images" of his troops and facilities in *Google Earth* (*Jiefangjun Bao*, 14 June 2007).

- An artillery brigade of the same military region received pictures from "model airplanes" and infrared imagery from an evaluation team during an inspection drill at the end of 2006, surprising the unit's command post who thought it had done a good job camouflaging the unit's positions (*Qianwei Bao*, 16 March 2007).
- During a region-wide command and staff field training event in August 2006, the Jinan Military Region command and staff conducted a "surprise" reconnaissance flight over the command posts of the participating units. Except for one artillery regiment's command post, which was protected by camouflage netting developed by the unit's commander, all other command posts were discovered (*Jiefangjun Bao*, 11 July 2007).
- A Beijing Military Region's notional enemy force, a "specialized blue force," showed "gigantic photographs" from "reconnaissance satellites" and "high-altitude reconnaissance aircraft" during a 2006 drill to raise the "red force's" awareness of advanced reconnaissance capabilities targeting the PLA (*Zhanyou Bao*, 23 February 2006).

The PLA has also enlisted the help of militia to improve its camouflaging capabilities. An unidentified PLA AF training base jointly held an air defense training event with the Tangshan Military Subdistrict (Beijing Military Region) near Bohai Gulf in early June 2007, where the subdistrict's militia camouflage element protected some air defense positions and fooled the adversary's bomb damage assessment. This militia reportedly developed a series of new technology and materials, making use of fire, lighting, smoke, and electronics, to hide or transform the shape of important infrastructure, such as oil depots, power plants, and bridges (*Jiefangjun Bao*, 14 June 2007).

- Composed of civilians specializing in simulations, this element also developed a computer-assisted decisionmaking system to help draft camouflage plans under various conditions.
- The PLA's cooperation with the militia is consistent with China's intention of drawing militiamen from specialized, high-tech civilian industries to boost the PLA's combat capabilities, as outlined in the 2006 Defense White Paper (Xinhua, 29 December 2006).

More Active Methods Under Consideration

Media reporting suggests Chinese "experts" are considering more technically challenging, active methods, such as jamming satellite telemetry. Thus, for example, an "expert" participating in the December interview with *Bingqi Zhishi* suggested that it was possible to electronically jam the "telemetry control signal" between the satellites and the ground control station to counter space-based imagery reconnaissance, citing a western press report on a "hacked" NATO satellite during its operation in Kosovo. He said that it would be ideal to hijack an enemy's satellite, although he recognized the difficulty of cracking an enemy's control signal encoding methods and encryption (December 2006).

- A Taiwan pan-green, pro-government newspaper reported that the Chinese had already used active methods -- in the form of laser dazzling -- against a "US military satellite" in September 2006 (*Taipei Times*, 11 March 2007). In addition, China carried out a kinetic, direct-ascent anti-satellite test that destroyed an old Chinese satellite on 11 January 2007, according to the Western press (AFP, 19 January 2007).

Counter-Evasion Emphasis Building Over Several Years

Media reporting suggests that the PLA's growing recognition of Western overhead reconnaissance abilities and the need to counter them dates back several years.

- A Hong Kong non-PRC-owned daily reported that a Chengdu Military Region division, prompted by its observation of NATO operations in Kosovo, held a "successful" exercise with a "focus" on "guarding against reconnaissance and surveillance" (*Sing Tao Jih Pao*, 6 December 1999). Officers and soldiers also learned about the "working principles and orbits" of various reconnaissance satellites, according to the article.

Reporting on evasion drills during training conducted by the Second Artillery Corps, China's tactical and strategic ballistic missile force, indicates Chinese recognition of the need to protect key strategic nuclear forces that they expect to be the prime target of enemy reconnaissance targeting.

- An unidentified Second Artillery brigade that claimed to operate strategic missiles reportedly improved its satellite detection evasion techniques during exercises before the end of 2005. *Jiefangjun Bao*, in a late 2005 account of a recent exercise, reported that during an earlier comprehensive exercise, the exercise directorate criticized the unit for not trying to identify enemy overhead or aerial reconnaissance when it traveled in broad daylight. The exercise directorate also commented that the unit's concealed area was "inappropriate," the deployment of camouflage took "too long," and its smoke screen was "too concentrated" (30 December 2005, 28 June 2006).
- CCTV-7 also reported in late 2005 that a brigade, possibly the 805th strategic missile brigade of the 55th Base,⁵ "intensified the satellite passage drills" and night movement drills (CCTV-7 Military Report, 22 October 2005).
- Two unidentified Second Artillery brigades separately conducted evasion drills against "satellites" and "unmanned aerial reconnaissance aircraft" during the opening of 2006 training, according to Second Artillery's official daily (*Huojianbing Bao*, 14 January 2006). Both brigades used camouflage to change the shape of the equipment and merge themselves with the terrain. One of the brigades, led by Fan Lixin, reportedly incorporated counter-reconnaissance into its training plan.

Units from other military regions reportedly conducted similar training, reflecting an assessment that a potential adversary would have overhead reconnaissance capability.

⁵ According to a Taiwan commercial military monthly, the 805th Brigade operates primarily the DF-5A intercontinental ballistic missile (ICBM) (*Ch'uan-Ch'iu Fang-Wei Tsa-Chih*, June 2004).

- In mid-October 2006, a Beijing Military Region mechanized infantry brigade, possibly the 188th, carried out "on the move camouflaging" and dispersed into small groups while traveling on the road near Taixing (northern Shanxi) after being warned of an "enemy" satellite passing overhead (*Jiefangjun Bao*, 20 October 2006).
- A Lanzhou Military Region anti-aircraft artillery element's [*fendui*] tri-tier (regiment, battalion, company) command post tested its field survivability during a division-level multi-arms exercise in early April by countering enemy reconnaissance such as satellites flying overhead and infrared reconnaissance (*Jiefangjun Bao*, 11 April 2007).