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# Shaking the Heavens and Splitting the Earth

Chinese Air Force Employment  
Concepts in the 21st Century

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Roger Cliff, John Fei, Jeff Hagen, Elizabeth Hague,  
Eric Heginbotham, John Stillion

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## Summary

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China's air force is in the midst of a transformation. A decade ago, it was an antiquated service equipped almost exclusively with weapons based on 1950s-era Soviet designs and operated by personnel with questionable training according to outdated employment concepts. Today, the PLAAF appears to be on its way to becoming a modern, highly capable air force for the 21st century. This monograph describes the concepts that the PLAAF is likely to implement in the future for employing its aviation, surface-to-air missile (SAM), anti-aircraft artillery (AAA), and airborne forces; analyzes how those concepts might be implemented in specific operational situations; assesses the implications for the USAF of the PLAAF implementing these concepts, given the capabilities it currently possesses or may acquire in the future; and develops recommendations for the USAF about actions it should take in response.

## Research Approach

The overall approach of the study from which this monograph results was to analyze publications of the Chinese military, as well as previously published Western analyses of China's air force, for information on how the PLAAF intends to employ its forces in the event of a future conflict; combine these findings with information available in published sources about current and future capabilities of the PLAAF to assess how those general principles might be implemented in specific potential combat operations; and use a combination of expert judg-

ment and quantitative analysis to identify implications and potential responses for the USAF. Most of the Chinese sources used in this study have not been translated into English, and all were read in the original Chinese to avoid the mistranslations, inconsistent use of terms, and other problems associated with most translations of Chinese military publications. The Chinese military publications used in this study were largely official reference books or textbooks used by China's military, collectively referred to as the People's Liberation Army (PLA). They do not necessarily reflect actual current practice, however, but rather appear to represent the views of the PLA, the PLAAF, and Chinese officers and analysts about how China's air forces *ought* to be employed, and thus can be regarded as a description of how the PLAAF aspires to operate in the future more than a documentation of how it is operated today (see pp. 4–10).

## **PLAAF Organization**

Before discussing PLAAF employment concepts, it is useful to examine how Chinese airpower fits into the overall structure of the Chinese armed forces. The PLA consists of the PLA Army, the PLA Navy (PLAN), the PLAAF, and China's strategic rocket forces, known as the Second Artillery Force. For peacetime operations, China is divided up into seven Military Regions (MRs) (in protocol order): the Shenyang, Beijing, Lanzhou, Nanjing, Guangzhou, Jinan, and Chengdu MRs (see Figure 2.1 in Chapter Two). The commander of each MR—which, to date, has always been an army officer—has control over all PLA Army units, as well as all military operations, in his or her MR. During peacetime, however, the Chinese navy, air force, and Second Artillery Force are responsible for operational command, training, and other administrative and management issues of their respective forces in each MR. In the event of a war, a theater command would be established with operational command of all (conventional) military units within one or more MRs (see pp. 14–15).

China's aerospace power is contained in all four services of the PLA. In addition to the PLAAF, the PLA Army operates air defense

(SAM and AAA) and aviation (helicopter) forces; the PLAN has its own aviation forces, shore-based AAA, and shipboard SAM and AAA systems; and the Second Artillery Force operates conventional surface-to-surface missiles (SSMs). The PLAAF, moreover, comprises four combat branches: aviation, SAMs, AAA, and airborne (see pp. 15–27).

## Key Employment Concepts and Principles

Official Chinese military publications define *airpower* as an overall term for aviation forces belonging to air forces, navies, air defense forces (such as the Russian ProtivoVozdushnaya Oborona [Anti-Air Defense], or PVO), ground forces, and special operations forces. In joint operations, airpower is said to be used for high-speed, in-depth strikes against key targets and to be used first and throughout campaigns to seize control of the skies in support of broader campaign objectives. It also is used defensively to protect the ability of an air force to conduct air operations by defending air bases, air defense positions, and radar sites, as well as to protect ground and naval operations (see pp. 54–56).

PLA publications assert that the struggle for dominance of the battlefield will increasingly consist of an integrated struggle for air, space, information, and electromagnetic (and even computer network) superiority. Acquiring air superiority is considered a prerequisite in a variety of operations involving all services. By obtaining air superiority, one can restrict enemy air, air defense, and ground forces' operational movements while ensuring that one's own ground and navy forces have effective cover from the air to carry out their operations. Like the USAF, however, the PLA does not assert that achieving absolute air superiority in all stages of combat and across all battlefields or theaters is necessary. Instead, it aims to achieve enough air superiority to achieve its campaign or tactical objectives. Presumably because of reservations about its ability to defeat a qualitatively superior opponent, such as the United States, in the air, the PLA places primary emphasis on achieving air superiority by attacking the enemy on the ground and water: forces, equipment, bases, and launch pads used for

air raids. Especially at the beginning of a war, the PLA will endeavor to attack enemy air bases, ballistic missile bases, aircraft carriers, and warships equipped with land-attack cruise missiles before enemy aircraft can take off or other forms of enemy air strike can be carried out. Another means of achieving air superiority will be to carry out attacks to destroy and suppress ground-based air defense systems and air defense command systems. In addition, defensive operations will be an important component of air superiority throughout a campaign (see pp. 56–60).

In future warfare, space superiority is expected to be crucial for controlling the ground, naval, and air battlefields. To gain space superiority, offensive and defensive weapon systems will be deployed on the ground, air, sea, and space. Space control operations are said to include space information warfare, “space blockade warfare,” “space orbit attack warfare,” space-defense warfare, and space-to-land attacks (see pp. 60–61).

In struggles for information superiority, the goal is to control information on the battlefield, allowing the battlefield to be transparent to one’s own side but opaque to the enemy. Methods for achieving information superiority include achieving electromagnetic superiority through electronic interference; achieving network superiority through network attacks; using firepower to destroy the enemy’s information systems; and achieving “psychological control” (see pp. 61–62).

While acquiring electromagnetic superiority is described as a subset of acquiring information superiority, it is treated as a distinct operation in PLA publications. Methods for obtaining electromagnetic superiority are said to include electronic attack and electronic defense. In electronic attack, soft kill measures include electronic interference and electronic deception. Hard kill measures are said to include antiradiation destruction, electromagnetic weapon attack, firepower destruction, and attacks against the enemy’s electronic installations and systems. Electronic defense is simply defending against enemy electronic and firepower attacks. The primary targets of electronic warfare (EW) are said to include command, control, communications, and intelligence systems (see pp. 61–64).



PLAAF publications describe three major types of air combat operation: air-to-air combat, air-to-surface combat, and surface-to-air combat. Air-to-air operations are an area of traditional emphasis for the PLAAF, but the PLAAF seems to be moving away from emphasizing air-to-air operations and toward emphasizing operations to gain air superiority by attacking enemy airfields and controlling the enemy on the ground before resorting to fighting the enemy in the air. Air-to-surface operations are considered more effective, less costly, and less reactive than air-to-air operations (see pp. 65–78).

### **Campaign-Specific Employment Concepts**

Chinese military publications identify four types of air force campaigns: air offensive campaigns, air defense campaigns, air blockade campaigns, and airborne campaigns. These can be either air force-only campaigns or, more frequently, air force-led joint campaigns that incorporate other services. These air force campaigns can also be part of broader joint campaigns, such as an island-landing campaign or joint blockade campaign. In most air operations, a great deal of emphasis is placed on surprise, camouflage, use of tactics, meticulous planning, and strikes against critical targets (see p. 85).

An air offensive campaign can include one or more of several objectives: obtaining air superiority; destroying key enemy political, military, and economic targets; destroying the enemy's transportation and logistic supply system; and destroying the enemy's massed forces to isolate the battlefield and facilitate PLA ground and maritime operations. Obtaining air superiority is needed in order to conduct air strikes against targets, but the ultimate objective of an air offensive campaign is to strike political, economic, and military targets. Several types of combat groups are involved in air offensive campaigns: a strike group, a suppression group, a cover group, a support group, an air defense group, and an operational reserve. An offensive air campaign is said to consist of four tasks: conducting information operations, penetrating enemy defenses, conducting air strikes, and resisting enemy counterattacks. The last of these is conducted throughout the campaign. The

others are generally initiated sequentially, beginning with information operations (see pp. 89–113).

A textbook on military operations would list three primary missions for air defense campaigns: protecting the capital against air attack, protecting other important targets within the theater, and seizing and holding air superiority. Air defense campaigns, according to Chinese military writings, can be national in scope or can be confined to a particular theater. Depending on the circumstances, the entire air effort in a given war could be defensive; a single phase could be defensive; or, in the case of a geographically wide-ranging conflict, some theaters could be defensive, while some are offensive. In a war over Taiwan, for example, the PLA might conduct an offensive air campaign in the area opposite Taiwan while preparing for air defense campaigns to the north and south in anticipation of possible retaliation or counterattack by U.S. forces. Air defense campaigns are said to entail three types of operations: resistance, counterattack, and close protection. *Resistance operations* are actions to intercept, disrupt, and destroy attacking aircraft. *Counterattack operations* are attacks on enemy air bases (including aircraft carriers). *Close protection operations* are passive defense measures, such as fortification, concealment, camouflage, and mobility. China's overall approach to air defense is to combine the early interception of enemy attacks with full-depth, layered resistance to protect targets and forces while gradually increasing the tempo of counterattacks on enemy bases (see pp. 118–139).

*Air blockade campaigns* are operations to prevent an adversary from conducting air operations and to cut off its economic and military links with the outside world. Some Chinese sources describe them as simply a special variety of air offensive campaign, but most authoritative sources regard them as a distinct type of campaign. They will usually be conducted as part of a broader joint blockade campaign but can be implemented as an independent air force campaign. Air blockade campaigns are regarded as having a strong political nature, being long in duration, and requiring a high level of command and control. Typically, an air blockade campaign will entail the establishment of one or more no-fly zones surrounded by several aerial surveillance zones. Actions conducted as part of an air blockade campaign

will include information operations, flight prohibition operations, interdiction of maritime and ground traffic, strikes against the enemy's counterblockade system, and air defense operations (see pp. 145–161).

Unlike the U.S. armed forces, the PLA's paratroops belong to its air force; therefore, an airborne campaign in the PLA is an air force campaign, not a joint campaign. Airborne campaigns are regarded as resource-intensive and difficult. For an airborne campaign to be carried out, information and air superiority must be seized (at least locally) and firepower preparation around the landing zone must be carried out. Then, air corridors to the landing zone must be opened up and kept clear, and enemy land-based air defenses near the landing zone must be suppressed while airborne forces are flown to the landing zone. Once they have landed, the airborne forces must clear and secure a base for receiving additional forces and supplies, including, if they landed on or near an airfield, seizing the airfield and bringing it to operational readiness. Meanwhile, friendly air and missile forces will suppress and interdict nearby enemy ground forces. Finally, the air-landed forces can initiate ground operations (see pp. 165–177).

Although any of these four types of air force campaigns can be conducted as an independent single-service campaign, they are more likely to be conducted as part of a broader joint campaign, such as an island-landing campaign or a joint blockade campaign. Even if an air force campaign is conducted as an independent, single-service campaign, moreover, other services, particularly the PLAN and the Second Artillery, are likely to be involved in supporting roles. For example, conventional missiles of the Second Artillery will play a key role in air offensive campaigns, counterattack operations of air defense campaigns, and providing firepower support for airborne campaigns. Similarly, the PLAN has responsibility for defending certain sectors of China's airspace and would be the service responsible for conducting counterattacks against air attacks launched from aircraft carriers and, thus, would likely play an important role in an air defense campaign. The PLAN is also responsible for providing air defense for surface naval forces, including, presumably, a Taiwan-bound invasion force. Little information appears to be available in published Chinese sources, however, on how PLAAF and PLAN aviation and SAM forces

would interoperate when conducting air operations—a potentially significant challenge, particularly given the huge engagement envelopes (150 km or more) of the land-based and ship-based SAMs the PLAAF and PLAN have begun acquiring. Conversely, the PLAAF appears to have no naval strike mission or capability, meaning that naval strike operations are the sole responsibility of the relatively small and less-capable PLAN aviation forces (along with, possibly in the future, the Second Artillery, if it acquires an antiship ballistic missile capability) (see pp. 179–186).

## Implications and Recommendations

By 2015 or so, the weapon systems and platforms China is acquiring will potentially enable it to effectively implement the four types of air force campaigns described in the previous section. The significant numbers of modern fighter aircraft and SAMs, as well as the long-range early warning radars and secure data and voice communication links China is likely to have by 2015, for example, coupled with the hardening and camouflage measures China has already taken, would make a Chinese air defense campaign, if conducted according to the principles described in Chinese military publications, highly challenging for U.S. air forces. Similarly, those same modern fighters, along with ground-launched conventional ballistic and cruise missiles, cruise missile-carrying medium bombers, and aerial refueling aircraft, will enable China to conduct offensive operations far into the western Pacific. Whether China will actually be able to fully exploit its air force doctrine and capabilities, however, is less clear. Much will depend on the quality of the training and leadership of China's air force, and it should be pointed out that the PLAAF last engaged in major combat operations in the Jinmen campaign of 1958, more than 50 years ago (see pp. 187–223).

The concepts and capabilities described in this monograph have a number of implications for the United States. First, if the United States intervenes in a conflict between the People's Republic of China (PRC) and Taiwan, it should expect attacks on its forces and facilities in the

western Pacific, including those in Japan. Even in peacetime, therefore, the United States should take steps to prevent China from collecting information on military and sensitive civilian information systems or on U.S. early warning, command-and-control, SAM, and other sensors and communication systems. Similarly, U.S. forces should also ensure, to the maximum extent practical, that their information systems are protected from network intrusions or denial-of-service attacks while planning and training for the possibility that some of these systems will fail or be compromised in the event of an actual conflict. During such a conflict, the U.S. armed forces should prepare to deal with electronic jamming on a scale larger than it has seen in any conflict since the end of the Cold War. U.S. intelligence collectors should also expect extensive efforts to deceive them about the locations and posture of Chinese forces both prior to and during a conflict (see pp. 237–238).

Once the conflict begins, the United States should accept the likelihood that the runways of Okinawa's military airfields will be rendered at least temporarily unusable and that many or most unsheltered aircraft will be damaged or destroyed in the initial salvo of ballistic missiles, with sheltered aircraft, fuel storage and distribution facilities, and repair and maintenance facilities subject to follow-on attacks by cruise missiles and manned aircraft with precision-guided munitions (PGMs). One set of responses to this challenge would be to increase the number of missile defense systems on Okinawa; to build shelters capable of protecting all aircraft to be based on Okinawa; to harden runways, fuel, and repair facilities; to increase rapid runway repair capabilities; and to deploy mobile point-defense systems, such as the U.S. Army's Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM), to defend Okinawa's air bases. If even vague indications are received that China might be planning to use force somewhere in East Asia, the United States should begin parking aircraft in shelters when not in use, begin keeping early warning and interceptor aircraft continuously airborne, and regularly relocate its SAM batteries to unpredictable sites (see pp. 238–239).

An alternative approach would be to keep relatively few combat aircraft on Okinawa in the event of a crisis over Taiwan and instead deploy the bulk of U.S. land-based air forces to several more-distant

bases in Japan and elsewhere in the western Pacific. Even more-distant bases should not be regarded as sanctuaries, however, so the United States should nonetheless deploy active missile defenses, construct aircraft shelters, harden runways and facilities, and increase rapid runway repair capabilities at these bases. In either case, the USAF will need to continue to invest in fighter aircraft technology and pilot skill to ensure that it maintains its advantage in the face of rapid Chinese improvements in these areas (see pp. 239–240).

An alternative, or supplement, to fighter operations would be larger aircraft capable of carrying large numbers (e.g., 20 or more) of extremely long-range (e.g., 200 nm) air-to-air missiles. A supersonic bomber, such as the B-1, would be one possibility for providing this capability, as would be a stealthy aircraft like those that were considered for the USAF's now-canceled Next-Generation Bomber program. The missiles themselves could potentially be derivatives of existing airframes, such as those of the Patriot MIM-104 or SM-2ER RIM-67, perhaps coupled with a smaller second stage for the terminal engagement (see pp. 240–241).

In addition to improving its capabilities to defend Taiwan's airspace, the USAF should also examine ways to improve its capabilities to conduct offensive operations against China, as it may be that the most effective way to defeat China's air force in a conflict over Taiwan would be to attack China's aircraft while they were on the ground. The USAF's stealthy B-2 bomber can potentially be used to conduct such attacks, and, if a new-generation bomber becomes available, it will be able to provide this capability as well. An alternative to bombers penetrating into China's territory would be a long-range, stealthy cruise missile that could be launched at standoff ranges from bombers that the USAF possesses in larger numbers than the B-2. The stealthy Joint Air-to-Surface Standoff Missile–Extended Range (JASSM-ER) launched from B-1s or B-52s might be able to play this role for targets up to 300 nm inland. To reach targets further inland, a longer-range stealthy cruise missile would be needed, such as, if feasible, an Advanced Cruise Missile converted to carry a conventional warhead (see pp. 241–243).

In a conflict over Taiwan, the capabilities of Taiwan's armed forces would also be critical to the outcome, even if the United States intervened on a large scale. The longer Taiwan is able to deny the PRC air superiority over Taiwan, the more combat power the United States will be able to bring to the defense of Taiwan and the better the chances of a successful defense of the island. Defending Taiwan against air attack is feasible if Taiwan makes systematic, sustained, and carefully chosen investments.

Like the United States, therefore, Taiwan should take steps to prevent China from collecting information on military and sensitive civilian information systems or on Taiwan's early warning, command-and-control, SAM, and other sensors and communication systems. Moreover, in the event that a Chinese attack was planned, Taiwan's intelligence collectors should expect extensive efforts to deceive them about the locations and posture of Chinese forces. Taiwan's forces should also ensure, to the maximum extent practical, that their information systems are protected from network intrusions or denial-of-service attacks, and plan and train for the possibility that some of these systems would fail or be compromised in a conflict with the PRC. Once a Chinese offensive air campaign is under way, Taiwan should be prepared to deal with massive electronic jamming (see pp. 243–244).

It is not feasible for Taiwan to acquire enough missile defense systems to protect it against the simultaneous arrival of the number of ballistic missile warheads China is likely to fire at Taiwan in a conflict, though additional missile defenses, such as the six PAC-3 batteries Taiwan plans to acquire, will have some utility by increasing the number of ballistic missiles China would have to launch to be certain of putting out of action the runways at all of Taiwan's military airfields. For Taiwan's PAC-3 and PAC-2 systems to be effective, however, they must be relocated on a regular basis to unpredictable locations (see p. 244).

At least as important as to the defense of Taiwan, and possibly more cost-effective than active missile defenses, are passive defense measures, such as building shelters to protect Taiwan's combat aircraft from ballistic missile attack; hardening runways, fuel, and repair facilities; and increasing rapid runway repair capabilities at Taiwan's air

bases. Ideally, the number of shelters would be several times the number of Taiwan's combat aircraft, with each aircraft randomly assigned to one of several different shelters every time it returned to base. Mobile point-defense systems, such as SLAMRAAM, could help defend Taiwan's air bases and other key targets. Finally, even if hostilities have not actually occurred, if there are indications that China might use force against Taiwan, as many aircraft as possible should be maintained aloft (see pp. 244–245).

Taiwan's defenders should expect the PRC's cruise missiles and aircraft to approach Taiwan not on a direct line from their launch points but from all directions, including the north, south, and east, and to make use of low altitude and terrain masking to disguise their approach. The attacking aircraft and missiles should be expected to focus their attacks first on Taiwan's own air and missile capabilities. An airborne landing, if attempted, would most likely occur in a lightly defended location in an area where the PRC could ensure continuous air superiority between the point of embarkation and the landing zone (see p. 245).

From what we find in Chinese military publications, Taiwan should also expect attacks on government, water, and electric installations and, if a prolonged campaign is expected, on key economic targets. Mitigating actions should be taken, such as ensuring that backup installations exist and evacuating government facilities, if there are indications that China might use force against Taiwan (see p. 245).