

PLAN Project 9935 [Aircraft Carrier]

Version 1.1 (7 February 2004)

Section 1: General Characteristics:

Full Load Displacement: 48,000 tons (stated)
Standard Displacement: 44,700 tons (estimated from Orel data)
Light Displacement: 35,000 tons (estimated from Orel data)
Maximum Displacement: 52,750 tons (estimated from Orel data)
Overall Dimensions: 288x71x9 meters (calculated from Gorshkov data)
Waterline Dimensions: 254x33x9 meters (calculated from Gorshkov data)
Flight Deck Dimensions: 288x67.5 meters (calculated from Gorshkov data)
Angled Flight Deck Dimensions: 220 meters long (standard length)
Hangar Dimensions: 144x68 meters = about 9,800 sq. meters (estimated from Orel data)
Draft: 9 meters nominal, 10 meters maximum (same for all classes in design series)
Full Speed: 28 knots (stated; confirmed by calculation from Gorshkov data)
Machinery: Type: Geared Steam Turbines driving 4 shafts (same for all classes in series)
Machinery: Turbines: 4xRussian TU-12 55,000 hp maximum (49,750 hp sustained)
Machinery: Boilers: 8xRussian KVG-4 turbopressurized (640 kg/cm sq., 500 deg. C)
Machinery: Total SHP: 220,000 hp maximum (199,000 hp sustained)
Ski Jump: 15 degrees, 2 runs of 105 meters and 1 run of 170 meters (estimated from Orel data and from model of class)
Arrester gear: 3 wire, 14 meter spacing
Catapult: 1 (on angled deck) about 85 meters long of about 30 tons capacity (estimated from model of class and maximum weight of Su-27 aircraft family)
Hangar Capacity: 30 Su-27 class aircraft (stated to be "30-40" but calculated lower from hangar deck dimension estimate and aircraft data) Note 1
Air Group: 30-40 (stated) See Section III [No evidence of dedicated air groups forming]
Anti-Shipping SSM: 8xUnknown. (stated) Probably YJ-12. Possibly C-803 in lead unit.
Point Defense SAM: 8xLY-60N (Aspede) mountings, 24 missiles each (2 per quarter)
Point Defense Guns: 12xType 69 Twin Gatling Guns (3 per quarter, 5 km range)
Early Warning Radar: Russian Top Pair 3D MR-800 Voskhod
Air Search Radar: Russian Top Plate 3D (dual radar antenna, back to back) D/E band
Surface Search/Air Search Radar: Type 363 E/F band
Surface Search Radar: Type 364 (ESR 1) I band; Navigation: 2xDecca 1290 I band
Aircraft Control Radar: 2xFly Trap B G/H band; Tacan: Cake Stand
Target Acquisition Radar: 2xRussian MR 700 Frecat
Fire Control Radar (Missile): 4xChinese LL-1
Fire Control Radar (Gun): 4xChinese GDG-775 (radar/tv/laser/ir) directors
Passive ECM/ESM: Type 826 plus 2 PJ-46 decoy launchers and 8 Chaff launchers
Laser Warning: 6xHalf Cup
Active ECM: Type 984 I band jammer; Type 985 E/F band jammer
SATCOM: Thomson CSF Tavitac
Sonar: DUBV-23 (hull mounted search and attack, medium frequency) (PLAN standard)

Note 1: The hangar has four tracks for moving aircraft (same for all classes in series)

Section 2: General Description:

Project 9935 is probably based on a Russian Nevskoye Design Bureau design contracted for in 1994. An article published in China says that the final design was made by Hudong Shipyard, Shanghai in 1999. The ship is a modified Russian Admiral Ghorshkov carrier “to Chinese specifications.” The ship is scaled up only about 6%. Significant changes are the mounting of all PRC point defenses and associated fire control systems, the mounting of a steam catapult on the angled flight deck, and modification/updating of the electronic suite. The Chinese article says that formal authorization to build a carrier was made in 1992. This apparently refers to legislation passed in that year which authorized “two aircraft carriers.” Three covered graving docks were constructed at Shanghai and eyewitness reports indicate all three now have carriers building in them. Another source says the lead ship launched in 2002 and was expected to complete about 2004. The Chinese article says the lead ship should “commission” in 2006 and that a “battle group” should form “by 2010.” These appear to be very conservative dates. Evidence strongly suggests that these ships are intended to be a technical surprise in several senses, including initial operating dates. The 2006 date is more realistic for the first carrier group. All three ships could be operational with battle groups by 2008-2010. The Chinese article says that maintenance facilities have been built at Shanghai, Dailan and Zhejiang. From this, and PLAN organization, it appears each fleet will be allocated a single carrier.

The operational concept of these aircraft carriers differs from that of other nations. Aircraft carriers are not seen as the “core” of the fleet. Rather submarines are. Instead, carriers have a primary fleet defense mission: to provide air and anti-submarine defense for surface forces, especially amphibious flotillas and logistic convoys. There is a significant secondary offensive strike mission, indicated by the mounting of SSMs and also inherent in the ability of fighter-bombers to carry offensive weapons. However, it appears that the carriers are not intended for distant power projection operations in the sense US CVNs are. Designed to operate near PLAN bases, they are to be offshore aviation platforms for a mainly land based naval air force. [See Section 3 below]. This may mean the aviation staying power of these ships is much greater than would normally be expected if they operated dedicated air groups. Further, in the absence of the need to buy aircraft and train crews for them, the unit cost of the carriers is lower than otherwise would be the case, while the cost of lost maintenance assets is also less, should a carrier be sunk. This is an imaginative, but very reasonable, application of naval air power to the essentially regional requirements of the PLAN.

Section 3: Air Group Concept:

There is no evidence that dedicated air groups are forming for the PLAN carriers. Nevertheless, the capacity to be building three ships simultaneously was created by construction of three covered graving docks at Shanghai. At the same time, all PLAN fixed wing fighter and attack pilots have been required to “carrier qualify” on a mock up of the flight deck of HMAS Melbourne. Given this mock up is at a PLAAF base, it may be that PLAAF pilots also have been practicing deck landings. The investment in the carrier project also involved building maintenance facilities, purchase of foreign aircraft carriers for study and the purchase of foreign aircraft carrier designs from Spain and Russia. These investments, combined with the reported laying down of actual hulls, combine with the lack of newly-formed air groups for the ships to imply that existing air units will be assigned to them.

In this context, the description of an “air group” for the new carriers is an entirely operational concept. Actual aircraft compliment will be determined by mission requirements and availability. But since “availability” is in the context of the fleet, as reinforced by other fleets and even by the air force or army aviation corps, it should result in a much greater likelihood even a large mission requirement can be met. Further, the ability to operate on a sustained basis should be much greater than would be possible for any air group dedicated to the ship.

It is probably useful to understand the direction in which Chinese air force organizations are moving. Aircraft are organized by types, with fixed wing combat aircraft mainly assigned to air divisions, while rotary wing and specialized fixed wing machines are assigned to independent squadrons. For fighter/attack types, air divisions are typically subdivided into two (formerly three) air regiments, which is the operational unit. Each regiment has two (formerly three or four) “flying units” with a nominal compliment of 10 aircraft, and a “maintenance unit” which actually “owns” all the aircraft of the regiment. In practice, a flying unit will operate 2, 4 or 8 aircraft, as required by a mission. Because the flying unit has 30-50% more pilots more than its nominal size requires, it is even theoretically possible a 12 aircraft mission could be flown. Air force regiments also include a “training unit” which operates dissimilar as well as similar machines, including turbo-prop trainers on which unlimited flying is permitted. The PLAN appears to have concentrated training assets in a single air division, and it is not clear if there is also a training unit in each regiment. But in both cases, navy and air force fighter/strike air divisions with newer combat aircraft operate two air regiments each of which has two flying units (squadrons). A normal full scale regimental strike would involve up to 16 aircraft. This is the practical limit in the PLAN, because often the regiment only has 18 machines. But PLAAF regiments have 24 machines, so strikes of 20 or 24 aircraft are theoretically possible, especially on initial missions in any conflict. Helicopters tend to operate singly or in small detachments, as required.

[Section 3: Air Group Concept, Continued]

Project 9935 ships appear designed to facilitate operations by two flying units simultaneously, with up to six helicopters (fueled and armed) in deck park in addition. [The helicopter deck park is forward of the island structure. Helicopters in this location are stowed with rotors folded aft.] The ships have the ability to have two fighters in position for take off runs up the angled deck plus four aircraft parked beside the long island structure (photographic evaluation of Adm. Kuznetsov operations during evaluation operations with Chinese and Indian observers). There is sufficient deck for up to four additional machines aft of the island. At the same time, a different flying unit would have access to the angled flight deck, and its catapult. If operated in this mode, both elevators are unavailable for use, being used as additional deck park space. More normally, one flying unit, plus some helicopters, might be operating. Apparently it is normal to use only the aft elevator, as trucks or helicopters normally are parked on the forward one. Even so, it is apparent a single Project 9935 ship could have elements of two regiments embarked, one on the flight deck, one on the hanger deck. As described above, a regimental strike would normally involve up to 16 aircraft.

A more typical operational aircraft compliment would probably involve a single regiment of fighter/attack aircraft. This would typically be 8 or 16 aircraft, depending on the mission requirement. One also would expect a compliment of 4-8 ASW helicopters, a detachment of 2 SAR helicopters and a detachment of 2 AEW helicopters. If the newest aircraft available to the Navy were assigned, one would expect the jets to be a carrier variant of the Su-30 (two batches of 20 ordered in 2003 for the PLAN) plus variants of the Ka-28 Helix. If older aircraft are operated, one might encounter J-6 (MiG-19), J-7 (MiG-21) or J-8 fighters (two engine mod of MiG-21), JH-7 (Chinese design) or Q-5 (mod MiG-19) attack aircraft, and Z-8 (Super Frelon) or Z-9 (Dauphin) helicopters. If Army Aviation Corps helicopters were embarked, the most likely would include Mi-181 transports and the attack variant of the Z-9.

Section 4: Strike Operations:

PLAN literature concludes that it takes 8 to 10 cruise missile hits to disable a US CVN. At the same time, they require an average of 4 cruise missile hits on half the escorts of the enemy battle group. To achieve this, they estimate 70 to 100 cruise missiles should be launched on three or more threat axis. If a carrier were to participate in such an attack, it and its escorts would launch 24-40 cruise missiles as one component while an air regiment would deliver about 32 cruise missiles on another axis. The remainder would have to come from surface action groups and submarines. It is very difficult to coordinate launching such multiple attacks simultaneously. The critical issue is detecting and tracking the enemy target task force. If this can be achieved, probably by satellite or MR aircraft, and if all elements of the attacking force could reach firing position before being engaged, this (Russian) attack concept is potentially effective.

Section 5: Possible Carrier Battle Group:

With one carrier nearing commissioning and a second unit launched, it is noteworthy the PLAN operates 2 Sovremenny class DDGs and will obtain 2 more by 2005. This might imply an intention to form up 2 DDGs with area defense SAMs with each carrier battle group. However, note that, in spite of its SA-N-7 area defense SAM system, the Sovremenny is primarily a surface attack vessel. It is more likely the ships of this class will serve as flagships for surface attack groups which can also provide limited area defense SAM defenses for other naval surface units (e.g., amphibious ships and logistics task units). They should be expected to attempt to lead a group of surface attack ships in any coordinated attack on a major enemy task force. The Sovremenny SSM is particularly formidable, and launched in a coordinated way with other SSMs (so that the missiles reach the prospective target about the same time), it might be particularly difficult to defeat them all.

The PLAN is also building AAW ships of its own. The newest, 168 class DDGs, appear to also use the SA-N-7, from the same type of launcher as the Sovremenny (implying this, and not VLS, is the new PLAN standard). As three of these ships are building, and all are likely to complete in time, it is likely that eventually one will be assigned as the primary AAW escort to each carrier battle group. They will apparently use the Chinese C-803 SSM, and will have the ability to combine these missiles with those from the carrier in a surface strike evolution. They probably will have a data link capability, so they could effectively form an integrated tactical team with a new carrier.

In addition, the PLAN has 3 older AAW ships, 2 Luhui and 1 Luhai class. They were built with the HQ-7 SAM (a Chinese variant of Crotale) and have a significant capability to operate 2 ASW helicopters. They carry the C-802 SSM (some reports indicate it may have been upgraded to C-803 standard). It is possible one of these ships might also be assigned to a carrier battle group. Older DDGs of the Luda class, also equipped with the HQ-7, might be assigned, but they lack significant ASW capability and they do not carry current generation SSMs which would be tactically effective if combined with those on the carrier and her primary AAW escorts.

China operates six Jiangwei II type missile frigates (although possibly 2 will transfer to Pakistan, if it can ever pay for them). If the PLAN intended to have six units, this may imply 2 would be available for assignment to each carrier battle group. Also armed with the HQ-7 SAM, these ships have a significant (2 helicopter) ASW capability. At the same time, they are armed with the C-802 SSM, and may be upgrading to the C-803. If this appreciation is correct, three carrier battle groups could form by 2008 using ships existing or building. Each would have one CV, one 168 type DDG, one Luhui or Luhai class DDG, and two Jiangwei II class DEG.

[Section 5: Possible Carrier Battle Group (Continued)]

A Chinese language article says as many as 8 surface ships might be assigned to a carrier battle group. This is possible if fewer carrier battle groups are deployed, if the Russian DDGs are assigned to carrier battle groups, or if older ships are also assigned to them. The same article indicates as many as 4 submarines might be assigned to the battle group. This is possible, but coordination between surface ships and submarines is difficult. Nevertheless, Chinese military literature mentions tactics such as “decoy and ambush” involving submarines. [In this case, an older Romeo class submarine maneuvers in a way likely to be detected – for example running diesel engines underwater as is normal when charging batteries – to attract an attack by a US SSN or Taiwanese attack submarine. A quiet Kilo, in ambush nearby, might be able to solve her fire control problem from the noise generated by the attack on the Romeo.] In a similar way, a carrier battle group might serve as “bait” for a suspected US SSN, drawing her into an attack position at risk from a prepositioned line of Kilos, unmoving and therefore almost undetectable. Such a tactic would not involve communications, if it were pre-planned