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CHINA'S NEW AWACS – KJ 500

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China's new AWACS KJ-500. Source: http://www.wantchinatimes.com/news-subclass-cnt.aspx?cid=1101&MainCatID=11&id=20131110000006

Recently a Chinese military website released photos of China's new AWACS, the KJ-500[1]. The KJ-500 seems to be the next generation early warning aircraft for People's Liberation Army Air Force (PLAAF) and will replace the KJ-200 Balance Beam early warning aircraft which was based on the Y-8 platform.

KJ-500 is based on China's new transport aircraft, Y-9, manufactured by Shaanxi Aircraft Company. The Y-9 is an improved version of the Y-8 which was developed from the Soviet era AN-12 transport aircraft. It is a four engine turboprop powered by improved Chinese WJ-6C turboprop engines. It has more advanced avionics with a "glass cockpit". The aeroplane is similar to the American C-130J Hercules.

The Chinese have claimed that the KJ-500 has a phased array antenna with AESA technology similar to the KJ-2000 AWACS on IL-76 airframe. There is no rotating antenna in the KJ-500. The scanning in azimuth and elevation is done electronically. Three flat antennas are mounted in the radome on top of the fuselage in a triangle. Each antenna scans 120 degrees, thus covering full 360 degrees in azimuth. The limitation of 120°coverage for each flat antenna is because the highest value, which can be achieved for the Field of View (FOV) of a planar phased array antenna, is 120°. Thus, by placing three antennas side by side full 360 degrees coverage is obtained. Elevation scanning is also done, electronically, by the array source. Since the Y-9 is a turboprop aircraft its cruising altitude is lower than the jet engine KJ-2000. Consequently the KJ-500 detection range will be less than the KJ-2000. The KJ-500 looks similar to the ZDK-03 Karakoram Eagle AWACS which China exported to Pakistan Air Force in 2011. However, the radar in the KJ-500 is more advanced[2]. The Chinese have not revealed many details about the KJ-500 but if we consider the normal cruising altitude of a turboprop aircraft to be 20,000 feet then it is likely to have a maximum detection range of around 300 km. The induction of KJ-500 will further improve China's early warning capability.

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PLAAF at present has about eight AWACS aircraft out of which four are the bigger KJ-2000 and four are the smaller KJ-200 Balance Beam[3]. India on the other hand has three Israeli Phalcon AWACS on Russian IL-76 airframe and a follow on order for two more Phalcons has been placed with IAI (Israel Aircraft Industries). India's Defence Research and Development Organisation (DRDO) have also started development of its own full fledged AWACS. This programme was started in 2013 and if all goes well is expected to be completed by 2020[4]. In March 2014 DRDO issued a Global tender for supply of six suitable aircraft as platforms for the indigenous AWACS. The requirement given was for "Designing, Structurally Modifying, Certifying and Supplying of Aircraft Platform for AWACS Role"[5]. The IAF also has plans for three smaller AEW&C aircraft on the Brazilian Embraer business jet platform, EMB-145. The radar for the EMB-145 has been indigenously developed by DRDO. The first radar has been developed and the other two are in the final stages of development. DRDO has in principle approval to develop five more systems for the EMB-145 platform[6]. The radar is similar to Sweden's Erieye AEW& C aircraft with a balance beam two sided planar array mounted on top of the airframe. While details of the DRDO radar have not been revealed it is apparent that two sided planar radar will not cover more than 240 degrees in azimuth.

In the India-China context both PLAAF and IAF will face AWACS performance limitations in the mountains, since undulations in the terrain will create detection problems for aircraft masked behind hills. The laws of physics are universally applicable and requirement of line of sight condition has to be met for radar pick up. However, there is a lesson for India in the way the Chinese have developed their indigenous capabilities in this field. Although the Chinese initially started developing their KJ-2000 AWACS on a Russian IL-76 platform, their long term aim was to develop AWACS on their own indigenous platforms. The smaller AEW&C aircraft like the KJ-200, ZDK-03 and the KJ-500 were mounted on their own aircraft, Y-8 and Y-9. With the development of their heavier Y-20 transport aircraft it is likely that the bigger AWACS, in future, will be mounted on this platform, thus making them fully self reliant. The Y-20 was test flown last year but its planned commissioning date has not yet been announced. This aircraft is in the 60 tonne payload class which is more than the 40 tonne payload Russian IL-76. India needs to expedite its plans to develop indigenous transport aircraft so that we are fully self reliant and use these platforms for various military and civilian duties.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies CAPS)

End Notes

[1] "China's new early-warning aircraft shown on PLA website" , http://www.wantchinatimes.com/news-subclass-cnt.aspx?cid=1101&MainCatID=11&id=20131110000006, accessed on May10, 2014.

[2] "New Powerful AEW&C KJ-500 and Electronic Warfare Aircraft GX-10" http://errymath.wordpress.com/2014/01/05/new-powerful-aewc-kj-500-and-electronic-warfare-aircraft-gx-10/ , accessed on May10, 2014.

[3] Military Balance 2014.

[4] "India To Augment Awacs Fleet", March 31, 2014, http://aviationweek.com/military-government/india-augment-awacs-fleet , accessed on May20, 2014**.**

[5] Centre for Airborne Systems, DRDO, Bangalore , Global Tender Notice , https://www.hcilondon.in/pdf/Tender_Notice_AWACS_14FET014.pdf , accessed on May16, 2014.

[6] Ibid. N. 4.