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# J-10 MULTIROLE FIGHTER: SYMBOL OF CHINA'S IMPROVING INDIGENOUS FIGHTER AIRCRAFT DEVELOPMENT CAPABILITY

***Arjun Subramanian P***

***Associate Fellow , CAPS***

Recent online photograph of the J-10B version is claimed to be the mass production model of the jet.[i] The J-10 B is an improvement over the J-10A version and the multirole fighter is the first successfully produced indigenous fighter in China, except for the engine. PLAAF is in need of large number of such class of fighters to replace its other aging aircraft like the J-6, J-7 and J-8s. It is expected that China will go for mass production of this aircraft.[ii] The WS-10 (which is still under development) is said to be the indigenous power plant for the aircraft.

The J-10 fighter will be replacing the age old J-7 and Q5 fleet of the PLAAF. It is a multi-role fighter capable of performing air-to-air as well as air to ground strikes missions. The design goal of this aircraft was to develop a low cost but advanced fighter that could be mass produced to meet the low-to medium end requirement of the PLAAF. The aircraft, Chinese sources claim, is of the class of the Lockheed Martin F-16.

The aircraft is said to be designed based on the Israeli Lavi jet, which itself is based on the US F-16 aircraft. A number of aerodynamic design similarities can be seen between the F-16, Lavi and J-10. However, there are some dissimilarities between the F-16 and the other two aircraft. Unlike the F-16, the Lavi and the J-10 are tailless delta wing designs. Also, the F-16 does not have a horizontal canard in the forward section of the aircraft fuselage. The horizontal canard enhances the J-10's manoeuvrability and improves the low speed handling of the aircraft.

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The J-10 appears to be a blend of a few western delta wing aircraft designs. The aircraft is further being improved and customised for better performance and utility. The J-10 development process has given China's aviation industry mastery in several aircraft design aspects and it is emerging as a globally competitive industry. The new upgraded design, the J-10B, has several improved features from airframe modification for better performance, to reduction in RCS and incorporation of new sensors.

The J-10B comes with a Diverterless Supersonic Inlet (DSI)[iii], which is a slight angled bulge in front of the engine air intake section. This is incorporated to reduce the aircraft's Radar Cross Section (RCS). The engine, particularly the turbine blades, is a major reflector of radar waves. The DSI deflects and traps the incoming enemy radar emissions thus preventing the waves from reaching the radar receiver. Compared to the J-10A variant the J-10B appears to have reduced RCS.

Other design improvements are the nose cone, i.e. the radome geometry has been made a little flat and long with a tilt downwards. This pulls the nose section angle away from 90 degree reducing the radar reflectivity. It is also speculated that the radome houses an AESA radar.[iv] This arrangement could possibly give the pilot better view of the ground during low level visual ground attack missions and while landing. The tilted nose design and its alignment appear similar to the Su-27 and Su-30 nose section.

Another addition in the nose section is the incorporation of an Infra Red Search and Track (IRST) sensor. This sensor would enhance the aircraft's close air combat capabilities in terms of detection, tracking and engagement of enemy aircraft in the IR region of the spectrum. The other sensor is an Electronic Warfare equipment mounted atop the tail fin.[v] There are further improvements in its Max takeoff weight, which is now 19 tonnes, and higher payload carriage capacity, which is between 6 to 8 tonnes.[vi] Among all this, one of the most significant improvements is the increase in the combat radius (increased to 1000 km[vii]) which was one big disadvantage of the aircraft. According to a Chinese military expert, the J-10 B is 30% better than the J-10A.[viii]

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The indigenous power plant WS-10 is not yet ready, though there are some J-10s that are using the indigenous engine. Otherwise, most of the fleet is powered by the Russian AL-31 series engines. The J-10B is reportedly using the AL-31FN thrust vector Control (TVC) engine.[ix] TVC capability improves manoeuvrability and helps in short take off during critical times.

The aircraft is at par with other aircraft of its class. China will go for mass production of this aircraft both for the PLAAF and for export to other countries. Compared to other foreign aircraft of its class, the J-10 is a lot cheaper and has got tremendous advantage in the international medium weight fighter jet market. The only problem is the engine, which is not indigenous; hence any export of the aircraft along with the Russian engine would require clearance and cooperation from Russia. The J-10B is expected to be inducted into the PLAAF in the near future.

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[i] "The latest mass-produced F--10B off flight: segment number 140+ first appearance", 23 April 2015, Available at: http://military.china.com/important/11132797/20150423/19574948.html, accessed on 10 July 2015.

[ii] "New photos of Chinese mass production type J-10B fighter flight testing: Equipped with air refuelling pipe", Gansu Daily, 27 Jan 2015, accessed on 10 July 2015.

[iii] "The latest mass-produced F--10B off flight: segment number 140+ first appearance", 23 April 2015, Available at: http://military.china.com/important/11132797/20150423/19574948.html, accessed on 10 July 2015.

[iv] "J-10B Two-Seater Fighter Aircraft Compares Well to J-16 and J-11A", News.Ifeng, 20 January 2015.

[v] "Zang Zhao Zhong: J-10B Combat Power Increases by 3%, Leading India's Su-30 and Japan's F-15 in Terms of Fighter Planes", mil.m4.cn, 17 January 2015, accessed on 11 July 2015.

[vi] Ibid

[vii] J-10b Two-Seater Fighter Aircraft Compares Well To J-16 And J-11a , News.Ifeng.Com; January 20, 2015


[viii] No. V

[ix] "J-10 (Jian-10), Vigorous Dragon Multirole Tactical Fighter, China", http://www.airforce-technology.com/projects/j-10/j-107.html , Accessed on 11 July 2015.