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STEALTH FIGHTER: CHALLENGES FOR INDIAN AIR FORCE

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Introduction



Picture 1: J-31 at the Zhuhai Air show in November 2014. Note, the aircraft has no Chinese markings. The first two digits of the aircraft number are for J-31 and 001 signifies aircraft number 1.

Source: http://en.wikipedia.org/wiki/Shenyang_J-31

In November 2014 China showcased its new stealth fighter, J-31, at the Zhuhai air show in Guangdong province (Refer Picture 1). The twin engine fifth generation stealth fighter carried out an aerial display at the show. This was the first public flying demonstration of the J-31 but it was not shown in the static display where only a mock up was displayed. While the Chinese may have been trying to amaze the world with their



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technological prowess, the flying show of the J-31 **failed** to impress due to the under powered smoke trailing engines. It is not clear which engine was fitted in the J-31 but it could be either the indigenous WS-13 or the Russian RD-93. Apparently, the Chinese wanted to show the J-31 keeping an eye on the export market. According to press reports, Pakistan Air Force (PAF) has shown interest in acquiring 30 to 40 J-31s¹. This article briefly discusses China's and India's stealth projects and requirement for IAF to counter the PLAAF and PAF stealth challenge.

China's Stealth Fighter Projects

China has two stealth projects in the pipeline – the first one is the **J-20** being developed by Chengdu Aircraft Corporation and the second one is the **J-31** being developed by Shenyang Aircraft Corporation. The J-20 was first flown in January 2011 and is likely to enter service in 2018². The J-31 was first test flown in October 2012, but there have been no announcements on its planned dates for entry into service.

The J-20 is a single seat, twin engine fifth generation fighter, bigger than the J-31. It is also bigger and heavier than the American F-22 Raptor and the Russian PAK FA T-50³. Not many details are available about the J-20 and J-31 performance, therefore, how advanced are they compared to Western and Russian stealth fighters will have to be seen in the coming years. One of the major **problems** both these projects face is of finding a suitable **aero engine**. China's aviation industry has not been able to develop high performance fighter jet engines for their advanced fighters. China's fourth generation fighters, J-10 and J-11B have also been fitted with Russian engines because the indigenous WS-10A Taihang engine faced some development problems. China is trying to procure Russia's most advanced aero engine, Saturn 117S for the J-20 and J-31 but the Russians are, evidently, hesitant to offer the 117S knowing the Chinese propensity to reverse engineer and copy them. The Saturn 117S has super cruise capability and is installed in the SU-35 and



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PAKFA/FGFA. It has been reported that the Chinese are investing \$1.53 billion on aero engine R&D to cover this key capability gap⁴.

At present there are no indications that PLAAF has placed orders for the J-31. It seems that the J-20 is likely to become a future front line fighter in PLAAF inventory⁵. The J-31 being a smaller aircraft than the J-20 is likely to be deployed for **carrier** operations with the PLA Navy. The J-20 seems more likely to be used for the air dominance role with air to ground strike being a secondary role. If PLAAF decides to buy the J-31, it may be the “low end” in a “**high – low**” mix, as Roger Cliff has said, with the J-20 being the more capable high end force⁶.

India's Stealth Fighter Projects



Picture 2: Russian T-50 PAK FA Fifth Generation Fighter from Sukhoi design bureau. Photo source: "Sukhoi T-50 Beltyukov" by Alex Beltyukov - <http://www.airliners.net/photo/Russia---Air/Sukhoi-T-50/2002344/L/>. Licensed under CC BY-SA 3.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Sukhoi_T-50_Beltyukov.jpg#mediaviewer/File:Sukhoi_T-50_Beltyukov.jpg

India's fifth generation stealth aircraft project is called **Advanced Medium Combat Aircraft (AMCA)**. Preliminary work on the design of this futuristic fighter is almost over⁷. The project is likely to be started in 2015 after completing the project definition, feasibility



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study and getting cabinet approval. The project will require about Rupees 4000-5000 crores (\$633-791 million) for initial design and development. HAL had displayed a scale model of the AMCA at the Aero India show in Bengaluru in 2013. AMCA will be a twin engine multi-role single seat fighter with internal weapons bay and indigenous stealth technologies like radar absorbent paint and composites which are under development⁸. While the IAF may be skeptic about HAL claims to develop the AMCA, due to protracted delays in the Tejas LCA (Light Combat Aircraft) project, this should not deter the planners from going ahead with this project. India cannot continue buying aircraft from abroad and we have to move ahead after Tejas to maintain our design capability and other technologies developed for the Tejas. The AMCA project assumes even more **significance** in view of the joint Russian-Indian **T-50 PAKFA/ FGFA** (Refer Picture 2. T-50 PAKFA is the Russian designation for this project. IAF calls it Fifth Generation Fighter Aircraft) program for a stealth fighter running into rough weather. This aircraft was originally planned for induction in 2022, but the Russians have now revised the dates for induction of 127 aircraft in IAF to 2024/2025⁹. Such a delay is not acceptable to India and the final R&D contract with the Russians has not yet been signed¹⁰. India has already paid \$295 million (Rs 1785.19 crores) to the Russians for initial design work on the FGFA. The FGFA project was planned as 50:50 joint venture with the Russians - like the Brahmos cruise missile project - but the Indian work share was a mere 13 percent which is another sore point for India¹¹.

The first prototype of the AMCA is planned for test flying in 2023-2024. To keep costs and delivery time frames in check the feasibility of foreign cooperation should be considered. It has been reported that foreign aircraft manufacturers like Saab of Sweden, Dassault of France and EADS (European Aeronautic Defence and Space Company), have expressed interest in being consultants for the project but no selection has been done as yet¹². India will have to find a suitable aero engine for the AMCA since this is another area in which India has not made adequate headway. The indigenous Kaveri aero engine project



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is still under development and unless it is produced to meet AMCA standards, India will have to look for alternatives from abroad.

Challenges for IAF

China's stealth projects are ahead of India's plans to procure stealth aircraft. The planned induction of J-20 in PLAAF by 2018 will give PLAAF a technological asymmetry against IAF and if PAF also receives the J-31 by 2018/2019, India will be faced with two adversary nations, on its borders, with stealth fighters giving them an advantage over the IAF. The earliest that India can hope to get FGFA in their frontline is 2024/2025. If negotiations with the Russians to expedite deliveries of the FGFA are not fruitful then India may have to look for alternatives from USA /Europe. The AMCA will take some more years after the planned prototype trials in 2023/2024. India needs to step up on AMCA development and take the services of foreign consultants and move this project on fast track.

The IAF also needs to look at counter stealth technology. These are relatively low cost passive detection systems and VHF/UHF band radars like the P-18/P-19 radars from Russia. China is known to have procured four Kolchuga-M passive detection systems from Ukraine along with their S-300PMU2 missiles. The system provides the capability for S-300PMU2 to do silent engagement. The Russians have also developed VHF band AESA radar, 1L119 Nebo SVU, which they claim has excellent pick up on stealth aircraft. IAF needs to have counter stealth systems **integrated** with its SAM systems to face the challenge from PLAAF and PAF.

(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])



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End Notes

¹ Farhan Bokhari, Islamabad, "Airshow China 2014: Pakistan in talks to buy '30-40 FC-31s", in Jane's Defence Industry, November 12, 2014, <http://www.janes.com/article/45718/airshow-china-2014-pakistan-in-talks-to-buy-30-40-fc-31s>, accessed on January 12, 2015.

² U.S.A. D.O.D. "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2014", p. 67.

³ "J-20 Black Eagle [Black Silk?] (Jianjiji-20 Fighter aircraft 20) / F-20", <http://www.globalsecurity.org/military/world/china/j-20.htm>, accessed on January 12, 2015.

⁴ "Aiming High : China's air ambitions" Jane's Defence Weekly, November 26, 2013, [http://www.janes360.com/images/assets/976/30976/China aircraft capabilities 1.pdf](http://www.janes360.com/images/assets/976/30976/China%20aircraft%20capabilities%201.pdf) accessed on January 2, 2015.

⁵ Ibid.

⁶ Wendell Minnick, "With J-31 Flight China makes a Statement", November 15, 2014, <http://archive.defensenews.com/article/20141115/DEFREG03/311150035/With-J-31-Flight-China-Makes-Statement>, accessed on January 12, 2015.

⁷ Rajat Pandit, "Make-in-India: Plan to Develop Fifth gen Fighter", in *The Times of India*, January 8, 2015, P. 9

⁸ "New Design For Indian Advanced Medium Combat Aircraft", *Aviation Week & Space Technology*, March 4, 2013, <http://aviationweek.com/awin/new-design-indian-advanced-medium-combat-aircraft>, accessed on January 2, 2015.

⁹ N.7 ibid.

¹⁰ Rajat Pandit, "Rafale deal hits rough weather", in *The Times of India*, January 12, 2015, P. 9.

¹¹ Gautam Datt, "T-50 PAK-FA fighter jet project with Russia hits turbulence," in *India Today*, August 31, 2014, <http://indiatoday.intoday.in/story/pak-fa-project-sukhoi-t-50-russia-india-ties-defence-ministry-iaf/1/380033.html>, accessed on January 2, 2015.

¹² N.8 ibid.

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