

# CENTRE FOR JOINT WARFARE STUDIES



## CENJOWS

### AVIATION TECHNOLOGY – DEVELOPMENTS IN CHINA

**Aviation – PRC.** For ease of analysis, Aviation Technology is often categorised into Flight Control Systems (FCS), Aero-engine, Airframe, Avionics systems, General systems, Weapon systems, Safety Systems, Electronic Warfare Systems, Tools, Test Equipment, Ground handling Equipment (TTGE) and Flight Testing. Chinese aviation industry is believed to have made noticeable progress in the development of all these systems except aero-engine which is believed to be in advance stage of development.

The Aviation Industry Corporation of China, Ltd. (AVIC) is the main organization dealing with all aspects of the aviation and provides complete services to customers in many sectors - from research and development to operation, manufacturing and financing.<sup>1</sup> Its business units cover defence aircraft, transport aircraft, helicopters, avionics and systems, general aviation, research and development, flight testing, trade and logistics, assets management, finance services, engineering and construction, automobiles and more. AVIC has over 100 subsidiaries, nearly 27 listed companies and more than 450,000 employees.

AVIC main products are: Fighter aircraft J-10, J-11, J-15, J-16, JF-17, J-20 and J-31; Fighter bomber aircraft, JH-7; Trainer aircraft, JL-8, JL-9 and L-15; Bomber aircraft H-6 and H-20; three types of AEW&C aircraft; six types of Transport aircraft; ten types of helicopters and a large number of UAVs.<sup>2</sup>

AVIC offers export of five types of military aircraft.<sup>3</sup> The FBC-1 is a two-seat, twin-engine supersonic fighter-bomber, designed for performing air interception and air-to-surface attack mission. Powered by two turbofan engines, it is equipped with advanced integrated avionics system. It can carry air-to-air missiles, anti-ship missiles, air-to-ground missiles

<sup>1</sup> <http://www.avic.com/en/>

<sup>2</sup> [https://en.wikipedia.org/wiki/Aviation\\_Industry\\_Corporation\\_of\\_China](https://en.wikipedia.org/wiki/Aviation_Industry_Corporation_of_China)

<sup>3</sup> *Ibid*

and guided bombers. The FC-31 is a fourth generation multi role fighter developed for the international market. With excellent combined operation effectiveness and independent intellectual property rights, it adopts a normal configuration - single seat, twin engine, outward tilted twin vertical tail and all movable horizontal tail, with big S inlet on its both sides and a built-in weapon pod. FC-20/FC-20A is a third generation fighter aircraft with high performance capabilities and multi-functioning abilities. The FC-1/JF-7 is a new-generation light multi-role fighter, jointly developed by China and Pakistan. Equipped with state-of-the-art systems and weapons, the FC-1/JF-17 has BVR air combat capability as well as powerful air-to-surface attack capability. The fifth product F-8T is a multi-purpose, supersonic, all-weather fighter aircraft. AVIC also exports Trainer aircraft, UAVs, Transport aircraft, Avionics systems and Aircraft simulators.

A test bed J-10B powered by a WS-10 with thrust vectoring (TVC) was demonstrated at the 2018 China International Aviation & Aerospace Exhibition. The TVC nozzle uses actuator-assisted moving petals, similar in concept to General Electric's Axisymmetric Vectoring Exhaust Nozzle (AVEN) and Pratt & Whitney's Pitch-Yaw Balance Beam Nozzle (PYBBN).<sup>4</sup> The Shenyang WS-10 codename Taihang is a turbofan engine designed and built by the AVIC. The WS-10A reportedly powers the J-11, the J-16, and the Shenyang J-15. Chinese media claims that 300 aero engines were manufactured from 2010 to 2015.

Successful development of the thrust vectoring system is a major achievement and it will enhance capability of the Chinese aircraft to the level of best modern highly maneuverable fighter aircraft.

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<sup>4</sup> [https://en.wikipedia.org/wiki/Shenyang\\_WS-10](https://en.wikipedia.org/wiki/Shenyang_WS-10)