CENTRE FOR LAND WARFARE STUDIES

ISSUE BRIEF

No. 208 January 2020

China-Pakistan Aerospace Nexus

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The JF-17 Thunder is a third-generation plus fighter aircraft jointly developed by Pakistan and China. It can be considered a show-case of Sino-Pak defence cooperation. Pakistan continues to be China's strongest ally. Their relationship became very close after the Sino-Indian war of 1962. Pakistan ceded to China, 5,180 square kilometre of land in Karakoram region of north Kashmir in 1963. In return, China began providing economic and military assistance. After the creation of Bangladesh in 1971, Pakistan forged a formal strategic alliance in 1972 with China. In 1978, the Chinese operationalised the Karakoram highway linking northern Pakistan with western China. China later became Pakistan's largest arms

Key Points

- China is Pakistan's 'time-tested all-weather friend' and has for long helped Pakistan build its military-industrial complex. According to the Stockholm International Peace Research Institute, Pakistan, followed by Bangladesh and Myanmar, are the biggest purchasers of Chinese weapons.
- The JF-17 Thunder is a third-generation plus fighter aircraft jointly developed by Pakistan and China. It can be considered a show-case of Sino-Pak defence cooperation.
- For Pakistan, China is a low-cost-high-value deterrent against India.
- Pakistan Air Force (PAF) is the seventh largest Air Force in the world and the largest in the Islamic world.
- Close ties between PLAAF and PAF make it incumbent on IAF to cater for a two-front war and to acquire advanced fighters, sophisticated support platforms, and smart long-range weapons.

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supplier and third-largest trading partner. In the fiscal year 2017/18, China-Pakistan trade volume totalled to US $13.2 billion, accounting for 16.4 percent of Pakistan's total trade volume. China's exports are US $11.49 billion and imports are US $1.74 billion. Major Pakistan exports are cotton yarn, rice, alcohol and other spirits, copper and related products and chromium ores. Pakistan imports military hardware and electronic good from China.

While China supports Pakistan on Kashmir, Pakistan, in turn, supports China on Tibet, Taiwan, and Xinjiang. Pakistan also acts as a link between China and the Muslim world. China's national strategic interest to get port facilities and a highway close to the oil-rich Middle-East made it commit US $46 billion in the Gwadar deep-water port and the road and rail corridor leading to it, called the China Pakistan Economic Corridor (CPEC). The long-term plan is to lay an oil/gas pipeline from Gwadar to central China. CPEC remains the 'crown jewel' of China's Belt and Road Initiative (BRI). Pakistan continues to be a key element of China's 'string of pearls' policy to create a sphere of influence around India. The relations between Pakistan and China have been described as "higher than the mountains, deeper than the oceans, stronger than steel, dearer than eyesight, sweeter than honey…". For Pakistan, China is a low-cost-high-value deterrent against India. China is Pakistan's 'time-tested all-weather friend'. China has for long helped Pakistan build its military-industrial complex and according to the Stockholm International Peace Research Institute, Pakistan, followed by Bangladesh and Myanmar, are the biggest purchasers of Chinese weapons. Between 2008-2018, China has supplied weapons worth over US $6.4 billion to Pakistan, with the US coming a distant second at $2.5 billion. Aerospace cooperation has been the lynch-pin of Sino-Pak relationship.

Sino-Pakistan Military Production Relationship Evolves

In the early 1980s, China started making huge investments in its military-industrial complex. It was looking for partners and markets to buy its still low-end products and platforms. Pakistan also needed an ally to balance the strong dominance of the USA in their relationship. China initially helped Pakistan set up munition factories and upgrading the ordnance factory at Wah near Rawalpindi. China also allowed license production of the MBT-2000 (Al-Khalid) tank which was essentially a Chinese variant of Russian T-90. It also built a turnkey ballistic missile manufacturing facility near Rawalpindi. China is building the most advanced naval warships for Pakistan. China has also committed to supplying Pakistan with

eight new stealth attack submarines by 2028, four of which will be constructed in China and the remaining four in Pakistan. Significantly, all these involve the transfer of technology (tot) to Pakistan. China reportedly supplied Pakistan with nuclear technology including perhaps the blueprint for Pakistan's nuclear bomb. After India signed the 123 Civil-Nuclear Agreement with the USA in October 2008, China agreed to set up two nuclear power stations in Pakistan.

Aerospace Cooperation

The Pakistan Air Force (PAF) is the seventh-largest Air Force in the world and the largest in the Islamic world with 400 combat and over 200 other support aircraft. China started supplying the Pakistan Air Force (PAF) with F-6 aircraft (air defence version of MiG-19) in 1965. A total of 253 F-6 aircraft were supplied till mid-1970s and they retired in 2002. A squadron of Harbin H-5, a Chinese version of Russian Illyshin IL-28 was formed in the early 1970s. China helped establish Pakistan Aeronautical Complex at Kamra in 1973. In the mid-1980s, PAF received 55 A-5Cs (Chinese MiG-19 ground attack variants) and 186 Chengdu F-7s (Chinese MiG-21).

The US froze F-16 deliveries and stopped spares for many years as a result of the Pressler Amendment 1990, which banned most economic and military assistance to Pakistan after nuclear tests. Thereafter, Pakistan went the whole hog to China for all its aerospace needs. In 2007, as part of a joint-venture project, China rolled-out a 'designed for Pakistan' Fighter JF-17 'Thunder'. Currently, PAF has 100 JF-17s and plans to induct 12 more. In addition, 26 JF-17B (two-seat) and 50 JF-17 Block III aircraft, 36 Chengdu J-10 'Vigorous Dragon' fighters (PAF designation FC-20) are under supply.[1] This tailless delta wing with canards is being compared by the Chinese with JAS 39 and Dassault Rafale. J-10 B will one day have the AESA radar and be equipped with the improved version of the failed Chinese WS-10A engine which is a copy of AL-31FN. Short range air-to-air missiles PL-8 and PL-9, medium-range radar-guided air-to-air missiles PL-11 and PL-12, precision-guided munitions including laser-guided bombs (LGBs), anti-ship missiles YJ-9K, and anti-radiation missiles PJ-9 are part of the package. 6 ZDK-03 Chinese AWACS have been inducted. 60 Chinese designed K-8 Karakoram intermediate jet trainers are currently in service and more are on order. PAF has also received four CH-4 Recce-cum-strike drones which can carry up to 4 PGMs and reportedly have the endurance of 30 hours. PAF has bought Chinese ShanDian-10 (SD-10) radar-guided, mid-range homing air-to-air missiles to equip the JF-17 fighters. China has transferred 34 M-11, road-mobile, short range ballistic missiles (SRBM) with related technology, and manufacturing capability to Pakistan. Despite Chinese pledges to the contrary, it has continued

to provide Pakistan with specialty steels, guidance systems, and technical expertise in the latter's effort to develop long-range ballistic missiles. Hatf, Shaheen and Anza series of missiles have been built using Chinese assistance. China helped Pakistan develop nuclear warheads that directly contributed to Pakistan having nearly 150 nuclear warheads as on date.

JF-17 'Thunder': A Joint Success Story

The JF-17 Thunder or CAC FC-1 Xiaolong is a light-weight single-engine, third-generation-plus multirole combat aircraft jointly developed by the Pakistan Aeronautical Complex (PAC) and the Chengdu Aircraft Corporation (CAC) of China. The JF-17 can be used for aerial reconnaissance, ground attack, and air interception. Its designation 'JF-17' by Pakistan is short for 'Joint Fighter-17'. This fly-by-wire, 1.8 Mach fighter is powered by the Russian Klimov RD-93 turbofan engine. Russia has cleared up to 400 engines to be supplied to Pakistan. It could later be powered by the Chinese indigenous Guizhou WS-13 engine. Aircraft has wide-angle Head Up Display, aerial refuelling, a data-link, and KLJ-7 Doppler radar which is far more powerful than the Thales RC-400 multi-mode radar earlier planned. Aircraft has an electronic warfare suite. The JF-17 can deploy diverse ordnance including air-to-air and air-to-surface missiles, and the 23 mm GSh-23-2 twin barrel cannon. JF-17 is designed to employ Chinese weapons on its seven hard-points which can carry an external load of 6,700 lb (3100 kilogram). Weapons include the PL-5 short-range air-to-air missile, LS-6 'Thunderstone' GPS-guided glide bombs, and YJ-12 supersonic and YJ-83 subsonic anti-shipping missiles. PAF maintains one squadron in the maritime strike role. PAF had ordered 600 Chinese PL-12 radar-guided beyond-visual range (BVR) missile with a range of around 80 kilometre. The Chinese claim that missile is comparable to the American AIM-120 AMRAAM and the Russian R-77.

Thunder is claimed to be highly manoeuvrable. The costs were kept low by borrowing technologies developed for Chinese J-10 fighter. The JF-17 is to become the backbone of the PAF complementing the General Dynamics F-16 Fighting Falcon. The PAF inducted its first JF-17 squadron in February 2010. In 2015, Pakistan produced 16 JF-17s. As of 2016, Pakistan is believed to have the capacity to produce 25 JF-17 per year. Workshare wise, 58 percent of the airframe is Pakistani and 42 percent Chinese/Russian-origin. As of 2019, Pakistan operates around 100 JF-17s in five operational squadrons, plus a testing and training unit. Nearly 70 jets are of Block 1 Type and the remaining are Block II Type. The aerial refuelling got introduced in Block II. In May 2019, China has delivered the first overhauled multi-

role JF-17 fighter jet back to PAF. The last three JF-17 Block II aircraft were delivered to the PAF in June 2019.

A Block III variant of the JF-17 is under development. Production of the Block III aircraft has reportedly started, according to the Fighter Jet's Chief Designer Yang Wei, who is also the developer of the J-20. It will have the Chinese KLJ-7A active electronically scanned array (AESA) radar, digital fly-by-wire flight control system, a new helmet-mounted display, network-centric warfare capability, an infra red search and track system, new electronic warfare systems, weapons upgraded and a radar cross-section reducing 'pseudo-stealthy' airframe. KLJ-7A can track fifteen targets and engage four targets simultaneously. The weapons include a new longer range and more sophisticated air-to-air missile, the PL-15 (150 km). The Block III Type is being called a fourth generation-plus fighter by some. The Block III with AESA and PL-15 combination with a 150 kilometre range could outrange analogous systems with IAF. According to Chinese state run Global News, it made its maiden flight in December 2019. The PAF plans to operationally deploy the latest variant of the JF-17 fighter jet in 2020. PAF plans to procure fifty more JF-17, Block III standard by 2024, and 26 two-seat JF-17Bs with additional fuel stored in a dorsal fin and enhanced application to training and possibly strike missions. Older JF-17s may also be upgraded to the Block III variant later. The initial JF-17 aircraft were priced quite cheap at US $15 to 28 million. The new Block III, which will supposedly cost around the US $32 million each. Since its induction in 2011, the JF-17 Thunder has accumulated over 25,000 hours of operational flying. JF-17B is the two-seater combat variant which is also used for training. It serves as a more effective electronic warfare platform in which the second seat can accommodate a weapon systems officer (WSO).

Three JF-17s have been sold to Nigerian Air Force in 2018 and have delivered at least six out of an order of eighteen JF-17Ms to Myanmar. China and Pakistan are aggressively trying to find possible export customers. Targeted countries are Algeria, Argentina, Bangladesh, Egypt, Iran, Myanmar, Malaysia, Morocco, Nigeria, Sudan, Sri Lanka, and Zimbabwe. The reasonable price makes it attractive.

Tejas Light Combat Aircraft versus JF-17

Comparisons are being drawn between the JF-17 and India's Light Combat Aircraft (LCA) 'Tejas' LCA Mk 1. The Tejas uses many new technologies including large amounts of composite materials, advanced avionics, and a unique aerodynamic configuration. It has good potential to be expanded into variants. JF-17 is the aircraft of today and the

Tejas, the aircraft of tomorrow. The JF-17 costs close to US $ 25 million. The LCA Mk 1 costs around US $ 28 million. LCA and JF-17 are competing for the Malaysian contract which will begin shortly.

Light Combat Aircraft Tejas has been manufactured by a single country and is claimed to be the world's lightest supersonic fighter. Currently, only one squadron with sixteen aircraft has been formed. Aircraft production is still to be ramped up to sixteen aircrafts a year. The more comparable LCA Mk 1A will have its first flight only in 2021. The JF-17 is a joint project between China and Pakistan. More than 100 are already flying. The aircraft production is now stable at nearly 24 aircrafts a year. The Block III variant with modern AESA radar was to fly in 2019. There are already two foreign customers flying the JF-17. JF-17 has been operational for the past 12 years and serves in six squadrons at full operational capability, whereas the Tejas has only one squadron. The contenders have 'fairly similar' performance. JF-17's Russian engine has maintenance and serviceability issues well-known to Malaysia from their MiG-29 experience. LCA's General Electric F404 engine is much more reliable.

Beyond JF-17

Pakistan chose the Chinese Chengdu J-10B fighter for orders over the Lockheed Martin F-16C Block 52/60, the most advanced F-16, currently in PAF inventory. It was claimed that the J-10 B had more advanced technology such as its radar and OLS targeting system, and its new generation stealthy features, such as its DSI intake giving it an edge over the F-16. Beyond the JF-17, China and Pakistan are involved in several projects to enhance military and weaponry systems—K-8 Karakoram advance training aircraft, tailor-made for PAF based on the Chinese domestic Hongdu L-15. China supports Pakistan in space technology, and AWACS systems, Pakistan Army has imported Chinese-built Low to Medium Altitude Air Defence System (LOMADS) LY-80.

Sino-Pakistan Air Exercises

Pakistan Air Force and Peoples Liberation Army Air Force (PLAAF) have participated in a series of exercises called Shaheen since 2011 to improve inter-operability to respond to 'mutual threats'. The missions have included simulated air combat, surface attack missions, air-refuelling, and logistic support missions. Shaheen-I was held in Pakistan. Shaheen-II was held in September 2013 in Hotan in western China. PAF had then sent Mirage III EA and F-7G (MiG-21 class) aircraft. PLAAF fielded J-10 multi-role fighters and J-7C. The more manoeuvrable J-10s acted as the aggressors. The 3 week-long Shaheen-III exercise was held in

May 2014 at PAF Rafiqi airbase near Shorkot in Western Punjab. The exercises gave both air forces the opportunity to improve specific skills and practice Dissimilar Air Combat Training (DACT). It also allowed training under different threat environments and training philosophies. PLAAF was reportedly impressed by PAF's aggressive combat style and the streamlined efficient training approach. These exercises were of special importance to PAF as it gave them exposure to fly against Chinese Sukhoi Su-27/Su-30MKK aircraft which are similar to the IAF frontline SU-30 MKI aircraft and to help them validate their tactics.

The most recent Shaheen VIII (Eagle VIII) was also held at Hotan in south-western Xinjiang in August 2019, primarily to develop a mechanism for the interoperability of both air forces. This was the first wargame after the abrogation of Article 370. PAF participated with JF-17s while China fielded J-10 and J-11 fighters which are PLAAF's backbone. The J-10 is more or less a version of the abandoned IAI Lavi fighter programme. The J-11 is a copied variant of the Russian Su-27 air superiority fighter.

Aerospace Implications for India

Close ties between PLAAF and PAF force IAF to cater for a two-front war and acquire advanced fighters, sophisticated support platforms, and smart long-range weapons. PLAAF with nearly 1,700 aircraft (600 fourth Gen plus) and aggressively modernising, and nearly 450 aircraft of the People's Liberation Army Navy (PLAN), and the soon to be inducted state-of-the-art aircraft carriers, makes a great air power. PAF has twenty-two fighter squadrons and has a target of twenty-eight. Current IAF: PAF ratio of 1.5:1 is a far cry from the once 3:1 dominance. The Force ratio edge of IAF over PAF is thus at an all-time low. With eight Chinese airbases in the Tibet Autonomous Region (TAR) and many more in the Chengdu Military Region east of Myanmar, any collusion with PAF would encircle India and create significant air threats to counter. India thus needs to re-look at the force structure.

IAF is currently down to thirty squadrons vis-a-vis the authorised 42. Many Indian defence analysts believe that to cater for two-fronts, there was a need to eventually increase combat squadrons from hitherto targeted forty-two to around fifty squadrons. IAF immediately requires advanced fighters, sophisticated support platforms, and smart long-range weapons. The Defence Research and Development (R&D) and Indian aircraft industry too would have to get their act right. IAF's long list of acquisitions of 114 medium multi-role fighters, the hastening of development and production of the LCA and Advanced Medium Combat Aircraft (AMCA), and the various other force multipliers

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need to unfold quickly. All this would require significant funding over the next three decades and defence budget increased to at least 2.5 percent of the gross domestic product (GDP) from the current 1.41 percent. IAF needs to deploy more Surface-to-Air missiles on the China border to defend against aircraft and missile strikes . There is a need for IAF to build up force levels quickly lest IAF gets left too far behind PLAAF and PAF bridges the gap.

The changed South Asian dynamic (with China rapidly expanding its footprint) necessitates action options for India to be considered on an urgent basis. For a lasting solution, it is essential to break up the Pakistan-China nexus. India's muscle-flexing, and the military response for terrorist provocations – air and land strike – have driven Islamabad deeper into China's camp. Pakistan is strong enough to be a spoiler and, in cahoots with China, pose a substantial problem. Simultaneously, India needs prioritising strategic and expeditionary military capabilities against China and for distant operations jointly with friendly states in the Indian Ocean Region (IOR) and South-East Asia will secure India's extended security perimeter.

Endnote

1. Franz-Stefan Gady, "Pakistan's JF-17 Block III Fighter Jet to Make Maiden Flight by the End of 2019", The Diplomat, July 11, 2019 at https://thediplomat.com/2019/07/pakistans-jf-17-block-iii-fighter-jet-to-make-maiden-flight-by-the-end-of-2019/, January 13, 2020.

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