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India's Fighter Jet Conundrum in the context of a hostile Neighbourhood

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Abstract: **India is situated in a very dangerous neighborhood. On the Western side, there is a perpetual enemy, Pakistan, which loses no opportunity to undermine India's national security, and on the northern side lies China, which has its eyes on the land of all its neighbors, including India. Although smaller countries such as Bangladesh are also hostile to India, their threat is on a smaller scale given their weaker military might. However, this is not the case for China. Airpower has become a major determinant of the outcome of modern war. The decisive component of the airpower of military powers is the number of fighter jets possessed by a country. This study analyzes the relative assessment of the position of Indian fighter jet power in comparison to its principal adversaries in its neighborhood, especially China and traces the route ahead.**

Keywords: **Fighter jet, Hostile Neighbourhood, F-35, SU-57.**

1. INTRODUCTION

Air power has played a pivotal role in modern warfare Since World War II. During the Second World War, the bombing of England by German Luftwaffe in 1943 made it clear that in the foreseeable future, air dominance was key to military supremacy. Since then, many countries have focused on building strong and resilient air forces. The US clearly displayed the potential of air power during the invasion of Iraq, the war over ISIS, the Afghan campaign, and on numerous other occasions. The inclusion of Artificial Intelligence in an air power matrix makes it more potent and destructive. In the future, air power is more likely to be interwoven with space power, because the latter is a logical extension of the former.

Since the Cold War ended, there have been two predominant airpowers: the US and the USSR/Russian Federation. China soon understood that, without a substantial air force, it could not be a dominant military power. As a result, by the late 90's of the last century, China started investing heavily in its air force.

Experts have highlighted prominent principles of airpower employment. These include 1) air control, 2) centralized control and decentralized execution, 3) priority, 4) balance, and 5) concentration (Jones, n.d.). All modern air forces must be determined based on these principles.

By virtue of its geography and unique history, India has been bestowed with hostile neighbors. The nation of Pakistan on its Western frontier has always been hostile since its inception on August 14, 1947. To date, the country has imposed three full-fledged wars in India apart from its misadventure in Kargil. China, its other major neighbor, has been its greatest adversary. China has illegally occupied 38000 sq kms of Indian territory (Press Trust of India, 2022). The Eastern front, which has been peaceful for the past two decades, has become hostile ever since Sheikh Haseena was ousted from power. While it was fashionable for strategic experts to talk about 2.5 front war, the discourse has now been modified to a 3-front war as the worst-case scenario for India. Needless to say, India exists in a stressed neighborhood, where armed conflicts can occur at the drop of a hat. In any future war, airpower and, more importantly, power exerted through fighter jets are likely to play a decisive role in determining the outcome of regional conflicts.

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The theoretical underpinnings of Air power consolidation with reference to India and its neighbours

The scenario obtained in India's neighborhood is both complex and ridden with uncertainties. The **Realist framework** of International Relations states that the international system is a self-help system, in which survival is the key motive of states. Survival requires strong military and economic powers. The hostile neighborhood of India necessitates a strong military, including air power, that can warn against conventional and non-conventional threats from adversaries. This makes it imperative for India to build a strong airforce to safeguard its boundaries. The Security Dilemma confronting India is real and immediate.

Technology is a major determinant of modern warfare. The theory of **Technological Determinism** states that war strategies and outcomes are determined by the technology used. The difference in technological levels between countries is a major determinant of the outcome of the modern war. Currently, India operates mostly 4th generation or 4.5 generation fighter aircrafts, while China has a number of 5th generation war planes in its deployment and is currently working on 6th generation aircrafts.

The **Critical Security Studies** paradigm assigns weights to the nonconventional aspects of security. In the present case, Indian efforts at airpower consolidation critically hinge on the government's policy approach towards air power consolidation, the country's aspiration to be a great power, and structural factors.

Indigenous fighter aircraft manufacturing is an evolutionary process typically involving several stages. India's strategy has been to **leapfrog the stages** and build the AMCA, thereby not traversing the intermediate stages (Khosla, 2025). This strategy has been attempted in the case of HAL Tejas, resulting in several bottlenecks, including dependence on foreign suppliers for critical technologies such as engines. A strategy involving both private and public players often prevents the evolution of natural fighter aircraft-manufacturing ecosystems. .

India and its neighborhood- Air power status

Taking a leaf out of Clausewitz's book, we can state that, "War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty' (*Fog of War*, 2025). This uncertainty clouds the probable outcomes of war and makes decision making extremely hazardous, both on and off the battlefield. The actual airpower can also be gauged on battle-skies.

Since the Indo-China War of 1962, there had been a semblance of air power balance between India on the one hand and its hostile neighbors–China and Pakistan on the other. There was subtle confidence that India's machinery in the air would match that of its adversaries. However, given the rapid advancement of Chinese airpower, both in scale and technology, this confidence can only be sustained through proactive steps from the Indian side. According to recent reports, the gap between India and China in terms of air power is increasing rapidly.

Table 1: Airpower of select countries

	Fighter	Helicopters	Transporters	Trainers	Aerial Tankers	Bombers	Special Mission Platforms	Close Air Support	Total Active Aircrafts
United States of America	1610	218	697	1325	453	140	266	295	5004
India	542	498	282	374	6	0	14	0	1716
China	1975	68	270	1060	26	209	125	0	3733
Pakistan	498	54	37	274	4	0	12	0	879

Source: (WDMMA, 2025)

Table 1 provides a clear picture of the countries affecting India. While the USA stands as a reference point for air supremacy, China and Pakistan are hostile neighbors whose airpower is a matter of concern for India. China has rapidly modernized its air force. Its modernization efforts differ significantly from those of India because China has a high degree of indigenization,

whereas India is primarily dependent on foreign technology for the modernization of its air fleet. The J-20 stealth fighter, the Xian H-6 bombers J-7 and J-16, and a host of other machines were indigenously designed and produced, giving the Chinese a distinct edge. It is noteworthy that the Chinese possess more fighter aircraft than the USA. The integration of advanced weaponry into the Chinese Air Force also occurred in a fast clip (Siddiqui, 2024). China has favored Electronic Warfare (EW), Airborne Early Warning and Control Systems (AWACS) and mid-air refueling (Siddiqui, 2024). For a fighter aircraft, J-20 distinguishes itself through its very weak radar signature. The Chinese have also taken the world by surprise by unveiling its prototype for the 6th Generation war plane, J-36. The 6th Generation aircrafts are expected to outperform their 5th generation counterparts, not only in terms of speed, maneuverability, and stealth, but also in terms of their self-healing properties (Aircraft Wiki, n.d.), in the same way as the 5th generation fighters outperformed their fourth-generation counterparts in terms of stealth, avionics, maneuverability, multi-role capability, data fusion, and networking abilities (Hollings, 2021). Pakistan, another hostile neighbor, has a range of sophisticated legacy air platforms. Apart from aircraft from fighters from the stable of Dassault Aviation, such as Mirage 5, JF-17A &C, and variants of F-16s (WDMMA, 2025), Pakistan's air force has also ordered 40 pieces of the highly stealth 5th Generation J-35s (Khan, 2024). The addition of these stealth fighters will greatly boost Pakistan's fire power in the skies and will replace aging F-16s and Mirage aircraft. However, if we look at India, the scenario is not encouraging. The country has any 5th generation fighter aircraft in its arsenal. Apart from the fact that its squadron strength is much below the required level (31 instead of 42), a good portion of the aircraft is the vintage MIG-21 (Bisons), which overshot their serviceable period. The most advanced aircraft in India's arsenal are the Rafale Jets, which are at best 4.5 generation planes. While geography gives Indian fighter jets an advantage over the Chinese, the dynamics could drastically change in the case of a 2 or 2.5 front war. The excruciating delays encountered in the production and induction of Tejus Mark-1 (a 4th generation aircraft) forced India to look beyond the country for a suitable 5th generation aircraft. The international scenario indicates that countries such as the US States would be less forthcoming in parting with cutting-edge technologies, especially those related to the production of engines. While the US agreed to transfer 80% of the technology required to manufacture the GE414 INS6 engine, along with the creation of assembly lines, there has been a significant escalation in costs beyond the $1 billion mark (PUBBY, 2024). Furthermore, the delivery of GE's F-404 engines to the Tejas MK1A series has been delayed for over two years (Kunde, 2024). This leaves India with little option other than to go in for off-the-shelf purchases of either the American F-35 or the Russian SU-57 5th generation fighters to cover the looming equipment deficit. The costs associated with such purchases are presumably very high, with little or no technology transfer on offer.

China also has the advantage of significantly larger numbers of satellite-based intelligence, surveillance, and reconnaissance (ISR) assets. The large number of anti-satellite weapons systems deployed by China also enhances the air and space defence capabilities of the country (Siddiqui, 2024).

India's Indigenization Efforts- Road blocks

India plans to be a significant producer of fighter aircraft not only to meet its internal requirements, but also to access major international markets in the near future. Financial allocation for indigenization is only one part of the story, and the creation of an enabling ecosystem is the other. Recently, the Central Government allocated Rs.15000 crores for the first phase of the Advanced Medium Combat Aircraft (AMCA) project (V, 2024). However, this mission has not yet been resolved. Even the most optimistic estimates expect the first prototype to be flown out only by the year 2028-2029 only (Peri, 2024). The optimistic estimates expect the first aircraft to be inducted by 2034 (Peri, 2024), a far cry from the Chinese who have already flown out the prototype of their 6th generation aircraft. Presumably, by 2034, the Chinese would have inducted their 7th Generation aircrafts into their armed forces. Recently, the Indian Air Force planned to issue tenders for the procurement of 114 medium-role fighter aircraft (MFRAs), which have run into rough weather owing to the escalation in local production costs to the tune of $20-$30 million per jet, making indigenously produced aircraft far costlier than directly procured aircraft (Kunde, 2024)1. Furthermore, the development of an indigenous ecosystem for sustainable production and maintenance of high-end jet aircraft is a laborious task. Currently, the supply chain of fighter jet manufacturing in India is in its infancy.

One of the options proposed for the Indian Air Force is to procure battle-tested and nimble F-21 from Lockheed Martin Stable. Experts have suggested that these aircrafts are a good bet given India's plans for the indigenization of critical component production. Lockheed Martin offers the transfer of critical technologies and local production, thereby providing an opportunity for the country to build a complete fighter aircraft ecosystem (Linganna, 2025). Other benefits of aircraft include lower maintenance costs, ease of absorbing newer technologies, and lighter weight (Linganna, 2025). The biggest disadvantage is that the aircraft is a modification of the F-16 (Falcon) platform, which already operates with the Pakistani Air Force, making its avionics transparent to the Pakistani and, by default, to the Chinese armed forces.

As far as the 5th generation aircrafts are concerned, India's best bets seem to be either F-35 or SU-57. In contrast, F-35s far outstrip SU-57s. A basic version of F-35 costs not less than $82.5 million, while a basic SU-57 costs only $35 million. India-specific variations can significantly increase the prices of these machines. However, in terms of performance, F-35 is considered superior to SU-35 because of its low radar signature and advanced avionics. The reliability of delivery is another important issue. To date, only 20 SU-57s have been delivered to the Russian Air Force, while more than 1000 F-35s are already in service (Linganna, 2025)1. Furthermore, the lifecycle cost of the platform is high (Columnist, 2024). There is also a likelihood that procurement of these platforms from Russia could attract sanctions under the Countering America's Adversaries Through Sanctions Act (CAATSA) (Columnist, 2024). However, acquiring either F-35s or Sukhoi-57 negatively affects the AMCA project. Substantial resources can be diverted from the project to fund purchases (Columnist, 2024). While procuring either aircraft could enhance India's insights into advanced avionics and state-of-the-art stealth, it could also result in dependency on the US or Russia, as technology transfers will not be cent percent. In the long run, this could hamper the indigenization process. Moreover, choosing one platform over another creates barriers for future collaboration in similar fields with at least one party.

The Indian Air Force is a significant force in terms of fire power. In addition to the advanced short-range air-to-air missile (ASRAAM), the IAF also boasts of indomitable Brahmos (air version), Air-to-Air Python-5 (Highly Agile and Maneuverable Munition Extended Range (HAMMER)), MICA, SPICE, and a host of other missiles (Sagar, 2021). The introduction of a Directionally Unrestricted Ray-Gun Array (DURGA), a low-cost, lightweight, high-power directed energy weapon, is expected to provide an air force with a low-cost but potent air defense tool. Along with KALI (Kilo Ampere Linear Injector), this system will be capable of terminating incoming missiles in the final stages of their journeys, at ranges of about 25 km (Baruah, 2023).

In the case of helicopters, India is constrained to have them in larger numbers than Pakistan and China, considering the difficult topography. In the higher reaches adjoining China, Helicopters are the best mechanism to land men and materials during times of need. Although helicopters and transport aircraft are important, most print space and media attention is focused on the acquisition of fighter aircrafts.

The LCA Tejas programme has been stymied since its inception due to the failure of the DRDO to come out with a successful version of the indigenous Kaveri engine. Developed by the Gas Turbine Research Establishment (GTRE) under DRDO, the engine to date has not been able to generate sufficient thrust to power LCA. The current thrust of the engine (80 kN) is sufficient to power only the unmanned aerial vehicles developed by DRDO, but not the fighter aircraft. Efforts are required to enhance the thrust of an engine by using an afterburner. Future aircrafts such as the AMCA would require higher thrust, and the progress of the Kaveri engine leaves much to be desired. In this scenario, HAL considered GE-404 as an alternative. Although the supply of engines has been contracted, delays have plagued the delivery of Tejas aircraft to the airforce. One of the reasons why advanced countries do not participate in critical fighter aircraft technologies is that the market for these machines is lucrative, but competitive. Most advanced countries do not welcome the entry of low-cost producers into their market. Fighter aircraft manufacturing is a sunrise industry in the developed countries. It is ironic that the Tejas project, which was inaugurated in 1984, is yet to complete the delivery of even the first 40 aircrafts ordered by the air force (Sharma, 2025).

The Road Ahead

It is significant to note that efforts towards creating credible airpower deterrence against any misadventure by hostile countries lie both with the government and the private sector. While critical processes can be implemented by government institutions such as HAL and DRDO, micro-innovation and supply chains must be established by the private sector. Even in the US, technologies developed by universities have been commercialized by private companies such as Lockheed Martin, L3Harris, Honeywell, Boeing, and General Dynamics. The government should take the lead in establishing a critical ecosystem in which defense-related technologies are produced in scientific laboratories and universities, while their customization is done by HAL or DRDO, as may be the case. Commercialization and production must be undertaken by the private sector.

The Government of India needs to scout for cutting-edge technologies developed in advanced countries (especially friendly ones) and purchase them off-the-shelf for customization and application. For instance, one strategy adopted by the Chinese government to augment its technological base was to provide incentives to industry and academia in Europe and the US to develop and transfer dual-use technologies (Tenyotkin et al., 2020).

The startup mission of the Government of India can be positioned to encourage learners to set up firms that produce critical components in the defence industry. The large number of unicorns in the country is indicative of youth's interest in setting up commercially viable business enterprises that cater to the needs of the market.

The integration of AI into the production and functioning of war machines, including fighters, requires further attention. As the world progresses towards 6th generation fighters, the integration of AI into war machines is critical. In particular, the autonomous navigation modules of a 6th Generation fighter jet operate almost entirely on AI inputs. Situational awareness and real-time data analysis is an area in which the integration of AI will aid the faster development of 6th Generation fighter jets. However, this requires the creation of incubation labs, reworking generational AI models, and working closely with air force pilots.

Along with the Indian private sector investment in technology development and auxiliary manufacturing related to various components of jet aircraft, foreign investments from established players in the field, such as Lockheed Martin, Safran, and Boeing, are essential to procure financial resources, technology, and expertise. Government-owned and run enterprises cannot accomplish this task alone.

With the drastic negation of the "Pivot of Asia" strategy by the US, countries like India are forced to depend on their own technological and financial wherewithal for development. It is therefore futile to look towards the US, especially under Trump, to transfer critical technologies. Indigenization of jet manufacturing is the main solution, along with assistance from like-minded countries such as France. In this scenario, the slow pace at which the AMCA project is progressing is concerning. Currently, the first jets under the project can be inducted (on an optimistic note) by 2035, by which time the Chinese would have progressed beyond the 7th generation of jets. The solution seems to lie in working with like-minded countries on the creation of 6th Generation platforms. It is advisable for India to accept the invitation to join the European "Future Combat Air System (FCAS), which aims to develop next-generation platforms. India could also partner with the UK, Japan, and Italy in their Global Combat Air Program (GCAP). Although participation in these projects entails costs, the experience gained could be useful for the development of AMCA. The Indian Government and the Ministry of Defense with their proactive outlook is sure to act fast on this aspect.

The HAL could also work closely for its engine development program with the Indian Space Research Organization (ISRO), which already has experience in fabricating engines, including cryogenic engines. Although the nature and texture of fighter jet engines differ from those of satellite engines, the engine-manufacturing ecosystem developed by ISRO will be useful for faster innovation and prototype creation.

In light of the induction of 5th generation fighter jets by China and the likely induction by Pakistan in the near future, India must acquire at least two squadrons of the latest 5th Generation jets either from Russia or the US. India-specific modifications can be implemented to ensure aircraft security. Indigenous development of 5th generation jets is in progress and should continue in parallel.

The procurement of Medium-Role Fighter Aircraft (MFRAs), as mentioned in the Discussion section, is another pending issue. Logistically, it is easier to maintain rafales because of high acquaintance with machines, yet diversification is essential to prevent future supply shocks in adverse conditions. There is substantial pressure from the US to acquire one of the F series machines, but the high cost of acquisition and maintenance and unreliability of American supplies are issues that need to be addressed. Israel's experience can be quoted in terms of the reliability of its supplies. President Biden ordered a halt to the export of 2000 pounds of high-intensity bombs to Israel, citing concerns related to civilian safety in the midst of the latest Arab-Israeli conflict (Harrison, 2025). The moot question here is not one related to the morality of such transfers (in which case the deal should not have arrived at all nor the payments should have been taken), but to the reliability of the US as a reliable supplier of arms during a crisis. One of the aspects mentioned in the MFRA tender is related to local manufacturing and technology transfer. This is unlikely to have been fulfilled by any US company during the Trump regime.

2. CONCLUSION

The recent Arab- Israeli conflict highlights the importance of airpowers in emergent conflict situations. The situation in the Indian subcontinent is more complex, with multiple inflection points competing with weapons systems. Earlier wars, whether in 1948, 1962, 1965, or 1971, were predominantly land- and ocean-based conflicts, with airpower playing a lesser role. The fighting machines used were of inferior quality. Future conflicts (as well as when they occur) have a greater role for fighter aircrafts. Undoubtedly, in those wars, the force that rules the air shall win. Therefore, the Indian Air Force must build a mean, lean, and brute air force to ward its adversaries off.

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