

Evolution of the indian air force assignment

[Environment](#), [Air](#)



EVOLUTION OF THE IAF Air Power is a relatively recent addition to military power. Born in the early twentieth century it has matured in just some eighty years, a relatively short time, and come to occupy a central position in the mustering of a nation's military might. India's Air Power has made great progress from its humble beginnings in 1932. The past 74 years bear testimony to the country's growing prowess in air operations. Understanding the evolution of the IAF to see how we have come to where we are is vital to chart the future course of the IAF.

This understanding of the evolution also gives an indication of the effectiveness of policies and strategies used in the past and in force on date, further projection and refinement of which, would yield tomorrow's strategy, and required capabilities along with the required force structure. The aim of this paper is to trace the evolution of the IAF in the past 74 years and derive useful inputs for further development and transformation of the IAF in the years ahead. In the course of the paper I will first cover : - a)The formation of the IAF and its growth from 1932 till 1941, moving on to, b)World War-II, 1941 to 1946.)I will next cover the period from 1947 till 1960. followed by, d)The period from 1961 till 1971 e)Development from 1971 till date including Operation Cactus. IAF from Formation till 1941 Before the IAF itself was formed there were Indians who were pioneers in Military Aviation. Three of these early Indian military aviators were Sardar H. S. Malik, Lt Indra Lal Roy, DFC and Lt S. G. Welingkar, MC who served in the Royal Flying Corps during World War-I. A military flying school was set up in India at Sitapur in Uttar Pradesh in Dec 1913.

Civil flying clubs were set up in the metropolitan cities of India at Delhi, Bombay, Calcutta and Lucknow in the late 1920s. These civil flying clubs allowed adventurous young men to learn flying as a sport. Many of them later joined the volunteer reserve and later several accepted absorption into the Air Force. With growth of the nationalist movement demand for Indianisation of the armed forces gained ground. A committee was formed in 1925 under chairmanship of the Chief of General Staff, Lt Gen Sir Andrew Skeene, KCB, KCIE, CMG, to study the proposal.

Regarding the Air Force the committee recommended that selected, deserving Indians should be given King's Commission to form an air arm of the Indian Army and be sent to the Royal Air Force training college at Cranwell. The Indian Air Force Act became effective from 8 October 1932. Six young Indian cadets (Subroto Mukherjee, H. C. Sirkar, A. B. Awan, Bhupendra Singh, Amarjeet Singh and J. N. Tandon were sent to England in 1930 for two years' training. The first five qualified as pilots and J. N. Tandon as an equipment officer. Twenty nine men were recruited from railway workshops and trained for a year as "Apprentice Aircraft Hand".

Of these twenty two qualified and were later called "Hawai Sepoys". On 01 Apr 1933 'A' Flight of No. 1 Squadron of the IAF was formed at Karachi with four Westland Wapiti aircraft. The Sqn was commander by Flt Lt C. A. Bouchier, DFC of the RAF and initially had just five Indian pilots. The Sqn consisted of a squadron headquarters and one flight of four Westland Wapiti aircraft. During subsequent years further batches of recruits were sent to Cranwell and post training swelled the ranks of 1 Sqn. Some of the other IAF

officers to be later trained at Cranwell were A. M. Engineer, K. K. Majumdar, H.

Ranganathan, Narendra, Habibullah Khan, Prithipal Singh, Mehar Singh, R. H. D. Singh, S. N. Goyal and Arjan Singh. Of these A. M. Engineer and Arjan Singh rose to serve as Chief of the IAF and the post of the Marshal of the Indian Air Force is today held by Marshal Arjan Singh. After three years of training ' A' Flight of No. 1 Sqn of the IAF moved to Peshawar on 01 Apr 1936, the day ' B' Flight was formed. At Peshawar it was attached to No. 20 Sqn RAF for training in frontier operations. Both flights then underwent a phase of intensive Army co-operation training followed by armament training.

In September 1937 the squadron got its first taste of action. On 31 Aug 1937 ' A' flight moved to Miranshah for operations against the tribesmen. The pilots were on the job from 5 Sep to 21 Oct and again from 17 Nov to 22 Nov. On 22 Nov they moved to Peshawar and on 25 Dec 1937 F/O S Mukherjee was made the Commander of ' A' Flight. And remained in command till 27 Feb 1938 when Flt Lt C. H. Smith took over. F/O Mukherjee was posted to ' B' Flight as its commander on 3 Apr 38. The pilots often suffered casualties from forced landings, engine failures and hostile fire from the tribesmen .

Beginning of the year 1938 saw both flights engaged in training. From Jan to Apr ' A' flight at Hyderabad (Sind) and ' B' flight at Bangalore took part in extensive army co-operation exercises, on completion of which ' A' flight moved to Peshawar and ' B' flight to Ambala. June saw the formation of ' C' flight and by the end of the month it moved to Ambala and joined ' B' flight

there. ' A' flight sent 3 aircraft to Miranshah for operations in the middle of June. ' A' flight also moved to Ambala on 03 Jul 38. In Sep ' C' flight was sent to Miranshah for operations under command of F/O K. K.

Majumdar where it moved on 25 Sep 38 and replaced No. 20 Sqn of the RAF. The flight was employed on operations from 25 Sep to 18 Nov. In the early months of 1939 all three flights were involved in army co-operation training for the mutual benefit of the air and ground crew. On 16 Mar 39 Sqn Ldr C. H. Smith was posted to the UK and Flt Lt S Mukherjee took his place as the first Indian commander of the squadron. At end of March ' A' flight again moved to Miranshah for operations where for the first time Indian SNCOs took charge of their trades and successfully discharged their duties. The flight returned to Ambala on 15 June 39.

The standard of the squadron's flying and serviceability of their aircraft earned the admiration of all concerned. Calls by the Legislative Assembly for expansion of the IAF were opposed by the Government citing the high cost involved. The equipment of a single squadron cost Rs 80 lakhs and its recurring expenditure was from Rs 20 to Rs 25 lakhs . The squadron began conversion to the Hart on 25 Jun 1939. The conversion was completed in a few weeks without any problems. When World War-II broke out the IAF comprised a total of 16 officers and 144 men in one squadron with three flights. 1942 to 1946

Outbreak of World War-II saw calls for expansion of the IAF as it was feared that the RAF in whom responsibility for India's defence was vested may be so involved in operations in other theatres that it may be unable to spare

resources for India. Hence, invitations were sent to holders of commercial pilots licenses to join the IAF Volunteer Reserve (IAFVR). A hundred such pilots joined the IAFVR and after a short conversion course they were posted to the newly raised Coast Defence Flights (CDF) where they flew Wapiti, Hart, Audax and other aircraft types requisitioned from civil owners and discarded by the modernising RAF. Their duties included long surveillance missions over coastal waters and at times escort of ship convoys through maritime trade lanes. Japan's entry into the war in 1941 accelerated calls for expansion of the IAF. The 1940 Plan 'A' put air requirements of India at 21 squadrons and 5 CDFs consisting of a total of 282 aircraft. The 1941 plan taking into consideration deteriorating relations with Japan raised requirements to 6 CDFs (57 ac) 21 squadrons (325 ac) and 2 C. A. T. U. s (12 ac). Against these India had 5 CDFs of the IAFVR, 2 RAF squadrons and 1 IAF squadron.

The various squadrons were to be formed at various times between Apr 1941 and Jan 1942. Flying Training Schools were set up at Walton near Lahore and at Ambala. The five CDFs were to be expanded to squadron strength and an extra CDF was to be added. In Oct 1940 the first squadron was at full strength but the five CDFs were only at half strength. In response to these requirements No. 2 Sqn was formed on 1 Apr 41 at Peshawar on Wapiti aircraft, under command of F/Lt A. B. Awan, and established for 20 officers and 164 airmen. The core was formed by six ex-1 Sqn officers apart from the CO. In May 7 fresh pilots were posted in from No. 1 Service Flying Training School (Ambala) and by June the squadron was up to strength with two flights. Two Operational Training Units came up at Risalpur (for Fighters) and

Peshawar (for ground attack). No. 3 Sqn was formed at Peshawar on Audax aircraft, of which six were received in October. This Sqn also formed with a nucleus of 1 Sqn pilots and as personnel continued to be posted in, by March 1942 it was nearly at its establishment strength. No. 4 Sqn also formed at Peshawar on 1 Feb 42 on Lysander ac. Some aircrew were taken in for this unit from No. and 3 sqns and some aircrew with Lysander experience in England and the Middle East joined the squadron. The IAF had thus built up to four squadrons. The plan for build up of CDFs was not implemented, these being disbanded towards end 1942. the personnel of these flights were absorbed in three new squadrons, 6, 7 and 8 that formed on 1 Dec 1942. No. 6 Sqn formed at Trichinopoly, absorbing personnel of No1 and No2 CDF and had 10 4 Sqn aircrew too. These personnel were trained at 151 Operational Training Unit (OUT), Risalpur on Hurricane ac and the squadron then located to Bhopal.

No. 7 Sqn formed at Vizagapatam with personnel of No 3 and No 6 CDF on Vultee Vengeance ac, training for which was imparted at No 152 OUT at Peshawar. No 8 Sqn also formed on Vengeance ac at Trichinopoly with personnel of No5 CDF, though formed on same date as No 7 Sqn its conversion started only by Apr 43 and OUT training was completed on 15 Jun 43. like No 7 Sqn No 8 Sqn came together for the first time post conversion at Phaphamau. Formation of more squadrons was delayed by a year due non-availability of pilots. No 9 Sqn started forming at Lahore on 3 Jan 44 with S/L .

W. Riddler as CO, two Flight Commanders, one Engineering Officer, 12 British and 17 Indian ORs. On 8 Jan it received 18 Hurricane IICs and two days later 18 pilots fresh from No. 151 OUF joined it and by 17 Jan the squadron moved to Bhopal. The next squadron No. 10 Sqn, the last to be formed in the War also started forming at Lahore on Hurricane IIC ac from 20 Feb 44. Paucity of pilots delayed its coming to strength. No. 1 and 2 Sqns continued in army co-operation tasks in the NWFP in addition to coastal defence duties in Karachi area. In mid-1941 No. 1 Sqn re-equipped with Lysander aircraft. After the Japanese entry into the war, No 1 Sqn was moved to Burma, starting its move to in end Dec 41 and reaching Toungoo on 01 Feb 42. It remained in operation till Rangoon fell. In June 42 it converted to the Hurricane IIC. In the first half of 1943 it changed locations several times and in early 1944 moved to the Manipur front reaching Imphal on 3 Feb 44. It remained in action for 14 months seeing action through the siege of Imphal and the trans-Chindwin and trans-Irrawaddy offensives. The squadron withdrew from operations in Apr 1945.

No. 2 Sqn went in for operations in NWFP within three months of its formation. In 1941 it converted from Wapitis to Audax and alternated live tours in NWFP with intensive training exercises and in Sep 1942 the Sqn converted to Hurricane IIC ac and spent the rest of that year training on the new equipment. In Apr 43 a detachment of the Sqn went to Imphal for operations, returning on 25 May 43. The Sqn trained for advanced operational tactics, including tactical reconnaissance and air-to-air combat and demonstrated high proficiency in exercises.

In Oct the squadron was tasked to proceed to the Burma front, completing the move to Cox's Bazar on 14 Nov 44. The operational tour lasted till 17 May 1945. No. 3 to No. 10 squadrons post formation put in intensive training and all saw action on the Burma front against the Japanese, initially to throw them out to Burma and then to throw them out of Burma. Siege of Imphal. By 1944, the IAF had 9 squadrons, all flying the Hurricane but No. 7 and 8 that flew Vultee Vengeance dive bombers. No. 6 Sqn deployed at Cox's Bazar on the Arakan coast in Nov 43 followed by No. 8 dive bomber squadron.

Sqn Ldr Meher Singh through his extraordinary courage earned a DSO (Distinguished Service Order) the only one to be won by a member of the IAF. F/O J. C. Verma of No. 6 squadron earned the DFC for shooting down a Japanese Oscar while himself flying a Hurricane. These squadrons carried out reconnaissance, dive bombing in support of troops and also dropped needed supplies, contributing to both morale and physical victories of the ground troops. By June 1944 No. 6 and 8 squadrons were withdrawn from the Eastern front and replaced with No. 4 and 9 Sqns based at Feni and Comilla respectively.

The Japanese attacked in strength early in March and soon crossed the Chindwin river. Imphal was completely surrounded and besieged with all lines of land communication cut off. The only supply was by air. At this time No. 1 Sqn of IAF was based in the Northern part of Imphal valley. The first person to see the Japanese was, then Sqn Ldr, Arjan Singh who while returning solo from another mission noticed troops in strange uniforms at the Northern end of the valley, on which he on his own initiative called up his

squadron becoming the first to attack the Japanese who had come up to the outskirts of Imphal.

No. 7 Sqn based at Silchar was employed in bombing the Japanese wherever they were found. The months of April, May and most of June were spent in battling the Japanese in this area. Meanwhile Dakotas were used to supply Imphal as the land communications had been cut by the Japanese. This situation continued till end June when the forces under siege at Imphal and Kohima managed to break free of their sieges and link up. No. 1 Sqn was the squadron that stayed the longest in the battle area, fourteen months with Sqn Ldr Arjan Singh as its CO. his squadron's personnel were the heroes of Imphal. Sqn Ldr Arjan Sigh was awarded the DFC on the field of battle. Lord Mountbatten flew in to Imphal after the Japanese had been thrown back and at a ceremony pinned the DFC on Sqn Ldr Arjan Singh. No. 7 squadron's important contributions included bombing the Japanese supply line along the Kalewa-Tiddim road and the bombing and destruction of the bridge on the Manipur river on the Tiddim-Imphal road. On the Burma front the IAF flew Hurricane and Vultee Vengeance aircraft which had been discarded by the RAF to second line duty.

Despite facing superior Japanese aircraft the IAF gave a good account of itself. The high level of performance can be judged by the fact that at the end of World War-II Indian pilots had earned 1DSO, 22 DFCs (with one bar) and a host of other awards. 60 IAF pilots were killed in action. In recognition of the IAF's service and contribution King George VI conferred the prefix ' Royal' making it the Royal Indian Air Force in 1945. The IAF flew 16, 000

sorties/ 24, 000 operational flying hours over Burma of which 4, 813 sorties / 7, 219 hours were to credit of No. 1 Sqn alone in their 14 month stay.

Field Marshal Slim in praise of 6 Sqn of the IAF wrote: " I was impressed with the conduct of a reconnaissance squadron of the Indian Air Force. Flying in pairs the Indian pilots repeatedly went out, time and again, in the face of overwhelming enemy fighter superiority..... they were a happy, efficient, and a very gallant squadron. " This testimonial is proof, if any were needed, of the bravery and skill of Indian pilots, especially as it came from one of the greatest generals of World War-II. When World War-II started the IAF had just symbolic strength and its role was internal security on the frontier.

The IAF was expanded and re-equipped during the war years but still not with the latest aircraft. The years 1942 to 1944 saw the IAF gain maturity and when the war ended the infant IAF had matured into a strong and sturdy youth who had proved his mettle by passing through the ordeal of fire. Its performance during the war imbibed a sense of confidence and provided it with leadership to build up for greater achievements in the years ahead. The courage, daring and skill of the IAF personnel overcame relative inferiority of their equipment vis-a-vis the enemy's and gave an excellent account of itself.

The IAF established that " the man behind the machine matters more than the machine itself" (IAF was to adopt this as its credo in later years), with IAF's Hurricanes and Vultee Vengeance aircraft taking on the vastly superior Japanese Zeros among other Japanese aircraft. This lack of the latest weaponry persisted till very recently, with the IAF taking on PAF Sabre Jets

and F-104 Star fighters armed with Air-to-Air missiles with gun armed Mysteres and Gnats in 1965. The excellent performance despite inferior machines makes one wonder what this force may have achieved with more modern equipment. 1947 to 1960

At the end of WW-II the IAF comprised nine fighter squadrons flying Hurricane and Spitfire XIVs. It had sent one Sqn, No. 4 with the British Commonwealth Occupation Force to Japan. At this time need to raise a transport squadron was felt and No. 12 Sqn was raised with 10 Dakotas in 1946. The IAF phased out Hurricanes and replaced them with Tempest-IIs. In the training role Harvards and Tigermoths were used. In those early years service in the armed forces carried great prestige. Military service was one of the most sought after professions and hence the country's elite volunteered to join the IAF.

Getting high quality manpower was not an issue for the IAF in the initial years. The IAF of undivided India was carved into the current IAF and the Pakistan Air Force (PAF) in 1947 on partition of the country. India received seven fighter and one transport squadron while Pakistan was given two fighter and one (newly raised) transport squadron. Indo-Pakistan War 1947 J In response to the invasion of Kashmir by Pakistani irregulars on 20 Oct 47 and the call for assistance followed by accession to the Indian Union by the Ruler of the erstwhile princely state of J Dakotas of the IAF's No. 2 Squadron along with Dakotas supplied by Civil operators carried out a remarkable airlift at very short notice. Initially it was expected that Srinagar would fall to the raiders by 26 Oct 47. Shri VP Menon accompanied by military officers

flew in to Srinagar on 25 Oct 47 for a first hand assessment. Even at that time it was uncertain if the raiders had entered the outskirts of the city, and it was expected that they would take over the city in at most a day or two.

On 27 Oct 47 between 0930h and the end of the day the 1st Battalion of the Sikh Regiment had been airlifted to Srinagar airfield, then a dirt strip with no facilities. Thereafter an entire Brigade was airlifted to Srinagar in five days.

On 28 Oct 47 Tempests from Ambala attacked intruders at Patan and two days later Spitfires were inducted to Srinagar. IAF aircraft were the decisive element in turning the tide against the intruders in the battle of Badgam, Battle of Shalateng and in operations in the Uri and Poonch Sectors.

Air support proved crucial in stopping the advance of the intruders and turning the tide in India's favour. While these fighters were providing close support to the army, the transport force continued to land or airdrop vital supplies to friendly forces all over the state. At Poonch the our troops were hard pressed by the enemy. Due to losses in supply drops, the troops and refugees built a 600 yard airstrip in 6 days and Dakota ac flew in supplies to this airstrip, the first supplies were mountain guns that outranged the enemy's artillery.

The transport pilots continued to supply the forces in Poonch despite enemy fire, on the return trips evacuating refugees and casualties. The lone transport squadron kept the forces in the valley supplied and carried out casualty evacuation. Improvising to achieve desired results with what was at hand, the IAF used Tempests to airdrop supplies to the beleaguered Skardu garrison, as transport aircraft were not able to airlift supplies to Skardu. Leh.

Dakotas were the first aircraft to land at Leh, operating at the very edge of the aircraft's operational envelope.

At Leh an airstrip was prepared by 6 Apr 48 built by Engineer Sonam Narboo, at an altitude of 10680 ft and surrounded by mountains of up to 24, 000 ft. Despite the Dakota's ceiling of 19500 ft on 24 May 48 landing was achieved at Leh, against orders from higher Headquarters; on 01 Jun 48 six aircraft flew troops in to Leh, comprising a Gurkha battalion and 29172 lbs of load. These troops and stores were instrumental in securing Leh and its surrounding areas. Troops and supplies flown in to Leh were instrumental in saving vast tracts of land and securing the defences in the Ladakh sector.

Skardu. Skardu lies on the approach to Leh and dominates the easiest approach towards Leh. On 21 Nov 47 Lt Col Sher Jung Thapa set course from Leh and reached Skardu on 03 Dec 47, tasked to defend Skardu with remaining elements of 6J&K infantry that comprised 40 Sikh and 31 Muslim troops against more than 600 hostiles. Defence of Skardu was based on its fort, Col Thapa's troops enhanced to 130 non-Muslim and 31 Muslim troops after re-enforcements reached Skardu by 07 Feb 48 following a hazardous trek from Srinagar. The defenders had very limited food, water and ammunition.

Col Thapa asked for air support, which was ruled out by the IAF due to the distance, altitude of mountains enroute, lack of twin engined fighters and limited payload carriage at the extreme ranges required of aircraft and need to divert aircraft from operational tasks in vicinity of the Kashmir valley. By 9 Apr Col Thapa reported severe enemy pressure, no water and asked for

immediate air support. This was turned down by IAF saying that Dakotas could not fly over 4750m (approx 15580 ft) AMSL to reach Skardu and diversion of fighter effort would be at cost of other sectors.

However, on 19 and 20 Jun 48 air attacks were carried out by Tempest aircraft and on 28 Jun and 01 Jul supply drops were carried out by Tempests which continued intermittently till 17 Jul 48. With limited carriage capability of Tempests, this supply turned out to be too little too late. The IAF was called upon when it was totally unprepared and in process of coming to terms with and consolidating subsequent to its being cleaved into two separate and hostile Air Forces. Despite being totally unprepared for live operations at that time the IAF's performance once again brought into sharp contrast the high calibre of the men behind the machines.

Often luck did favour the IAF. Despite indications that Srinagar was on the verge of falling to the intruders, the IAF flew in troops aboard Dakota aircraft to Srinagar on 27 Oct 47. This was in a situation where it was not clear whether the Srinagar airfield was held by friend or foe. Luckily, the airfield was held by friendly forces. This incident brings out a lack of detailed operational planning and prudence in execution of operations of course with benefit of 20-20 hindsight.

The IAF would have been better served by possibly a fighter recce of the airfield followed by a precautionary landing by a fighter at Srinagar prior to the first Dakota landing to ascertain the state on the ground. Overall success often leads to drawbacks being forgotten, a dangerous thing as these may then repeat. The most glaring aspect is the fall of Skardu. Col Thapa's (of the

state forces) desperate pleas for supplies were turned down for reasons of altitude of terrain, oxygen etc, the same factors being overcome to operate to Leh.

The IAF often asked the army if they would accept diversion of fighter effort from other parts of J to Skardu, while of the 7 squadrons it possessed only three were deployed in J operations. It appears that both the Army and the IAF higher echelons at the time did not correctly assess the importance of Skardu and benefits of controlling it. Moreover, several important targets that could have led to greater success, asked for destruction by Gen Cariappa, were thus turned down by IAF for lack of resources.

The remaining squadrons were held away for a possible all out war with Pakistan which never came. Reassessment of the situation and redeployment of forces may have led to far better results and possibly much larger tracts of West J under our control, quite apart from Northern J that could have been saved through timely and better assistance to the Skardu garrison. A major limitation in deploying more squadrons to J sector was the limited range of Spitfires and lack of suitable airfields close enough to the area of operations.

Innovative solutions were often found for operational problems at the tactical and field level, as seen in supply drops to Skardu by Tempests while Dakotas were even used for bombing sorties with crew rolling out bombs from the cargo bay and refuelling of Spitfires at Srinagar by siphoning fuel from Dakotas. Willingness to try despite daunting odds and achieve desired results in face of adversity were amply displayed by the induction of troops

at Leh by Dakotas a feat that is especially noteworthy as the aircraft needed to be operated at the very limits of its capability landing at altitudes it was not designed for.

In this war the new fledgling IAF of independent India showed that it was a fully capable fighting force with abilities and operational maturity well beyond its years and a service that could overcome the limitations of its equipment to deliver required performance, but also highlighted some flaws in higher operational planning and execution. The IAF performed beyond expectations at the field level with some enviable achievements to its credit. However, higher leadership was clearly found wanting. Expansion

Cessation of hostilities gave the IAF time to consolidate and proceed with its re-equipment and expansion plans towards a 20 squadron force. One hundred Tempests and Spitfires were acquired from Britain. For the bomber fleet 40 B24 Liberator bombers were salvaged from USAF scrapyards. In Nov 1948 the IAF became the first air force in Asia to acquire jet fighters with induction of DeHavilland Vampire ac, of which eventually 400 were acquired. To reduce dependence on Britain in 1953 the IAF inducted Dassault Ouragan (Toofanis) ac. 104 of these were bought by the IAF.

Air Marshal S Mukherjee took over as the first Indian Chief of Air Staff on 01 Apr 1954. On Pakistan acquiring F-86 Sabres the IAF tried for FMk6 Hunters and on being denied these inducted the Mystere IVA, later when in 1957 export of Hunter FMk6 ac was cleared, these were also acquired. Gnat fighters and Canberra bombers gave further teeth to the IAF. Transport fleet was increased with induction of more Dakotas, Devons and Viscounts as well

as a squadron of Il-14s. Fairchild Packet C-119s also joined the fleet in 1954. In 1958 a decision was taken to manufacture the new HS 748 in India.

In 1960 No. 44 Sqn was raised with the An-12 ac. In the 1950s the IAF's helicopter wing was born with induction of Bell 47 two seaters, followed by Sikorsky S 55s and Mi-4s. This expansion led to the IAF expanding to 18 fighter and 5 transport Squadrons by 1959. 1960 to 1971 1961 Congo and Liberation of Goa. The IAF took part in operations in Congo in support of UN forces in Dec 1961 with its new Canberra bombers that carried out ground attack as well as escort of transport aircraft. The same month in India the IAF used liberation of Portuguese territories as an exercise to test itself.

With no air opposition to it, the IAF put airstrips at Dabolim and Diu out of commission and attacked strongholds to smoothen advance of the army. 1962 Sino-Indian War The IAF was not used in an offensive role in the 1962 Sino-Indian War due to policies and compulsions of the then Government, its role being restricted to air supply of land forces but it still played an important role in which it dedicatedly transported men, material and supplies using fixed wing and rotary wing aircraft despite all obstacles and impediments.

Air support for forward positions had been an ongoing activity along the northern borders since the early fifties due to lack of adequate land communication lines. Flying of transport aircraft in the mountains was mostly at altitudes above the aircrafts' safe normal operating altitudes. Supplies were air-dropped and even landed at improvised landing strips at very high altitudes. This was often done under enemy fire. On 20 Oct 62 an An-12 on a

flight from Chandigarh to Daulat Beg Oldi came back hit by Chinese LMG fire. On 25 Oct 62 five An-12 aircraft airlifted five AMX-13 light tanks to Chushul.

These tanks later played a major role in preventing capture of Chushul by the Chinese. The extent of air transport support provided can be gauged from the fact that post the Chinese invasion on 20 Oct 62, Chushul airstrip, earlier used to one An-12 or C-119 Packet sortie a day saw up to six An-12 and eight Packet sorties per day. Air support in the East was initially carried out by Dakotas alone which were later joined by Packets and some An-12 sorties (the last moving to the Eastern sector after flying in the West earlier the same day) . Helicopter sorties were also undertaken extensively to supply forward posts.

In fact two Bell 47 helicopters were destroyed by enemy action and captured by the Chinese at forward posts of the Indian Army in NEFA, while one Mi-4 was lost to ground fire in November and another was abandoned at Zimithaung and fell into Chinese hands. These losses bring out that the IAF continued to provide air transportation support to the army even when under direct enemy fire from enemy forces in close proximity. Later with the Indian army in full retreat helicopters were used extensively to pick up the wounded and other demoralised retreating stragglers. This war saw the first extensive use of helicopters by the IAF. Bell 47, Sikorsky S55s and Mi-4s, helicopters that had been inducted in the years prior to this war were extensively used to supply troops and for casualty evacuation. On 20 Oct 62 the IAF lost two Bell 47 helicopters to ground fire. The fixed wing transport fleet airdropped supplies to forward posts in NEFA and Ladakh. Otter aircraft with their short

landing ability landed supplies at Walong. In Aksai Chin in Ladakh the IAF's sole An-12 squadron flew in troops and light tanks to many positions.

The IAF's air supply effort was commendable and responsible in large measure for maintenance of forward posts and the resistance put up by Indian troops in face of superior Chinese forces. Non use of the IAF in the offensive role against the invaders is an opportunity missed. Use of offensive air power could have led to the Chinese forces being thrown back effectively and could have changed the very nature of geo-political developments since then. Though denied an offensive role the IAF performed creditably within the boundaries set out for it.

The air-supply effort was continuous and carried out despite all adversities including enemy fire. Helicopters proved especially useful in mountainous terrain as they were able to land in areas where fixed wing aircraft could not venture. This war led to maturing of the transport fleet as the fighter fleet had matured during the Burma Campaign. After this war Canada supplied Caribou STOL transports, while France speeded up deliveries of Alouette-III helicopters and the US loaned the services of a C-130 squadron and supplied some used Packets. A squadron of Otters was also procured from Canada.

The government entered into a contract with the Soviet Union for purchase of the MiG-21 on denial of the F-104 by the US. Disused airfields in the East were activated. To beef up the radar and communications networks some old radar units called Air Defence Ground Environment System (ADGES) were acquired from the US. Plans were made for setting up of a troposcatter communication system of which only one unit was set up before an embargo

imposed due the 1965 war, the remainder being set up by the IAF itself. To help IAF assess and rectify its weaknesses an exercise was conducted with the RAF and USAF in 1963.

Following this two batches of Indian pilots flew Sabres with the USAF's 4521 Squadron, in anticipation of US arms supply to India, which never fructified . The most important result of the 1962 war was Government sanction for IAF to grow to a 45 squadron force. The IAF set about the task of building up to a 45 squadron force in earnest after the 1962 war. This involved not just evaluation of different aircraft and negotiations for their purchase but measures to ensure supply of spares and training of pilots, engineers and other support services' personnel.

Apart from the ac already in service, the MiG-21 deal was concluded and the HF-24 Marut was on the production line. In addition to Packets and Dakotas, An-12s were acquired in 1961 and the same year some Super Constellations were taken over from Air India. Caribous were inducted after the 1962 war. A variety of helicopters were also in service. With growth of the service and its responsibilities, the Commands originally organised on a functional basis were re-organised on a part geographical and part functional basis for greater effectiveness.

Several airfield lying disused since World War-II were revived to fill the gaps in aircraft basing. It was while the IAF was in turmoil, re-organising the commands and in process of a major expansion that the country went to war again. Indo-Pak War 1965 The Indo-Pak War of 1965 was preceded by skirmishes in the Kutch region. These were followed by a Pakistani plan to

infiltrate irregular forces mixed with their regulars into J to incite a rebellion aimed to coincide with a Pakistan army attack across the Line of Control (LOC) in J.

In this attack the IAF was instrumental in stemming the Pakistan Army's advance in the Chamb sector. The Indian army reacted to this with a counter attack across the International border in Punjab on 06 Sep 65. IAF bases in the West were first attacked by PAF on the evening of 06 Sep 65. Adampur, Halwara, Srinagar, Pathankot and Jamnagar were targeted by aircraft from Sargodha, Peshawar and Karachi. The enemy Sabres heading for Adampur were intercepted by Hunters and the Sabres' mission did not succeed. At Halwara too the Sabres were engaged by Hunters and two were shot down. At Pathankot MiG-21s and Mysteres were damaged on the ground.

In retaliation on 07 Sep 65 six Mysteres raided Sargodha at 0530h. One Starfighter scrambled and attacked the Mysteres, shooting one down, but itself fell prey to a Mystere, quite an achievement for the Mystere pilot considering the vast disparity in performance of the two aircraft types. There were four raids on Sargodha on 07 Sep 65. In the East the PAF attacked Barrackpore, Kalaikunda and Bagdogra twice on 07 Sep. In the first raid at Kalaikunda losses were suffered by IAF in terms of aircraft destroyed on the ground, while in the second PAF raid later the same morning the PAF lost two Sabres to Hunters over Kalaikunda.

Following this the IAF attacked Kurmitola airfield. In the West IAF bombed Pak airfields at Sargodha, Risalewala, Chak Jhumra, Multan, Nawabshah, Peshawar and Kohat deep inside enemy territory. In these raids and on those

in the Eastern Sector on 07 Sep 65 no aircraft were lost to anti-aircraft fire. IAF lost just one Canberra to ground fire on 21 Sep 65. Maximum numbers of raids on each others' airfields were on 07 Sep 65 resulting in some losses. IAF carried out several counter surface force sorties, with No. Sqn (Mysteres) giving ground support in the Khemkaran Sector including in the famous battle of Assal Uttar. No. 31 Sqn struck the supply line shooting up trains carrying tanks and other supplies for the battle. No. 32 Sqn operated along the Ichhogil canal and in the Lahore Sector. Hunter squadrons, No. 7, 20 and 27 were engaged in a variety of tasks from flying CAPs and interdiction missions and giving ground support in the major battles in Punjab. In the latter half of the war tactics were modified with night bombing by Canberras replacing daylight raids on each other's airfields.

The official IAF history admits to a loss of 75 aircraft in the 1965 war in combat as well as operational accidents. What stands out is admission of loss of 35 aircraft on the ground, accounting for two thirds of the losses . MiG-21s were inducted at end 1964/early 1965 and were flying with 28 Sqn, but due to lack of time for training coupled with the fact that most of the aircraft initially supplied were the Type-74 variant and not the MiG-21 FL (the latter with the R2L AI radar), despite flying about 80 sorties these did not contribute significantly to the war effort.

The only fighter with AI radar, these were not used for intercepts by night due lack of time for training, thus giving PAF B57s free reign of the night for repeated night raids on IAF bases. IAF flew 3, 937 sorties in the war. 17% of the effort was towards close support by fighter bombers, 17% was towards

other sorties by fighter bombers, 4% was Canberra night raids and 35 % was towards CAP over our bases. Close support and interdiction accounted for 60 % of total sorties. A significant number of sorties were flown in ferrying aircraft to and from Ambala to avoid B-57 night raids on our airfields.

In comparison the PAF flew 2, 363 sorties in all of which 55% were towards Air Defence, 27% towards army support, 4% towards day strike and 7% towards night strike . The large percentage of Air Defence sorties gives an indication of the IAF's offensive posture, forcing PAF onto the defensive.

Analysis / Lessons. The analysis of this War brings out several important lessons, some of which are as below : m ??? a)Dangers in use of obsolete aircraft and non-availability of required avionics was brought out clearly.

Vampires were extremely vulnerable as were Toofanis in skies where Sabres were to be met.

Lack of full operation of AI radar equipped fighters conceded night time skies to hostile bombers while lack of adequate ground based radar cover led to 35% of sorties flown to be in defensive purely visual CAPs over IAF bases as in most cases no radar direction was available. b)The IAF in general lacked dispersion and adequate protection for aircraft on the ground as well as adequate air defence (defensive counter air) capabilities. In the PAF raid on Kalaikunda Vampires were parked on the runway apron and Canberras in open blast pens, with little camouflage, thus vulnerable to strafing and rocket attacks.)Ground based radar cover was vastly inadequate and resulted in minimal warning of enemy raids necessitating airborne visual CAPs and making offensive sweeps by fighters ineffective. d)IAF had planned

for a long war and there were no contingency plans for a short war in which objectives would need to be achieved much faster without relying upon superior numbers to win an attrition based war. e) There weren't enough bases in the Rajasthan sector affecting air operations due lack of airfields in this sector. f) The MiGs were used for offensive sweeps which in absence of radar cover proved futile.

If bombers had been integrated with the sweeps some PAF fighters may have been encountered, but the PAF chose to ignore the sweeps and go about its tasks. g) Canberras performed extremely well despite their size and lack of manoeuvrability carrying out raids deep into Pakistan by day and night suffering just one loss to enemy action out of almost 150 sorties flown in the war. h) Lack of effectiveness of the MiG-21 in the 1965 War can be attributed solely to inadequate training as the same aircraft performed creditably in 1971. Rapid absorption of new equipment and development of new tactics to suit new technology emerged as a weak area. i) Passive air defence measures proved inadequate with a large number of aircraft lost on the ground to enemy air action. Importance and need of an integrated air defence network of early warning and GCI radar units was brought out. j) IAF's tactics needed improvement as seen by the large number of our aircraft that suffered self-damage from their own weapons' debris bringing out the importance of interaction with more technologically advanced countries, a lesson finally being implemented today as witnessed by the Garuda and Cope India exercises, apart from IAF participation in Ex Co-operative Cope Thunder. k) Co-operation between the IAF and the Army was sorely lacking with both planning in isolation resulting in ineffective air

support to land operations. The IAF should have carried out offensive operations against the PAF or Pak Army prior to the Indian Army crossing the International borders on 06 Sep 65, but due lack of intimation of the Army's plans this did not happen. l)While Pakistan's plan to take over J was foiled, analysis of the IAF's operations vis-a-vis the PAF clearly brought out several shortcomings in the IAF and most of these were addressed expeditiously to make the IAF more effective.)In 1965 IAF had no experience of a full fledged war and this was its first conventional war. Though the IAF prepared for war there was inadequate time to prepare thoroughly. Intelligence at the operating level was also found inadequate. As per indications the IAF today has plans for operations across the full conflict spectrum. n)IAF lacked well thought out passive air defence measures such as camouflaged hard blast pens for its aircraft. The issue has since been addressed and today the IAF has adequate hard camouflaged blast pens for all fighter aircraft.)An integrated air-defence system comprising radar units, static and mobile, SAMs and anti-aircraft guns was not in place. The system has since been put in place and its capabilities are being enhanced through induction of AWACS in the near future. p)Except for the Gnats, Canberras and Hunters most of the IAF aircraft, Vampires and Mysteres were obsolete and hence suffered high losses. This war also brought out that though the men behind the machines may be important, but the machines also matter! Today the IAF boasts of having some of the most modern fighters in the world such as Mirage 2000s and Su-30MKIs.)IAF-Army co-operation was unwieldy and ineffective due procedural problems. These problems were addressed immediately and refinements continue till date. r)IAF-Navy co-operation was

also lacking. The Pak navy bombarded an Indian naval base in Saurashtra without any interference from the IAF. These aspects have been addressed.

s) Availability of suitable weapons was also a drawback with aircraft often carrying out rocket (68 mm and 57mm) attacks and even gun attacks on runways, causing damage not commensurate with the effort and risk undertaken.

Since then the IAF has inducted specialist weapons for specific targets overcoming this lacuna. t) Sukhoi Su-7 fighter bombers were purchased in 1968 to replace the Mysteres. The project for a centralised training academy was sanctioned in 1966 and in three years the Air Force Academy was functional at Dundigal near Hyderabad. u) After the 1965 war improvements to airfields continued and concerted attempts were made to implement the lessons of the war. Inductions and consolidation also proceeded apace and by 1971 the IAF had achieved its expansion target of 45 squadrons, 35 fighter and 10 transport units.

TACDE was by now fully geared up to develop new tactics and impart advanced air combat training. The IAF had developed a potent force through dint of hard work and application by 1971. Indo-Pak War 1971 Tensions between India and Pakistan had been building through all of 1971 with the latter indulging in extremely repressive activities in erstwhile East Pakistan leading to a major influx of refugees into India. On 03 Dec 71 in a space of about five minutes PAF mounted simultaneous attacks on seven airfields and one radar station along the Western border.

At almost the same time Pakistani artillery started shelling Indian positions along the borders. In Chhamb sector on 04 Dec to 06 Dec IAF support was crucial in assisting Army units caught by surprise by a Pakistani offensive. This was despite lack of a clear bomb line due troops engaged in close combat. In the Eastern Theatre IAF provided massive airlift to the army forming air bridges with helicopters to assist the army cross obstacles such as rivers in the army's advance into East Pakistan. These air mobility operations demonstrated synergy of a very high order. In East Pakistan the IAF removed the PAF element from the scene in the first 48 hours and then attacked enemy lines of communication, carried out interdiction missions and provided extensive support to the army. IAF strikes put the PAF's main runways out of operation through bombing attacks by MiG-21s, resulting in total air supremacy for the IAF in the Eastern sector. Thereafter the IAF carried out extensive support for army operations. The final testimony to the IAF's abilities came in the form of the surgically accurate unguided rocket attack on Government House in Dacca where a high level meeting was in progress.

This attack led to Mr Malik the Pakistani governor of East Pakistan tendering his resignation and other senior Pakistani officers seeking shelter in Red Cross premises. IAF's contribution to successful prosecution of the Eastern operations came from none other than Gen Niazi the commander of Pakistani forces in East Pakistan when during the surrender ceremony talking to Air Mshl Dewan, AOC-in-C EAC he said " This (the Indian Air Force) has hastened the surrender. I and my people have had no rest during day or night, thanks to your Air Force.

We have changed our quarters ever so often, trying to find a safe place for a little rest and sleep so that we could carry on the fight, but we have been unable to do that. " In the West the IAF provided extensive air support to army units whenever required. In addition interdiction missions reduced the pressure on our army by destroying enemy forces and supplies before these could reach the front. This was especially so in the Fazilka sector where the Pak army attempted a breakthrough.

Pak armour and a major supply base in the vicinity of the Changa Manga forest area were destroyed by air action. This essentially halted the Pak offensive in this area, destroying their forces before these could be brought to bear on our forces. The battle of Longewala stands out as an example of IAF efficiency and effectiveness. A regiment of Pak armour along with a brigade strength of troops ingressed near Longewala in the Rajasthan sector, with potential to threaten the supply lines of 12 Infantry Division which was preparing to attack Northwards.

Hunters operating from Jaisalmer alone decimated the Pak forces, destroying half their tanks and causing heavy casualties to the enemy, effectively blunting the enemy thrust. Four Canberras led by then Wg Cdr KK Badhwar operating from Pune attacked Karachi harbour on night of 09 Dec 71, setting oil storage tanks ablaze, almost at the same time as the missile boat attack on Karachi harbour by missile boats of the Indian Navy. A major innovation was use of An-12 aircraft as bombers.

These attacks were carried out by night on enemy supply depots in the Changa Manga forest area, in the area around Kahuta in the Haji Pir salient

near Poonch, Fort Abbas, the HQ of Pakistan's 18 Division followed by the area around Suleimanke headworks near Fazilka, leading on to attacking the railway marshalling yard at Rohri and then the Sui gas plant in Sind. In the last bombing attack of the war by An-12s, a single aircraft led a formation of Canberras to bomb Skardu airfield. IAF flew some 7346 sorties in 14 days averaging some 500 sorties per day.

Of these combat sorties numbered 5400. Highest number of sorties was flown by Gnats, 1, 275 sorties, for two losses; the next highest sorties were flown by the MiG-21s with attrition rate of 0.5 percent, a total of eight aircraft were lost, two in the East and six in the West. Attrition rates were highest for Mysteres and Maruts. This was possibly due to the vintage of the Mysteres coupled with ground attack tactics in vogue. 40 percent of aircraft on strike missions suffered self damage pointing towards need for further refinement of weapon delivery tactics.

In the West the IAF attacked PAF bases at Sargodha, Mianwali, Murid, Peshawar, Chakjhumra, Shorkot, Chander, Masroor, Drigh Road, Talhar and Nawabshah. In the East all PAF bases were attacked. Interdiction missions successfully destroyed or damaged about 50 trains in the West while in the East the entire railway system was paralysed. In the West nine railway junctions were also attacked, all this was done while providing effective air defence and close support to the army whenever called for. The 1971 war saw the IAF in full bloom. Lessons of the 1965 war had been learnt well and almost all shortcomings that came out in 1965 addressed.

The passive defence measures were adequate for the task and radar coverage had improved. While obsolete aircraft such as the Mystere and Vampire were still used at times these were in an air defence environment that did not threaten them as much as in the earlier war. The IAF established total Air Supremacy in the Eastern Theatre in 48 hours and retained ability to establish local air superiority in areas of its choosing in the West. While the tactics followed by the IAF were still not always the most effective, one can not argue against 90, 000 POWs. TACDE was formed to address the shortcoming seen in tactics.

Overall the IAF had matured considerably between 1965 and 1971.

Especially noteworthy was the excellent Air-Army co-operation. 1971 Till Date The years after the 1971 war saw the IAF consolidate its capabilities, with more advanced variants of the MiG-21 in form of the MiG-21M and MiG-21 MF followed by the MiG-21 Bis entering service. A more advanced version of the Gnat , the Ajeet was inducted. Over time the IAF initiated a search for suitable replacements for ageing aircraft, notable among which was need for a Deep Penetration Strike Aircraft (DPSA). After evaluating several types, the SEPECAT Jaguar was selected for induction.

In the early 1980s Pakistan received F-16s from the US. Search for an equivalent aircraft led to induction of the Mirage 2000 followed by the MiG-23MF, with some MiG-23BN strike aircraft also being inducted. These were followed by MiG-29s. The radar network was also beefed up with induction of PSM, TRS 2215 and ST-68 radars. As part of its modernisation process the IAF selected the Su-30MKI as its high end fighter for the future, modified to

the IAF's specifications and took up the upgrade of the venerable MiG-21 Bis to extend their useful life till such time as the indigenous LCA becomes available.

Operation Cactus A coup was attempted to overthrow the legal government of the Maldives in Nov 1988. Responding to a call for help from the Maldives government India activated her forces to render assistance. On 03 Nov 88 at about 0715 hrs No 44 Squadron was ordered to place three aircraft on 'Stand By Three Hours' notice. The CO of the squadron and his crew arrived at a very accurate assessment of their possible task from watching the TV news and prepared flight plans for Hulule in the Maldives even prior to their formal tasking, thus saving crucial time.

By 1530 hrs, the first three aircraft with crew of 44 Squadron and the vanguard of a Parachute Brigade were ready for action, awaiting instructions, when officers from Army and Air HQ arrived at Agra with firm orders. The Maldives terrain ruled out a Para drop, hence a landing was planned for, information available indicated that the Hulule airfield was still lightly held by friendly forces. The Il-76 aircraft safely landed at the airfield, one never flown to by the crews before, the landings conducted in the dark without benefit of any landing facilities including runway lights.

The timely induction of Indian troops enabled restoration of the rightful government of the Maldives. The air assault at Hulule was India's first undisclosed strategic intervention at the request of a neighbour. This operation demonstrated India's ability to carry out rapid deployment of her military forces to meet contingencies. Good training, measured audacity,

daring initiative, swift action, considered decisions, full backing and non-interference in military matters by political leadership, all contributed to the success.

The IAF's excellent performance in International exercises such as the Garuda series, Cope India and Ex Co-operative Cope Thunder bring home the fact that the IAF today has indeed come a very long way from its humble beginnings in 1932, much like a beautiful butterfly compared to the caterpillar from which it metamorphosed. Today at the threshold of the Twenty-first century the IAF is poised to transform from an Air Force to an Aerospace force and secure the nation's security on earth and beyond.