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From Kargil to Balakot: The Continuing Challenges to India's Modern Air Power

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ABSTRACT Most leading air forces around the world were quick to learn from the experiences of the US Air Force between the Vietnam War in the 1960s and the Gulf War three decades later. This resulted in the widespread adoption by these forces of Precision Guided Munitions (PGMs) beginning in the mid-1990s. Only a few of these air arms, however, have matched the overall effectiveness of US air power, which combines aircraft survivability with weapon range, accuracy and lethality. This brief looks at kinetic Indian Air Force operations in the 20 years from the Kargil Conflict (May-July 1999) through the present day (Balakot, February 2019). It focuses on the technological and technical challenges over the years, the evolution of capability, and issues that remain unaddressed.

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INTRODUCTION

The Indian Air Force (IAF) was established in 1932, when India was still under British colonial rule. In the Second World War, the service participated in a range of operations from counter-insurgency in the North West Frontier Province (NWFP) to conventional air operations against Imperial Japanese forces in the east, earning the 'Royal' prefix in 1945. At the time of India's independence in 1947, the Royal Indian Air Force was operating a mix of fighters and transport aircraft, and these were pressed into action almost immediately in October 1947. The day after Maharaja Hari Singh acceded to the Dominion of India, C-47 transports of the RIAF airlifted the 1st Battalion of the Sikh Regiment into Srinagar to fend off Pakistani militia flooding into the state from the west. Spitfire and Tempest fighters entered the action a few days later, and were instrumental in reversing the tide and forcing a ceasefire in January 1949.[1]

By the time India became a republic in January 1950 and the IAF dropped the 'Royal' prefix from its name, the force was already operating jet fighters and heavy bombers. Helicopters entered the fleet in the mid-1950s and the transition to jet-powered bombers followed shortly, with English Electric Canberras arriving beginning in 1957. These were sent for India's first overseas deployment in 1961-64, part of a composite force of combat aircraft under the United Nations Operation in the Congo (*Opération des Nations Unies au Congo*, or ONUC), where they served well alongside aircraft from other countries, including Ethiopia, Sweden and Italy.[2]

The 1962 China-India War saw both countries limit their use of air power. The IAF was restricted to casualty evacuation and transport sorties in support of ground forces; this has been lamented not only by historians who have made accounts of the conflict, but also by a serving Chief of Air Staff in 2012.[3] The situation was different during the next major conflict, when the IAF and the Pakistan Air Force (PAF) duelled unrestricted over both Western and Eastern fronts in September 1965. Despite facing more advanced fighters such as the F-86 Sabre, the IAF gave a good account of itself in the air, enabling key Indian Army successes on the ground. It is worth noting that the bulk of India's aircraft losses during the month-long conflict took place on the ground, and not in aerial combat.[4] Although the 1965 War was effectively a military stalemate with the outcomes eventually decided on the negotiating table rather than the battlefield,[5] the experience did inform a number of reforms in the following years, leading to independent India's most unequivocal military victory in 1971.[6]

The years between the 1965 and 1971 wars were characterised by a comprehensive modernisation and expansion of the IAF, punctuated by a brief air action against a Mizo National Front uprising in March 1966.[7] The litmus test for the modernised Indian Air Force came during the 1971 India-Pakistan War. In both Eastern and Western theatres, the IAF was able to secure superiority against the PAF, and eventually achieved complete air supremacy in the East. Air strikes on the Government House in Dacca (now Dhaka) on 14 December precipitated the immediate resignation of Abdul Motaleb Malik, Governor of East Pakistan, and led to the eventual surrender of East Pakistani military forces and the creation of a new nation, Bangladesh.[8]

Following the 1971 victory, another round of modernisation commenced in the late-1970s. The IAF also continued to see action, principally as part of the Indian Peace Keeping Force in Sri Lanka from 1987 to 1990. The next time the Indian Air Force would see combat was a decade later, during the Kargil Conflict in 1999.

MODERN INDIAN AIR POWER

The 26th of February 2019 marked the first time the Indian Air Force had conducted airstrikes in Pakistan since 1971. In 1994, Elliot A Cohen wrote of the use of air power in the Gulf War: "Air power is an unusually seductive form of military strength, in part because, like modern courtship, it appears to offer gratification without commitment."[9] After the Balakot strike, it appeared the Indian political leadership was alive to this idea as well, following decades of eschewing air power in favour of no kinetic action (2001 Parliament attack, 2008 Mumbai attacks[a]), or limited land-based action across the Line of Control (various so-called 'surgical strikes'[10]).

However, even now it remains to be seen whether strikes like Balakot can establish deterrence against Pakistan's use of terror in the subcontinent, if the aforementioned gratification can be had without the requisite commitment.[11] Although the costs imposed on Pakistan in the months following were not insignificant, the rapid de-escalation after the aerial skirmish that took place the day after the strike suggests that neither side had much appetite for the risks of continuing the stand-off. Nevertheless, the airstrike did bring to the fore certain lessons, primary of which was that shallow reprisals along the LoC will always have less impact than deeper strikes, and deep strikes are only possible through air power.

MAJOR INDIAN AIR OPERATIONS: 1999-2019

There have been successes and failures for the IAF in every air action since Kargil. This brief will focus principally on the technical aspects, rather than the tactical. Standing apart, and somewhat neglected compared to those two, is perception management. This is an issue that is repeatedly raised yet has rarely been satisfactorily addressed, and for a myriad of reasons.

The impetus to media management that followed the Kargil conflict, for instance, appears to have been misinterpreted as a call for outright propaganda, which rarely ends well. The narratives surrounding the Balakot strike and the events of the following day immediately highlight a credibility deficit that the IAF and the Defence Ministry must work to address. More institutional transparency, and more frequent interaction with outside commentators would allow for less 'crisis-like' communications at times of actual conflict. The sustained outreach would also build institutional messaging capability and familiarise not only domestic but also international commentators with Indian military concepts and operations.

a All branches of the Indian military carried out large-scale mobilisations in response to terror attacks in 2001 and 2008, prompting similar mobilisations in Pakistan. However, political clearance to actually carry out retaliatory action in Pakistan was never issued and both sides eventually demobilised. The only exception was an air strike to clear a Pakistani intrusion on the Indian side of the LoC in August 2002, during the 2001-2002 mobilisation.

On the technical front, it is worth examining the capabilities and limitations the last three times the IAF has fired weapons in offence — Kargil 1999 (Operation *Safed Sagar*), Operation *Parakram* (2001-2002), and finally Balakot — to establish trends and highlight chronic or emergent deficiencies.

Operation Safed Sagar

During Operation *Safed Sagar*, the IAF's part in the 1999 Kargil conflict, the IAF was tasked with prosecuting targets located at unprecedented heights — between 4000 and 6000 metres. The government had also restricted the Air Force from crossing the LoC under any circumstances, to minimise the chances that the conflict might escalate beyond the Kargil theatre. Nevertheless, the initial view was that existing ground attack aircraft, weapons and tactics would suffice. Indeed, early strikes were deemed effective, but after the loss of two aircraft (a fighter and a helicopter[b]) to enemy shoulder-fired missiles (man-portable air defences, or MANPADS) the IAF was forced to innovate "on the fly" — electing to employ previously untested GPS-aided bombing. This was essentially little more than using a cockpit-mounted GPS unit to display an aircraft's position relative to a pre-set enemy target, and release ordnance from height at the correct GPS position after correcting for forward travel of the bombs.[12] Although the system kept aircraft out of harm's way, it reduced accuracy in a scenario where pinpoint impacts were required.[c] High-altitude bombing also meant airborne controlling and post-strike battle damage assessment were essentially unviable, making targeting and follow-up strikes an imprecise affair.

On the other hand, there was little interference from the Pakistan Air Force, which gave the IAF much more flexibility than it might have otherwise had. Two principal factors were responsible. First, the PAF could not be expected to engage the IAF in support of infiltrators that the Pakistani state had officially disavowed.[13] Second, the IAF's long-range R-27 and Super 530D missiles — on the MiG-29s and Mirage 2000s, respectively — conferred an advantage in beyond visual range (BVR) combat that the PAF could not overcome at the time. IAF air defence fighters deployed in theatre also overwhelmingly outnumbered the PAF detachment at Skardu, although it is unclear whether PAF intelligence had enough information on the Indian disposition for this to have been a factor.

It was not until the introduction of the Mirage 2000 in mid-June 1999, with superior high-altitude performance *and* a nav-attack system that could take advantage of the aircraft's kinematics, that IAF airstrikes regained their potency.[14] In addition, the Mirage 2000 was the only aircraft in the inventory at the time capable of being modified in time to use laser designation pods (the Israeli Rafael Litening) and laser-guided bombs (LGBs, American Paveway II kits mated

b It is worth noting that the fighter and helicopter were not shot down due to poor tactics, but because the former was circling low in search of a pilot that had ejected after an engine failure, and the latter was pressing home a rocket attack at close range without countermeasures equipment.

c Accuracy eventually improved as delivery techniques were refined.

to standard 1000-pound gravity bombs). The Mirages entered the operation nearly three weeks after it had commenced and dropped only a small fraction of all ordnance by weight, yet had a disproportionate effect on the outcome, and certainly the bombing campaign. It is worth noting here that Soviet-origin strike aircraft such as the MiG-23BN and MiG-27 were fitted with similarly sophisticated attack systems, but these were highly unreliable and difficult to keep operational that they were essentially ignored, and GPS-aided bombing from the Soviet aircraft became *fait accompli*.[15] The Mirage was not fitted with GPS equipment at all, so GPS-aided level bombing was never attempted with the type.

Precision-guided bombs were used sparingly, fewer than ten Paveway II LGBs being dropped through the conflict, although with near-perfect results each time. In fact, the certified PGM system for the Mirage 2000—a combination of the French Atlis II pod and a single 1000-kg Matra BGL-1000 LGB—was never used. The explosive effect of the bomb was judged as "overkill" for the Kargil campaign, and with only 60 bombs in service, the BGL-1000 was held in reserve for high-value targets in Pakistan proper in case the conflict expanded beyond the LoC.[16]

As noted earlier, the switch to GPS-aided bombing made pre- and post-strike target assessment more difficult, but the all-weather, day-and-night bombing campaign certainly dented enemy morale. Radio intercepts and diaries captured during the operation by ground forces revealed the severe psychological impact of the unopposed IAF air strikes throughout the conflict. By the end of the conflict, and in several post-action analyses, it was clear that not only had air power played a key role in India's victory in 1999, it had also hastened the eventual Pakistani capitulation.[17]

Operation *Safed Sagar* was a steep learning curve for the IAF and prompted an overhaul of weapons and tactics that began almost immediately after the campaign. Limited conflict under a nuclear umbrella meant that pinpoint targeting information to extract the most from weapons and aircraft was crucial. PGM adoption (Israeli Griffin and US Paveway LGB kits) became widespread with more aircraft being adapted to use these weapons. Training expanded to qualify more aircrew and aircraft types for 'Kargil-esque' high-altitude operations. Finally, upgrade programmes for the principal strike aircraft in service — the Jaguar and MiG-27 — were initiated.

Operation Parakram

After an attack on the Indian Parliament by Pakistan-based terror groups on 13 December 2001, the armed forces of India were mobilised under Operation *Parakram*, beginning a stand-off with Pakistan that lasted nearly a year. By this time, targeting issues during the bombing campaign in 1999 that centred on converting relatively imprecise Army grid references to standardised GPS coordinates had been addressed and resolved.[18] The IAF began its own targeting studies in 2000; this and subsequent efforts expanded and improved the quality of targeting information available to the Air Force. Aim points ranging from the strategic to sub-conventional were identified and mapped out. These were eventually subsumed into a joint target list, with coordinates verified in three axes and available to all three services.[19]

Although there was no sustained Air Force bombing campaign during Operation *Parakram*, the IAF did conduct a single strike during the stand-off, to neutralise a shallow Pakistani incursion along the LoC. This mission was instructive for its difference from the opening stages of the Kargil conflict three years prior, despite similar constraints regarding terrain and crossing the LoC. First, better intelligence regarding enemy disposition and capabilities, including presence of MANPADS, was available. Second, the exact location and coordinates of the enemy target at Point 3260 in the Machhil sector were established. Third, the attack was planned and executed to minimise exposure to enemy defences and maximise probability of success from the outset. The single mission employed precision-guided ordnance from the outset, without any attempt made at using cheaper weapons or conserving specialised munitions.

The strike itself was relatively straightforward. After being thwarted by foul weather multiple times (a notable limitation of LGBs), the Pakistani post was destroyed on the afternoon of 2 August 2002. An IAF ground team at a forward location used a handheld laser designator to illuminate the enemy position as a formation of four Mirage 2000s struck it with LGBs.[20] There was no learning curve on this occasion. The technology, techniques and equipment used in the attack were well understood in service. All participants were trained and familiar with the hardware, mission profile, and terrain. The strike reinforced a key joint-services lesson from Kargil: air power keeps lives from being needlessly lost in frontal assaults to take and hold territory.

Like the Kargil conflict, serious air opposition was absent during the mission. Pakistani fighters were scrambled, but too late for any engagement.[21] In any event, the IAF still outranged the PAF in the BVR sphere, and escort Mirages on the Indian side of the LoC would have had little trouble warding off intercepting PAF fighters.

Balakot

On 14 February 2019, a suicide bomb attack on a Central Reserve Police Force convoy in Pulwama, J&K, killed 40 Indian paramilitary personnel. The attack was claimed by the Pakistan-based Jaish-e-Mohammed (JeM) jihadist group.[22] Twelve days later, the IAF carried out an airstrike on a Jaish-e-Mohammed training camp at near Balakot in Pakistan's Khyber Pakhunkhwa. Although no official statements have described it as such, the airstrike was widely understood as a response to the 14 February attack. The Indian Foreign Secretary's official statement on the day of the air strike, however, described it as a "non-military preemptive action" taken "in the face of imminent danger" with no reference to Pulwama. Describing the target as Jaish-e-Mohammed's "biggest training camp" headed by Yousuf Azhar, brother-in-law of JeM leader Masood Azhar, the Foreign Secretary's statement claimed "a very large number of JeM terrorists, trainers, senior commanders and groups of jihadis who were being trained for fidayeen action were eliminated."[23]

The Balakot strike on 26 February 2019 had much more in common with the August 2002 mission than Operation *Safed Sagar*, although the relative successes of both

missions owe a great deal to the six-week bombing campaign of 1999. Balakot, however, marked the first time since 1971 that Indian aircraft had crossed an international border to deliver bombs in Pakistani territory (as opposed to occupied J&K).[24] Like the *Parakram* strike, intelligence on the target was comprehensive and up to date, and precision-guided munitions delivered by Mirage 2000s were selected for the mission. Airborne resistance was not anticipated, nor was it present until after the aircraft had delivered their payloads. The aircraft made shallow incursions across the LoC to provide the best range-altitude conditions for their weapons and returned to Indian airspace long before they could be intercepted.[25]

Pakistani officials, particularly the Director General of Inter-Services Public Relations (DG ISPR), claimed the attack had been prevented.[26] However, Air Chief Marshal (retd) BS Dhanoa, Chief of the Air Staff at the time of the attacks, revealed at a public discussion in December 2019 that the PAF was likely unaware of the existence of the camp at Balakot. Dhanoa noted that there were "no terminal defences" (transportable short-range air defence weapons) at Balakot in the lead up to the IAF strike, which implied that the PAF was not expecting an attack there.

On the other hand, the Jaish-e-Mohammed headquarters in Bahawalpur did have terminal defences manned by the PAF, indicating that there was a lack of coordination between the PAF and other elements of the Pakistani military regarding JeM locations in the country.[27] The PAF, which had been on alert in anticipation of an Indian reprisal since the 14 February attack, did have aircraft airborne on 26 February, but these were decoyed away to the south by a second package of IAF fighters that feinted toward Bahawalpur.[28]

The following morning, however, Pakistan attempted an aerial riposte the details of which have been hotly contested since. The DG ISPR claimed that PAF fighters had deliberately missed Indian military targets in the Poonch-Rajauri sector of J&K to ensure that the events of the previous day did not go unanswered.[29] In the ensuing interception and engagement, the DG ISPR initially claimed two IAF aircraft had been shot down and three pilots were captured. Similar claims of multiple pilots captured were later repeated by the DG ISPR and in other official Pakistani statements, before it emerged that only one Indian MiG-21 Bison had been downed and its pilot taken prisoner.[30] The following day, the Indian Defence Ministry released a statement saying the PAF attack had been foiled by IAF interception, admitting loss of one aircraft and pilot, and claiming a PAF F-16.[31] Although no wreckage was able to confirm the F-16 claim, the IAF later released radar data that showed an enemy aircraft track disappearing over the area.[32] For its part, Pakistan has not been able to produce wreckage of anything other than a MiG-21 Bison or any prisoners other than its pilot, Wing Commander Abhinandan Varthaman.

While the debate over whether or not a Pakistani aircraft was lost on 27 February 2019 remains open, Air Chief Marshal (retd) Dhanoa conceded there had been lapses in the IAF's ability to "impose significant costs on the PAF" on 27 February.[33] Regarding Pakistani and other[34] claims that the Balakot strike itself missed, Dhanoa declined to be drawn into specifics but noted that external analyses did

not know IAF "aim points" or details of the munitions used in the operation. He said the mission was not intended to effect large-scale destruction, or other weapons, including the BrahMos cruise missile, could have been used.[35]

AIR POWER EVOLUTION

The most obvious trend that emanates from Kargil is the IAF focus on targeting. Striking point targets on high peaks and ridges with relatively primitive technology in 1999 highlighted the mismatch between IAF weapons and targeting that has since seen a great deal of focus. As noted earlier, there are hypotheses that the Balakot strike missed owing to targeting inaccuracies in elevation.[36] But given that the IAF was successfully prosecuting such targets with high-altitude blind bombing in 1999, as well as investing heavily in its own and later joint targeting, these hypotheses hold little water.

Use of precision-guided stand-off weaponry was also a first during Balakot. Like the *Parakram* strike, the IAF started with the highest-end weaponry available, *unlike* Kargil where it elected to employ cheaper unguided munitions in bulk rather than use up precious PGMs. This signals not only confidence in weapons employment but also an understanding of the escalation environment and a degree of certainty in escalation management.

On the other hand, a number of lessons from 1999 and 2002 were either not adequately internalised, or have been stymied by the vagaries of Indian defence management and procurement processes. Operation *Safed Sagar* and even *Parakram* highlighted the importance of GPS guidance and accurate coordinate-based targeting, the reliability and capability of the Mirage 2000, the disproportionate effects of precision weapons, and air superiority secured by outranging the enemy's BVR weaponry. None of these learnings have been comprehensively operationalised.

Even though there was no stand-off strike ordnance available in 2002, the IAF's air-to-air advantage over the PAF was carried over from Kargil with the availability of longer-range BVR missiles. However, the PAF procured large numbers of upgraded and new-build F-16s from the mid-2000s onward, and AIM-120 AMRAAM BVR missiles entered service in 2010.[37] The historical trend of India outmatching Pakistan technologically was broken when the IAF failed to push through any procurement that could counter the F-16 and AMRAAM combination. The result of this inaction was the engagement on 27 February, with IAF fighters being forced to react to PAF long-range missile shots.[38] This was followed by public remarks by the then Air Chief, who claimed that if the Rafale and its Meteor BVR missile had been in service during the skirmish, the outcome might have been different.[39]

With the Mirage 2000 proving the most valuable aircraft of the Kargil conflict, a case was immediately initiated to procure this aircraft in large numbers to serve as the mainstay of the IAF going forward. Instead, the MoD decided that an earlier Cabinet approval for ten additional Mirages would be finalised, while the larger procurement would be competitively tendered. What followed was a

long and complex saga, the now-infamous 126-aircraft 'Medium Multi-Role Combat Aircraft' (MMRCA) programme.[40] The meandering procurement was abruptly terminated in April 2015 when PM Narendra Modi announced a government-to-government deal with France for 36 Rafale fighters.[41]

Even fighter upgrades have suffered from delayed action — the upgraded Mirage 2000-5 was prototyped in France as early as 1990, yet India contracted for its own Mirage 2000 upgrade over 20 years later, in 2011. The first upgraded jets were delivered in 2015,[42] and the upgrade programme is still not complete. Similarly, the MiG-29, which though potent was never particularly reliable, was not contracted for upgrade until 2008, a decade after the manufacturer had demonstrated the upgraded variant.[43] Like the Mirage fleet, the MiG-29 upgrade is also still ongoing. However, despite these and other upgrade programmes, a secure radio or multi-platform datalink remains a critical deficiency, one that was exploited by Pakistan in 1999 and again in 2019.[44]

Meanwhile, of the other aircraft that have received upgrades in the past 20 years, nearly all have been fitted with highly accurate navigation systems that combine ultra-precise inertial navigation platforms with global navigation satellite system (GNSS) updates. Yet few weapons in service can take advantage of this GNSS-INS accuracy. The incredibly accurate attack systems on the IAF's upgraded Jaguars can therefore drop unguided weapons with unerring accuracy, but will generally not face the permissive battlefield conditions that will allow them to safely do so. There is no equivalent to the all-weather Joint Direct Attack Munition (JDAM) in the IAF arsenal — a bomb that can cheaply and reliably hit a target anywhere in time and space regardless of battlefield conditions. In fact, in the case of the SPICE-2000, which *is* an all-weather GNSS-INS weapon, albeit extremely expensive, the weapon could not even take advantage of its own cutting-edge navigation. Older, non-upgraded Mirage 2000s were tasked with the Balakot strike, and one was unable to launch its weapon due to a larger than normal drift in the aircraft's legacy inertial navigation system.[45]

Even accounting for the SPICE-2000's all-weather capabilities, atmospheric obscuration remains an issue for all but a tiny fraction of the IAF's PGM arsenal. True all-weather, day-and-night weaponry is still seen as 'silver bullet' hardware, to be preserved and protected and used only when absolutely necessary. Indeed, the SPICE-2000 itself simply replaces an older penetration weapon that was in service with the Mirage fleet in similarly limited numbers — the Matra BGL-1000. A myopic one-for-one replacement led to the use of penetration weapons against unhardened targets at Balakot, with the result that destructive effects were not visible at the target. The IAF has belatedly corrected this by procuring — again in limited numbers — SPICE-2000 guidance kits mated to Mark 84 warheads with greater explosive effects.[46]

CONCLUSION

The IAF's capability accretion over the past 20 years caters more than adequately for the last war. Yet as Balakot and the following day's engagement showed, it does not cater adequately for future conflict, or indeed for

present-day. Piecemeal, small-scale, and perennially delayed acquisitions remain the principal obstacles to comprehensive recapitalisation of the Air Force. There are, however, options available to India's air power practitioners, even amid budget uncertainties and rapidly dwindling fighter numbers.[47]

Wider PGM adoption in general, and all-weather PGMs in particular will provide a critical capability enhancement going forward. These will significantly offset the lack of combat 'mass' to address conventional deterrence and retaliation. While certification of the air-launched BrahMos cruise missile is welcome,[48] the extreme effects of the missile make it less suited to calibrated response along the lines of Balakot. Just as important as air-to-surface weaponry, the IAF's air-to-air arsenal is clearly in need of overhaul — and this does seem imminent, with newer Israeli, European and indigenous missiles on the cusp of widespread induction.[49] However, instead of knee-jerk inductions, piecemeal contracting and heterogenous platform-weapon combinations, the IAF will need to focus on standardisation of weapons across launch platforms and production of these weapons in-country. The resulting cost savings alone could make up for the flat growth in capital spending that has limited aircraft acquisitions and stunted the IAF's expansion. ORF

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