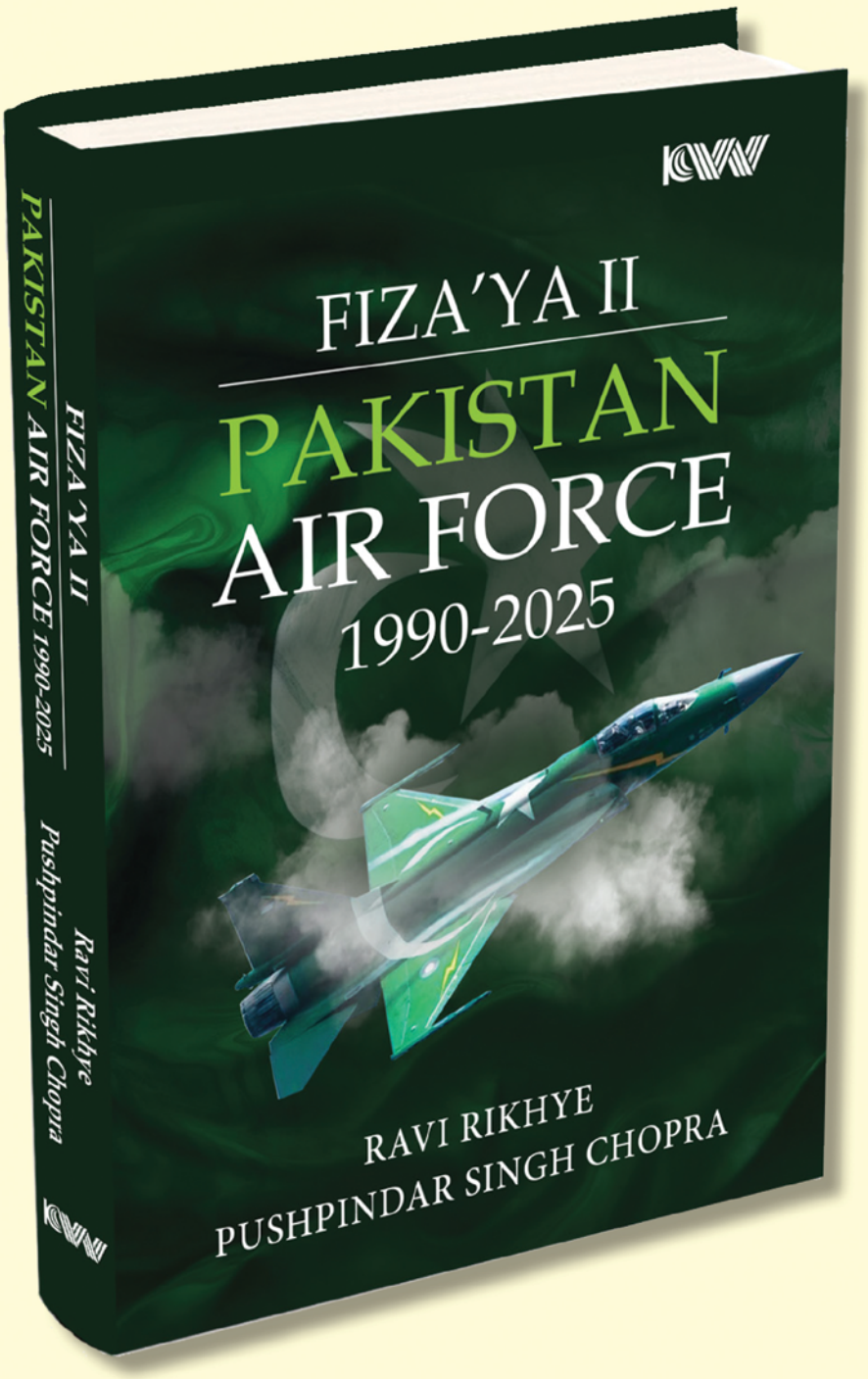
VAYU

Aerospace & Defence Review

IV/2025

More on Operation Sindoor
Domestic drone/UAV news
Dassault tie–ups in India

41 years later: to the ISS
Developments at HAL
Israel–Iran conflict–an analysis



This is a long-delayed follow-up to Fiza'ya: The Pakistan Air Force 1947-1990, by Pushpindar Singh Chopra and Ravi Rikhye. The delay was occasioned by Ravi's departure in 1989 for home in the US, and then the unfortunate and much-too-early death of Pushpindar Singh.

The book covers the PAF 1990-2025; its successes and failures; and particularly its orders of battle during this period. It covers PAF operations, modernisation, and the growth of Pakistan Air Force co-operations with a variety of allies and like-minded nations. The book particularly emphasises the growth of Pakistan-China air nexus.

Though direct comparison with the Indian Air Force is avoided, it becomes clear meanwhile India has failed in its air modernisation to the point it is barely superior to the PAF as opposed to the former's historic 3-1 superiority. Factor in the rise of China as a co-belligerent against India, and the salient point of this book is India is totally outclassed in the air.

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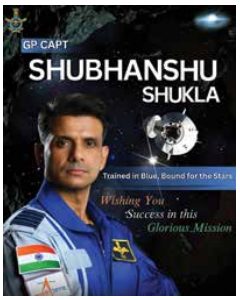
Cover : Photo by Simon Watson of an IAF Jaguar; the type that participated in Operation Sindoor.



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Admiral Arun Prakash says....

....1971 to Operation Sindoor, a paradigm shift in warfare

The news of Indian Air Force (IAF) missiles striking Pakistan Air Force (PAF) base Nur Khan with pinpoint accuracy during Operation Sindoor took me back to the morning of 4 December 1971. Serving with an IAF squadron, I had led a section of two fighter bombers to strike the same target then known as PAF Base Chaklala. Located just a few miles northeast of the Pak army headquarters in Rawalpindi, it was a heavily defended base, but my wingman and I returned home safely, after attacking some transport aircraft on the ground.

Separated by 54 years, Operation Sindoor, launched by India on 7 May 2025, in response to a terror attack in Pahalgam, and the 1971 India–Pakistan War are completely distinct events with vastly dissimilar contexts, objectives and scales. However, a brief comparison of operations may be informative for the lay reader to grasp how radically the nature of warfare has changed over the half century separating these two conflicts.

The proximate cause for outbreak of hostilities in 1971 was the pre–emptive strike by over 100 Pakistan Air Force (PAF) fighters on 12 Indian Air Force (IAF) bases in north India at dusk on 3 December 1971. This was followed by an extensive night offensive by PAF bombers. By midnight, India declared war. The IAF mounted a powerful counter–air response, and this provides the first major difference between then and now.

Most of the participating aircraft in 1971 were sub–sonic, second–generation fighters and bombers. The pilot's primary sensor was his eyeball, and since GPS had not yet arrived, navigation was by compass and clock. Armed with bombs, rockets and cannon (all of them "dumb" or un–guided), the attacking aircraft had to approach the target, enter a dive and release/fire weapons from a range

air missiles (SAM), inflicting heavy attrition.

Operation Sindoor, on the other hand, saw the deployment of fourth and fifth generation supersonic aircraft equipped with advanced sensors and smart, guided weapons. The long range bombs and missiles had stand–off ranges of 50 to 250 miles, and ground targets could, therefore, be attacked from within own territory, without risking exposure of pilot and aircraft to adversary ground fire or SAMs.

Another major threat to attacking aircraft in 1971 was the enemy CAP or combat air patrol mounted over vulnerable points/areas. When threatened by a CAP, the attacker could either flee or join combat after jettisoning weapons and auxiliary fuel tanks. During close (within visual–range) combat, both pilots manoeuvred with full engine–power under high gravity–loading, trying to close–in to less than 200 yards, before opening cannon fire for the kill. The few aircraft equipped with close–combat air–to–air missiles could engage targets at ranges of two to five miles.

The aircraft deployed in Operation Sindoor were not only equipped with

powerful, electronically scanned radars that could detect small targets at vast distances but could also engage them with air–to–air missiles of beyond–visual–range (BVR) capability. Thus, pilots on both sides had the ability to detect and, if required, launch missiles on targets at ranges of 60–100 miles or more without ever sighting each other.

With both air forces operating high–flying airborne warning and control system (AWACS) aircraft, the complete air picture could be monitored and aircraft control exercised by the AWACS crew. The AWACS could also pass target information to a fighter via datalink without the latter having to transmit on its own radar.

It is presumed that radio communication on both sides was electronically encrypted and could not be monitored by the adversary.

Unprecedented in earlier conflicts, both India and Pakistan employed unmanned aerial vehicles (UAVs) or drones which reduced the need for manned incursions, offering low–risk high–impact options for strikes and reconnaissance.

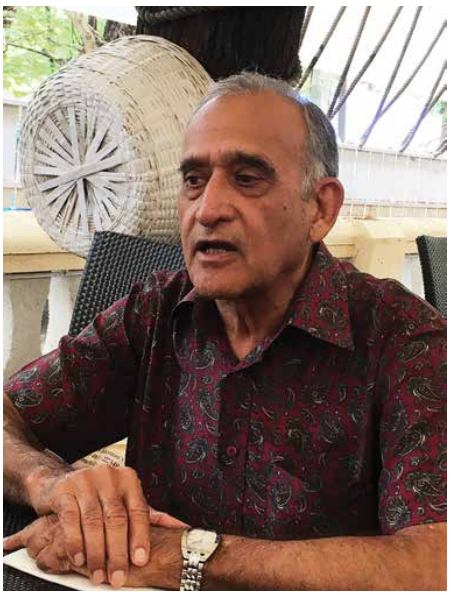
UAVs, designated loitering munition also known as suicide or kamikaze drones, are weapons that can hover/loiter silently for hours in the vicinity of a target before striking either autonomously or on command.

The drone threat had fortuitously triggered a whole ecosystem of Indian public and private sector companies developing innovative anti–drone technologies. Thus, there were adequate indigenous soft and hard–kill measures in place to neutralise drone swarms launched by Pakistan to attack our critical infrastructure.

Unlike in the 1971 war, Operation Sindoor involved no ground troop movements across borders. The Indian Army focused on defensive postures and retaliatory fire from Indian territory. This shift reflected a strategic choice as ground invasions run the risk of an expanded conventional conflict and uncontrolled escalation, especially, in a nuclear environment. In this context, an inference could, cautiously, be drawn that Operation Sindoor has further expanded the space for conventional operations below the nuclear threshold.

In 1971, the Indian Navy (IN) had played a key role in the outcome of operations, in both theatres of war, waging missile warfare in the west and mounting a carrier–borne air offensive in the east. In Operation Sindoor, the IN played a silent but, nevertheless, crucial role. An aircraft carrier task force was deployed in the north Arabian Sea, ready to undertake aircraft or missile strikes if ordered. In the lexicon of maritime operations, a robust naval presence has by itself numerous strategic implications. Given Pakistan's small coastline, with just 3–4 usable ports, considerable economic and psychological pressure could be built up by an IN taskforce exercising control over its maritime lifelines, carrying trade, energy and food.

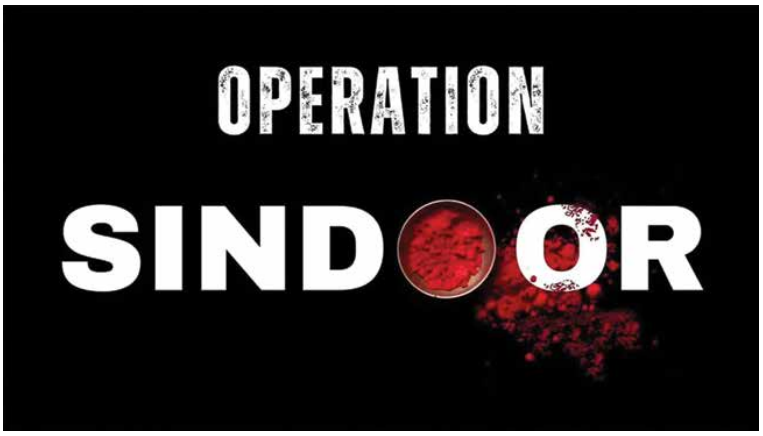
While providing a brief insight into the changed nature of warfare, Operation Sindoor also raises some questions about the future. Will technology–driven, non–contact warfare, which minimises escalation become the preferred option, replacing boots on the ground? Will autonomous weapons with lethality and range become more important than platforms like manned combat aircraft? While the success of Operation Sindoor does highlight a paradigm shift in warfare, can we assume that territorial transgressions are obsolete and that political imperatives will never again demand traditional war?



In the photo above is Admiral Arun Prakash

Lieutenant General (Retd) Syed Ata Hasnain says...

.....Their eyes remain on Kashmir



While the India–Pak military conflict is on pause, the likelihood of sporadic high–impact attacks remains. After all, the windows of terror infiltration and recruitment still remain open, albeit under much stronger surveillance and deterrence. But a return to the 1990s is unlikely.

First, Kashmiri society, particularly the younger generation, is showing signs of disengagement from violent extremism. Job aspirations, digital connectivity, and tourism have altered the local incentive structures.

Second, there is no ambiguity in the govt about its long–term objective: irreversible integration of Kashmiri society through a mix of security controls, economic development, and information dominance. This doctrine must stay the course, especially since democracy has been successfully returned to the Union Territory, and return to statehood will follow in due course. Today's govt has been instrumental in maintaining the required calm in the face of crisis.

All this said, there are at least six areas where India faces significant challenges, and needs to do focused work.

- Preventing hyphenation of any kind between India and Pakistan even while keeping the PoJK narrative intact. Pakistan will try to revive expired matters such as plebiscite, and this effort will have to be resisted worldwide.
- Maintaining an undiluted security grid, until such time when we have proof that terror threats have actually receded.
- Promoting tourism and all kinds of modern infra projects, which will progressively transform lives – and hearts and minds.
- Letting the Indian army return to lead status within the Unified Command. Experiments with its conflict termination status, if any, are premature and should be shelved. 'Holding the periphery' is the doctrine that needs to be understood and followed.
- Evolving a focused strategic communication doctrine with a post Op Sindoor orientation. Let patriotic clergy be a part of this.
- Developing AI – powered surveillance and intelligence well beyond the generation of equipment and capability demonstrated by terrorists. It is a field awaiting major transformation.

When the news of the 22 April Pahalgam terror attack broke, it felt like a jarring rewind to a past that India had hoped it had moved beyond. It was executed by a shadowy proxy linked to Pakistan's deep state, as a follow–up to Asim Munir's invocation of the Two Nation Theory to Pak diaspora audience. Pahalgam was a statement that the doctrine of 'thousand cuts' was seeking relevance all over again.

It had festered beneath the calm established after the abrogation of Article 370. In late March, during a visit to the Valley, I had sensed full sincerity in the way the new narrative of integration was progressing. It is also then that I sensed danger. Surely, Pakistan could not allow such normalcy, with 93 commercial flights a day at Srinagar airport. Kashmir was getting integrated faster than anyone expected. So Pahalgam happened. But the response that came was not from the India of yesteryears.

While surgical examination of the details is in progress, it's now important to take note of the effect of Operation Sindoor on the core domain from where it all started, J&K.

Conventional or near–conventional victories sometimes have a nasty way of upsetting the applecart of stability in the sub–conventional domain. The latter is a strange phenomenon within the spectrum of conflict; many times, it is least affected by success elsewhere.

Establishment of military superiority with a technical edge over the adversary is important, but ideological campaigns designed to spew hatred can remain unaffected; the loser's advantage, so to say.

Pakistan is not a nation that will give up its vicious bent. On being halved in 1971 it came back at us with viciousness, using the sub–conventional as a force multiplier. This is a model that it could attempt to repeat, although it will not succeed.

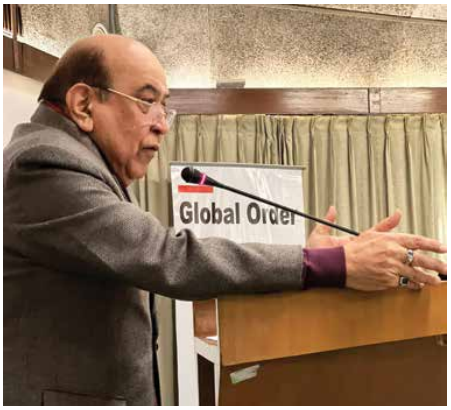
Recapturing the Kashmiri Muslim's mind space is important for Pakistan. It's the fight between economic prosperity and ideological mindset; also, between the pull of the Ummah and the pull of Indian patriotism. In both the post Pahalgam and post Op Sindoor periods a positive and patriotic sentiment has been witnessed among Kashmir's public. Can that last against an inevitable onslaught that a desperate Pakistan is likely to deploy to change this mind space?

The Op Sindoor hangover is complex but not regressive. Unlike during past flare–ups, civilian life continued without a negative halt, except in the LoC belt, where notably the sentiment against Pakistan remains at the maximum. However, even without a surge of radical sentiment, the risk of terror escalation remains.

Pak army, battling its own crises – from economic turmoil to domestic political fracturing – may lean even more on asymmetric warfare to maintain its relevance. ISI's decades old strategy of keeping Kashmir 'on the boil' is too embedded to be abandoned without a fight. Pahalgam may have been an attempt to test India's resolve, but it also served as a probe–to assess India's red lines and thresholds post–2019. Op Sindoor would have sent the answers Pakistan's way but self–delusional perceptions of victory could always bring a repeat of its old ways.

The surgical strikes and Balakot of 2016 and 2019 respectively, were both strategic messages of intent by India. Op Sindoor has gone well beyond, to convey deterrence. But the sub–conventional domain is extremely tricky to tie down. Deterrence here is difficult to determine.

As India recalibrates its strategic posture in Kashmir, the playbook has indeed changed. The next chapter will not be written in blood, but in ballots, bandwidth, and bridges – both literal and symbolic. Yet, the sword must always remain sharp for moments when the eyes blur and fatigue tends to overtake.



By Lieutenant General (Retd) Syed Ata Hasnain

The writer is a former commander of the Srinagar–based Chinar Corps

Photos of the author: DFFSS/ HQ–IDS

Courtesy: The Times of India/ Photos: Indian Army

Military historian Tom Cooper says....

....Clear–cut victory. The West misread the conflict, India decimated Pakistani bases.

In a detailed blog post analysing the recent India–Pakistan conflict, Austrian military historian Tom Cooper criticised Western media for what he called "PR efforts" that distorted the military reality on the ground.

When India launched a series of precise missile strikes deep into Pakistani territory 7 May 2025 onwards for a few days, the world took notice. Among the most striking endorsements came from Austrian military historian Tom Cooper, who labeled the operation a "clear–cut victory" for India — pointing not just to the scale of destruction inflicted, but to the strategic targeting of Pakistani air bases and nuclear weapons storage sites, with no credible Pakistani response in sight.

"When one side is bombing nuclear weapons storage facilities of the other, and the other has no ability to retaliate left, then that's a clear–cut victory in my books," he wrote.

Cooper noted that Pakistan lacked long–range missiles capable of countering India's firepower, singling out India's BrahMos and SCALP–EG missiles as unmatched in Pakistan's arsenal. He said Pakistan's celebrated missile capabilities had not translated into operational deterrence.

According to Cooper, India's strikes had severely damaged critical Pakistani air bases, including Nur Khan and Sargodha. He added that Pakistan's Director General of Military Operations contacted his Indian counterpart to initiate a ceasefire — a move that, he implied, underscored the imbalance in combat effectiveness. Cooper, a prolific author on aerial warfare in conflict zones such as the Middle East, Africa, and South Asia, remains an influential voice among military analysts and policymakers.

His comments came just two days after India and Pakistan agreed to halt military operations, following a call from Pakistan's DGMO to his Indian counterpart amid escalating tensions between the two nuclear–armed neighbours.

The Indian Armed Forces had earlier released visual evidence of the airstrikes, showcasing extensive damage inflicted on terror camps in Pakistan and Pakistan–occupied Kashmir, as well as Pakistani military infrastructure.

India also targeted a surface–to–air missile site at Karachi's Malir Cantonment, according to Air Marshal AK Bharti, Director General of Air Operations, in a press briefing.

Reinforcing India's military message, John Spencer, a retired US Army officer and Chair of Urban Warfare Studies at the Modern War Institute, said that India's homegrown defence systems had proven their mettle. "India's domestically produced weapons worked, China's did not," Spencer said, underlining the broader implications of the conflict for regional and global military watchers.

Author
Tom Cooper

Frankly (as always): can't care less about PR-efforts by CNN & Co KG GesembH AG, and even less so about Western 'military Experten'.

When one side is bombing nuclear weapons storage facilities of the other, and the other has no ability to retaliate left, then that's a clear cut victory in my books.

No surprise Islamabad 'sounded' for a 'cease-fire'.

Tom Cooper is an Austrian aerial warfare analyst and historian. Following a career in the worldwide transportation business – during which he established a network of contacts in the Middle East and Africa – he moved into narrow–focus analysis and writing on small, little–known air forces and conflicts, about which he has collected extensive archives. This has resulted in specialisation in such Middle Eastern air forces as of those of Egypt, Iran, Iraq and Syria, and various African and Asian air forces. In addition to authoring and co–authoring more than 50 books – including an in–depth analysis of major Arab air forces during the wars with Israel in 1955–1973 – and over 1,000 articles, Cooper is a co–editor of Helion's @War book series.

Courtesy: www.businesstoday.in

Lt Gen Kamal Davar says...

....Many questions on future of Pakistan's 'jihadi General': Will he remain, or fall?

It has been observed, across the world, that some dictators who manage to seize power from the legitimate authority within their nations display a streak of patriotism and hyper–concern for their country. But such altruism withers away after a short period of time as they begin to see themselves as even above their nation. That gets reinforced with the dictator getting a taste of absolute power, which is then hard to relinquish.

Libya's Col. Muammar Gaddafi is a good example of an idealist turning into a megalomaniac. Nearer home, in Pakistan, where the power–hungry Army has ruled, either directly or indirectly, ever since the country's birth, dictators like self–styled Field Marshal Ayub Khan, Gen Yahya Khan, Gen Zia–ul Haq and Gen Pervez Musharraf all fall into this category. In recent years, though, the Pakistan Army has cultivated the strategy of allowing a semblance of democracy as a facade, while the levers of absolute power actually remain with the GHQ in Rawalpindi. The current Pakistan Army Chief, General (Gen) Syed Asim Munir, has perfected the art of concentrating power in his hands and allowing Prime Minister Shehbaz Sharif to run the virtually toothless elected government in Islamabad. It is common knowledge in GHQ Rawalpindi's corridors of power that Gen Munir is a great admirer of Gen Zia–ul Haq's "K–2" strategy (Kashmir, Khalistan) to destabilise India.

After the ceasefire between the armed forces of India and Pakistan on 10 May, after four days of kinetic conflict, questions are being asked about Gen Munir's future. That Gen Munir, widely known as the "jihadi general", and believed to be the principal architect of the brutal Pahalgam massacre, where 26 unarmed tourists were murdered in cold blood by Pakistani terrorists, must explain to his nation and its people on what led him to initiate this brutal atrocity, which nearly took the two nuclear armed neighbours to full scale war, with all its potential consequences, besides causing unnecessary casualties to some people living close to the Line of Control. The fact that over two dozen innocent tourists were gunned down in front of their families on 22 April for the sole reason that they were Hindus clearly points to the inhuman and irrational mindset of the Pakistan Army Chief.

But before one examines the rationale of Pakistan's all–powerful Army Chief behind his decision to risk his nation's future by taking on a more powerful neighbour, it is worthwhile to take a closer look into this general's background. Asim Munir was born into a deeply orthodox Hafiz family (all of whose members can recite the holy Quran), with his father heading a madrasa (religious seminary).

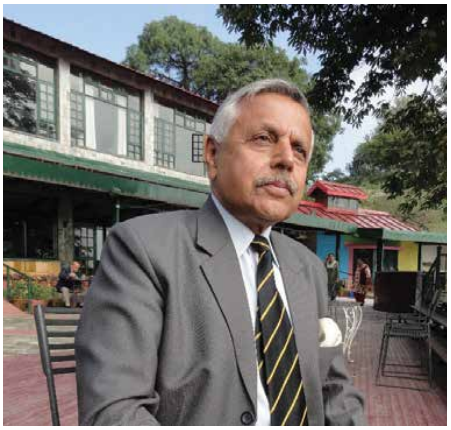
Commissioned into the Frontier Force Regiment, Asim Munir rose to be the director–general of both Military Intelligence (MI) as well as Inter–Services Intelligence (ISI) — among the very few Pakistan Army officers who have headed both these intelligence outfits. He also had commanded XXX Corps based in Gujranawala. During Imran Khan's prime ministership, after a short honeymoon between the two, he was sacked by Imran Khan as ISI chief. Gen Munir never forgot this insult and, true to his character, worked zealously for Imran Khan's ouster. Gen Munir is also rather unpopular with the Pashtuns, both in Afghanistan and those in Pakistan, as he had supported the mass deportation of illegal Afghan refugees from Pakistan back to Afghanistan. He has been accused of intervening in politics and ruthlessly suppressing the cadres of Imran Khan's Tehrik–e–Insaaf Party (PTI). In addition, even within Pakistan Army circles, Gen Munir's orders on the trial of civilians in military courts has been severely criticised both by the legal community and civil society alike.

Gen Munir's highly provocative remarks to a gathering of overseas Pakistanis in Karachi on how Hindus and Muslims were "two completely different nations" has been adversely commented upon both in Pakistan and around the world. In Balochistan, the insurgency seeking freedom from Pakistan for the Baloch people has assumed dangerous proportions. The inhuman handling by Gen Munir and his military has caused further fissures between the Baloch people and the Pakistani state. Gen Munir has come in for severe criticism regards the worsening track record of his Army and it is considered now a matter of time before a full scale bloody insurgency sets in, where elements from the Afghan Taliban, the Tehrik–e–Taliban and the Baloch rebels, in concert with each other, cause untold damage to Pakistan.

Though a majority of Pakistan's senior Army hierarchy have been fundamentalist and overly religious in their conduct over the past decades, yet the earlier Army Chief, Gen Qamar Javed Bajwa, in the last phase of his tenure, had made the right noises in his statements of Pakistan improving relations with India.

With India's Operation Sindoor now successfully over, many Pakistan watchers are now trying to gauge the future of Gen Asim Munir in Pakistan. Through massive doses of "fake news", Gen Munir appears to have convinced the Pakistani public of his armed forces having conducted their recent operations against India well — though the reality is the exact opposite. It can thus be stated that unless some major debacle suffered by Pakistan in recent days does not get unravelled, Gen Munir's continuance as Pakistan's Army chief is more or less certain. But if a real revolt erupts within the hierarchy of the Army at GHQ (where it is already simmering), there could be trouble ahead for Gen Munir. He might keep getting a series of extensions from a toothless Pakistan government, but that won't save him if a rebellion breaks out.

Notwithstanding Gen Munir's future, many lessons have emerged in the past month for India, its armed forces and the entire government. It will be worthwhile to analyse all these in a dispassionate and professional manner and the shortcomings removed, as needed, for our security and well–being.



The writer, a retired lieutenant–general, was the first head of India's Defence Intelligence Agency, is a long–time Pakistan watcher and has been involved in Track–2 diplomacy.

(All photos: Indian Army)

John Spencer says....

....Operation Sindoor: A Decisive Victory in Modern Warfare

India has not declared Operation Sindoor completely over (14 May 2025). What exists now is a sensitive halt in operations—some may call it a ceasefire, but military leaders have deliberately avoided that word. From a warfighting perspective, this is not merely a pause; it is a strategic hold following a rare and unambiguous military victory.

After just four days of calibrated military action, it is objectively conclusive: India achieved a massive victory. Operation Sindoor met and exceeded its strategic aims—destroying terrorist infrastructure, demonstrating military superiority, restoring deterrence and unveiling a new national security doctrine. This was not symbolic force. It was decisive power, clearly applied.

India was attacked. On 22 April 2025, 26 Indian civilians, mostly Hindu tourists, were massacred in Pahalgam, Jammu & Kashmir. The Resistance Front (TRF), an offshoot of the Pakistan based Lashkar–e–Taiba (LeT), claimed responsibility. As has been the case for decades, the group is backed by Pakistan's Inter–Services Intelligence (ISI).

But unlike previous attacks, this time India didn't wait. It didn't appeal for international mediation or issue a diplomatic demarche. It launched warplanes.

On 7 May, India initiated Operation Sindoor, a swift and precisely calibrated military campaign. The Indian Air Force struck nine terrorist infrastructure targets inside Pakistan, including headquarters and operational hubs for Jaish–e–Mohammed and Lashkar–e–Taiba. The message was clear: terror attacks launched from Pakistani soil will now be treated as acts of war.

Prime Minister Narendra Modi made the new doctrine unmistakable: "India will not tolerate any nuclear blackmail. India will strike precisely and decisively at the terrorist hideouts developing under the cover of nuclear blackmail."

More than a retaliation, this was the unveiling of a strategic doctrine. As Modi said, "Terror and talks can't go together. Water and blood can't flow together." Operation Sindoor was executed in deliberate phases:

May 7: Nine precision strikes were launched deep into Pakistani territory. Targets included key terror training camps and logistics nodes in Bahawalpur, Muridke, Muzaffarabad and elsewhere.

May 8: Pakistan retaliated with a massive drone swarm across India's western states. India's multi–layered air defence network—domestically built and augmented by Israeli and

India Today: "In a strong endorsement of Operation Sindoor, American urban warfare expert Colonel (Retd) John Spencer praised India's display of both offensive and defensive dominance. He stated that the operation sent a clear message: India can strike "anywhere in Pakistan, anytime." He also highlighted the ineffectiveness of Chinese air defence systems deployed by Pakistan, noting they were no match for India's BrahMos missiles, which successfully targeted military bases during the conflict".

Russian systems–neutralised nearly all of them.

May 9: India escalated with additional strikes on six Pakistani military airbases and UAV coordination hubs.

May 10: A temporary halt in firing was reached. India did not call it a ceasefire. The Indian military referred to it as a "stoppage of firing"–a semantic but deliberate choice that reinforced its strategic control of the situation.

This wasn't just tactical success. It was doctrinal execution under live fire. Some strategic effects achieved below.

A New Red Line Was Drawn—and Enforced: Terror attacks from Pakistani soil will now be met with military force. That's not a threat. It's precedent.

Military Superiority Demonstrated: India showcased its ability to strike any target in Pakistan at will–terror sites, drone coordination hubs, even airbases. Meanwhile, Pakistan was unable to penetrate a single defended area inside India. That is not parity. That is overwhelming superiority. And that is how real deterrence is established.

Restored Deterrence: India retaliated forcefully but stopped short of full war. The controlled escalation sent a clear deterrent signal: India will respond, and it controls the pace.

Asserted Strategic Independence: India handled this crisis without seeking international mediation. It enforced doctrine on sovereign terms, using sovereign means.

Operation Sindoor was not about occupation or regime change. It was limited war executed for specific objectives. Critics who argue India should have gone further miss the point. Strategic success isn't about the scale of destruction—it's about achieving the desired political effect.

India was not fighting for vengeance. It was fighting for deterrence. And it worked.

India's restraint is not weakness—it is maturity. It imposed costs, redefined thresholds, and retained escalation dominance. India didn't just respond to an attack. It changed the strategic equation.

This satellite image provided by Maxar Technologies shows Nur Khan Air Base with damaged buildings after a strike during hostilities with India in Rawalpindi (AP)

In an age where many modern wars spiral into open–ended occupations or political confusion, Operation Sindoor stands apart. This was a demonstration of disciplined military strategy: clear goals, aligned ways and means, and adaptive execution in the face of unpredictable escalation. India absorbed a blow, defined its objective, and achieved it—all within a contained timeframe.

The use of force in Operation Sindoor was overwhelming yet controlled—precise, decisive, and without hesitation. That kind of clarity is rare in modern war. In an era defined by "forever wars" and cycles of violence without strategic direction, Sindoor stands apart. It offers a model of limited war with clearly defined ends, matched ways and means, and a state that never relinquished the initiative.

The India of 2008 absorbed attacks and waited. This India hits back—immediately, precisely, and with clarity. Modi's doctrine, India's advancing domestic defence industry, and the professionalism of its armed forces all signal a country no longer preparing for the last war. It is preparing for the next one.

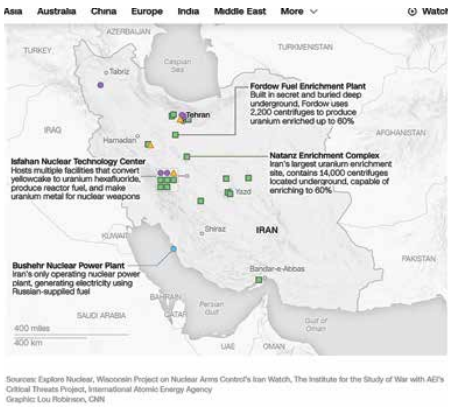
The halt in operations is not the end of Operation Sindoor. It is a pause. India holds the initiative. If provoked again, it will strike again. This is deterrence restored. This is a new doctrine revealed. And it should be studied by all nations confronting the scourge of state sponsored terrorism.

Operation Sindoor was a modern war—fought under the shadow of nuclear escalation, with global attention, and within a limited objective framework. And by every measure that matters, it was a strategic success—and a decisive Indian victory.

John Spencer is executive director of the Urban Warfare Institute. He is the co–author of Understanding Urban Warfare. Learn more at www.johnspenceronline.com. You can also follow him on 'X' at: @SpencerGuard

A weakened Tehran lashes out performatively against US airbases to save face

Analysis by CNN's Nick Paton Walsh



Sources: Explore Nuclear, Wisconsin Project on Nuclear Arms Control's Iran Watch, The Institute for the Study of War with AEI's Critical Threats Project, International Atomic Energy Agency
Graphic: Lou Robinson, CNN

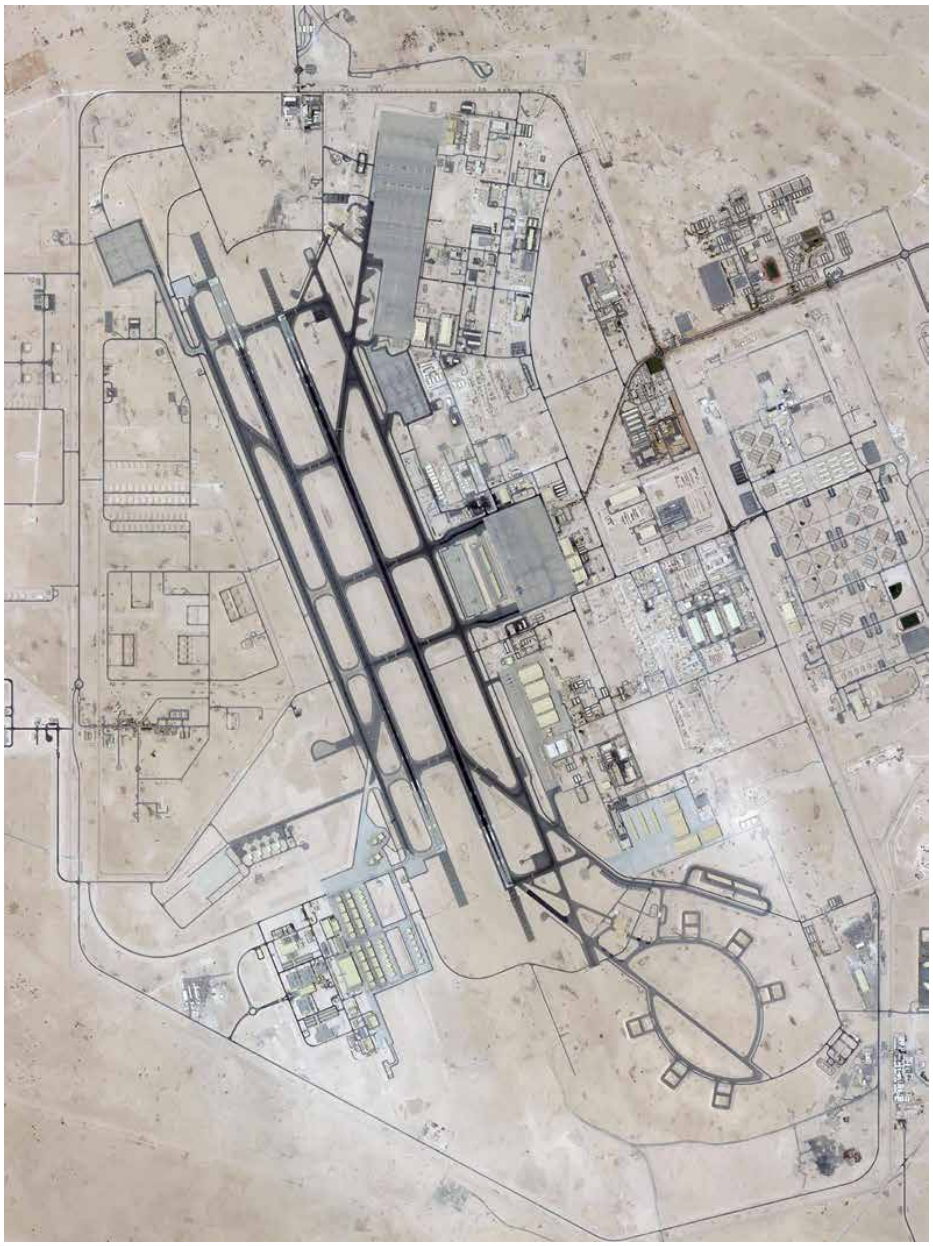
An empty base as a target, with many hours warning, and a limited number of missiles fired at some of the best air defence systems in the world. Iran's retaliation on 23 June 2025 for the US's weekend strikes on three of its nuclear facilities can only have been designed to deescalate.

The US–run Al Udeid airbase in Qatar had been evacuated days earlier, with satellite images showing the departure of planes and personnel widely publicised in the media. It is the most important US military airbase in the region, the home of Central Command. It even launched the drone that killed Iran's top military personality, General Qasem Soleimani, in 2020, Iranian state media said in the hours after "Operation Glad Tidings of Victory." The strike against Al–Udeid had close to zero chance of American casualties – and provided the perfect moment of quasi–absurd face saving for Iran.

The first hint of a possible strike came when the US Embassy in Doha, Qatar, issued an emergency "shelter in place" order for US citizens. As if to remove any doubt, Qatar closed its airspace about an hour prior to the launch of what appears to have been close to a dozen missiles by Iran.

Adding to the favourable conditions of the launch for Iran's dwindling arsenal, Qatar is close enough to permit the use of shorter range missiles, stocks of which have not been as depleted as the medium range missiles used to hit Israel over the previous week.

To pour water on anything resembling a flame, Iran's National



Iran fired missiles at a US military bases in Qatar. (Photo: CNN)

Security Council said moments after the attack the number of missiles fired had been "as many as the number of bombs used in the attack on Iranian nuclear facilities." Packaging the barrage as the definition of a proportionate response, the Iranian statement went on to insist the attack posed "no dangerous aspect to our friendly and brotherly country of Qatar and its noble people."

Tehran's method of retaliation–without–fangs has been successfully tried and tested. After Soleimani was killed, Iran's retaliatory missile attack against the US's Al Asad airbase in Iraq was reportedly telegraphed to Baghdad beforehand, possibly helping reduce the level of US injury suffered to mostly concussions. Iran's response to Israel's assassination of Hamas leader Ismail Haniyeh in July 2024 in the heart of Tehran heavily telegraphed in advance.

"We knew they'd retaliate. They had a similar response after Soleimani," a senior White House official said later on.

A playbook appears to be forming. But it is one that compounds Iran's military weakness each time it is employed. In 2020, the Islamic Republic lost its pre–eminent military personality – an Iranian hardline hero. In 2024, it showed that valuable allies were not safe in central Tehran. This year, the regime has lost control of its own airspace to the point of previously unthinkable strikes on their prized nuclear facilities by both Israel and the US.

This is stark testament to the differing powers on display. Iran has to feign its strength in a managed presentation of restrained and muted anger. The US and Israel get to break taboos daily, shattering Iran's long held position as a regional power in under ten days, and perhaps ending its ambitions to be a nuclear power.

There is now only one real red line left for the United States or Israel to cross, and that is to directly target Iran's Supreme Leader Ayatollah Ali Khamenei. But that may seem ill–advised, given the likelihood this octogenarian theocrat would be replaced by a younger hardliner who is keener to flex Iran's muscles of deterrence. Better to accept toothless retaliations amid Tehran's slow decline.

Each expression of Iran's anger has confirmed its slow erosion of power. An angry fledging nuclear power would have accelerated its race to an atomic bomb. That may still happen. But it looks more likely that Iran is desperately hoping its performative lashing out can sate what remains of its hardliners, decimated by Israeli strikes. It may even hope to shuffle back to diplomacy, with talks to contain a nuclear programme and ballistic missile stockpile likely severely depleted to shadows of what they were merely ten days ago.

Iran–Israel conflict

Lt Gen Kamal Davar says...

....Iran–Israel conflict escalation, with no early end in sight, leaves India in a fix

Tehran launches missile salvo after Israel said it began a "series of strikes" in western Iran. (Images: CNN)

The world is, unfortunately, at war with itself as never before since the end of the Second World War in 1945. Both global and regional disruptions litter the geo–political landscape with frequent kinetic conflicts and erupt in unexpected regions and scenarios. The latest is the Israel–Iran war, which has been raging with ferocity since13 June 2025. The US bombing of Iranian nuclear sites late on 21 June, bringing America directly into the conflict, has escalated it further.

The Israel Defence Forces, fully supported by Mossad, the country's celebrated intelligence service, launched Operation Sea Lion on 13 June, attacking many militarily vital targets all across Iran, including its nuclear infrastructure, heavy water plants, command and control centres and airbases. Israel, which fears an existential threat from Iran, especially if it acquires a nuclear capability soon, has also come under heavy retaliation from Iran and hit by an intensive barrage of long range ballistic missiles, drones, etc. There have been significant casualties and destruction on both sides, with considerable damage to Iran's nuclear infrastructure, including the ARAK heavy water reactor and the nuclear weapons producing facility at Natanz.

The threat to each other, over the past few days, and the consequent exchanges have cascaded exponentially, with no end in sight, despite calls from many nations, including India, to not prolong this conflict. The US, which said a few weeks ago that it was eager to bring about a ceasefire, seems to have changed its stand and is putting near impossible conditions for Iran and demanding its surrender. No self–respecting nation can ever accept such humiliation, and thus the conflict continues.

The highly sophisticated pinpoint accuracy arsenal with which Israel has ensured the elimination, by missiles and drones, of many very senior level Army officers and top nuclear scientists is also a significant factor. The Israelis are also claiming that they are in complete control of Iranian airspace. Meanwhile, the exchange of fire by long–range ballistic missiles from both sides continues to spread destruction. In addition, many civilians in several major towns inside Iran are evacuating their homes, and so have students who were studying in Tehran and other places in Iran. India has formally launched Operation Sindhu to evacuate its students and other Indian nationals through Iran's border with Armenia.

With this conflict not showing any signs of abating,


Left: Iran launches retaliatory strikes, with blasts heard in Tel Aviv, following Israel's unprecedented attack on Iranian nuclear sites. Right: Missiles from Iran are seen in the sky over Hebron, West Bank, on 21 June. (Photos from CNN)

India too finds itself in a dilemma, for New Delhi has cordial relations with both Iran and Israel. With Iran, we have civilisational and cultural links, apart from Iran never desisting from supplying us with oil at relatively cheaper rates and at times through rupee payments. Meanwhile, Israel has stood by India right since the 1971 operations and onwards, including during the Kargil conflict, and later supplying us with ammunition and other equipment according to India's requirements. It has never hedged in not stopping hi–tech state–of–the–art equipment to India, including the supply of drones, long range missiles and the like.

Therefore, the aggravation of the Iran–Israel war will certainly harm India to a large extent.

For India, Iran provides much–needed connectivity to Central Asia. India's massive investment in Iran's Chabahar port, a competitor to Pakistan's Gwadar port, allows India a vital link to the Central Asian republics. The latter is important for India not only regarding energy security but also the abundance of rare earth minerals. An Iran–Israel war will hamper India's trade with Central Asia and also delay the progress of the International North–South Corridor. Any problems in this connectivity will hamper India–Afghan trade too as Pakistan does not permit trade between India and Afghanistan using its overland routes. China will thus try to replace India in its matrix with Kabul.

Importantly, the air war between Iran and Israel may pose a serious threat of disruption to India's energy supplies coming from Iran and the Gulf countries. India obtains nearly 80 per cent of its crude oil requirements from the Middle East region. The ongoing conflict has hiked oil prices already, and transport costs have seen a substantial jump, as a result of which both inflation and the current account deficit have been adversely affected.

This conflict has, once again, brought Pakistan back in the reckoning in South Asia. The de–hyphenation between two vastly differing nations, India and Pakistan, had reduced to a large extent.

India, as a victim of terrorism from across the border, cannot be equated with Pakistan, which is widely acknowledged as the epicentre of global terror. Thus, the US making much of Pakistan's Army chief, the self–appointed Field Marshal Asim Munir, is surprising, to say the least. Some analysts feel that in case the United States intervenes directly in the Israel–Iran war, the US might require airbases close to the Iranian border, which Pakistan is ready to provide. Thus, a mercurial US President Donald Trump has altered his stance towards Pakistan, and has re–hyphenated Pakistan with India.

Pakistan will surely extract its pound of flesh from the US, which will encourage it to continue with its terror driven activities in South Asia. Also, in the long run, Shia dominated Iran will not be appreciative of Pakistan's current flirtations with the US, which is a sworn enemy of Iran. Tehran, meanwhile, also maintains not very warm relations with Pakistan.

With the situation escalating, and no sign of the Iran–Israel conflict ending anytime soon, both the Middle East and South Asia appear headed for violent turmoil in the immediate future. Not only for itself but for all these nations pitched against each other in unwarranted, senseless conflicts, India must take the initiative immediately to organise a peace seeking conclave in New Delhi with the concerned stakeholders and try to infuse peace and harmony among these warring nations. Let this be the message to the world from the land of Mahatma Gandhi.


Left: A screengrab from a video released by Israel's national emergency services shows a building on fire in the city of Holon. Right: First responders work at the scene of an Iranian strike in Haifa, Israel. (Photos from CNN)

DRDO and IN test MIGM

Defence Research and Development Organisation (DRDO) and Indian Navy have successfully undertaken combat firing (with reduced explosive) of the indigenously designed and developed Multi–Influence Ground Mine (MIGM). MIGM is designed to enhance the Indian Navy's capabilities against modern stealth ships and submarines. Bharat Dynamics Limited, Visakhapatnam and Apollo Microsystems Limited, Hyderabad are the production partners for the system.

New Brahmos facility centre in Lucknow

On 11 May 2025, on the inauguration of BrahMos Integration and Testing Facility Centre, Raksha Mantri said it would strengthen India's efforts towards Aatmanirbharta in defence and contribute to the socio–economic development of the region by generating significant direct and indirect employment. The 200 acre BrahMos Integration and Testing Facility Centre in Lucknow will have integration of booster subassemblies, avionics, propellant, ramjet engines. The programme centre with Design and Administrative blocks are also being planned in the complex.

First centre fuselage for Tejas Mk.1A handed over to HAL

The first centre fuselage assembly for the Light Combat Aircraft (LCA) Tejas Mk.1A was handed over to Hindustan Aeronautics Limited (HAL) by VEM Technologies in Hyderabad on 30 May 2025. This event marks for the first time a major sub–assembly for the LCA Tejas being manufactured by a private Indian company.

Joint instructions and joint orders for the three Services

In a major step towards modernisation and transformation of the Armed Forces, Raksha Mantri Rajnath Singh has authorised the Chief of Defence Staff (CDS) & Secretary, Department of Military Affairs (DMA) to issue Joint Instructions and Joint Orders for all three Services. This marks a shift from the earlier system wherein Instructions/Orders pertaining to two or more Services were issued by each Service separately.

BEL receives orders worth Rs. 3000 crores

Bharat Electronics Limited (BEL) has secured orders worth Rs. 572 crores and these include Integrated Drone Detection and Interdiction System (IDDIS), Software Defined Radio (SDR) and Data Communication Unit (DCU) for attack guns, AI based solutions for ships, simulators, communication equipment, jammers, spares, services, etc. Later, BEL secured additional orders worth Rs.537 crores that included communication equipment, advanced composite communication system for ship, jammers, software, simulator upgrades, spares, test rigs, services etc. A week later, BEL received orders from MDL, Mumbai, and GRSE, Kolkata, totally valued at Rs. 2,323 crore for supply of base and depot spares for the missile systems on Indian naval ships.

DRDO ToT for Nibe

In an effort to enhance the industrial base in development and manufacturing of indigenous defence equipment, Armament Research & Development Establishment (ARDE), DRDO signed a licensing agreement for Transfer of Technology (LAToT) of Pinaka Multi Barrel Rocket Launcher (MBRL) and Battery Command Post (BCP) with NIBE Limited, Pune.

DRDO transfers technologies of nine systems

Vehicles Research & Development Establishment (VRDE) has taken a major step forward by transferring technologies of nine systems to 10 industries. The technologies transferred to the industry are Chemical, Biological, Radiological, Nuclear (CBRN) Recce Vehicle (Tracked) Mk–II, Mounted Gun System, Anti–Terrorist Vehicle – Tracked Version, Full Trailer of 70t Tank Transporter for Main Battle Tank (MBT) Arjun Mk–1A, Expandable Mobile Shelter, Vajra–Riot Control Vehicle, Unit Maintenance Vehicle for MBT Arjun, Unit Repair Vehicle for MBT Arjun and Multi–Purpose Decontamination System.

13 contracts awarded under EP

In a move to strengthen the Indian Army's operational readiness in counter–terrorism operations, the MoD has concluded 13 contracts under the Emergency Procurement mechanism worth Rs. 1,982 crore. Some key equipment being procured include Integrated Drone Detection & Interdiction Systems, low level lightweight radars (LLLR), very short range air defence systems (VSHORADS) launchers and missiles, remotely piloted aerial vehicles (RPAVs), loitering munitions, including vertical take–off and landing (VTOL) systems, various categories of drones, bullet proof jackets (BPJs), ballistic helmets, quick reaction fighting vehicles (QRFVs) – heavy and medium and night sights for rifles.

TASL TSS for Igla

Tata Advanced Systems' advanced Thermal Sighting System (TSS) is now 'powering' the Indian Army's Igla missile systems – giving operators real time ability to track and engage aerial threats like drones and aircraft, day or night. As the OEM of these optronics, Tata Advanced Systems "proudly supports India's defence forces with indigenous tech that sees farther, reacts faster and hits harder".

8th India–US JWGACTC

The 8th meeting of the India–US Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), constituted under the auspices of the India–US Defence Technology and Trade Initiative (DTTI), was organised in India from 13 to 16 May 2025. A six member US delegation headed by RAdm Casey Moton, Programme Executive Officer (PEO), Aircraft Carriers visited various defence establishments in Delhi and Goa.

Samtel Avionics and ATSC sign collaboration

In a major step towards strengthening defence industry partnerships across the Indo–Malaysian corridor, Samtel

Avionics Ltd has entered into a Strategic Collaboration and Exclusivity Agreement with Malaysia based Aerospace Technology Systems Corp Sdn Bhd (ATSC). The agreement aims to jointly support the Royal Malaysian Air Force's (RMAF) fleet, particularly the Su–30MKM aircraft, with cutting edge avionics systems, repair and overhaul services and post–sales support.

Reliance Defence partnership with Rheinmetall

Reliance Infrastructure Limited promoted Reliance Defence Limited (Reliance Defence) and Dusseldorf based Rheinmetall AG have agreed on a strategic partnership in the field of ammunition. Reliance also announced securing of an export order worth INR 600 crore from Rheinmetall Waffe Munition GmbH.

Reliance Defence and Diehl Defence in agreement

Reliance Defence Limited announced a landmark Strategic Cooperation Agreement with Germany's Diehl Defence for the production of next generation Terminally Guided Munitions (TGM). The partnership will drive local production of Vulcano 155 mm Precision Guided Munition system, catering to the Indian Armed Forces.

SMPP in contracts from Indian Army

SMPP, an indigenous designer, developer and manufacturer of defence equipment, has added another feather to its cap; it was awarded dual contracts under 'Emergency Procurement 5' on 22 June 2025, by the Indian Army for supply of bulletproof jackets and advanced ballistic helmets. The total value of the order is more than Rs. 300 cr. According to this contract, SMPP will supply 27,700 bulletproof jackets and 11,700 advanced ballistic helmets to the Indian Army.

Avantel in MDL order

Avantel Limited, a provider of technology solutions to the defence and communication sectors, announced that it has received a new order valued at Rs 11.15 crore from Mazagon Dock Shipbuilders Limited. The contract involves the supply of an advanced Satellite Communication (Satcom) system, developed in accordance with MDL's technical requirements.

Embraer's new subsidiary in India

Brazilian aerospace and defence major Embraer, on 2 June 2025, announced a significant reinforcement of its commitment to India with the establishment of a fully owned Indian subsidiary which will have its corporate office in AeroCity, New Delhi. This strategic move "underscores Embraer's long term vision for growth and potential collaboration with India's rapidly evolving aerospace and defence landscape".

Thales' IFE and Services Lab in Bengaluru

Thales has unveiled a state–of–the–art Inflight Entertainment (IFE) and Services lab at its Engineering Competence Centre (ECC) in Bengaluru. Aligned with the vision of 'Aatmanirbhar Bharat', this lab will serve as a hub for the design, development and testing of next generation IFE systems. The lab is equipped with advanced tools to support and serve airlines in India and around the world.

BMT Aerospace and partners team up for India

Aerospace industry leaders including Honeywell Aerospace, Safran, Liebherr Aerospace and Moog, joined BMT Aerospace in India recently to assess how next–gen manufacturing capabilities align with this evolving landscape.

"The cooperation of these aerospace leaders to deepening their presence in the country, leveraging its engineering expertise, expanding supply chain networks and strengthening defence collaborations; with the Indian government's push for self–reliance and the rapid expansion of the aviation sector, India presents a significant growth opportunity", stated BMT.

Aernnova and Mahindra in multi–year contract

Mahindra Aerostructures Pvt. Ltd (MASPL) and Aernnova Aerospace, SAU have announced a multi–year contract valued at approximately $300 million for MASPL to manufacture metal sub–assemblies and components for a range of Airbus aircraft and also for Embraer aircraft families (including the Embraer C390 Millennium military transport aircraft). The contract covers the supply to several Aernnova sites in Spain, the UK, Portugal and Brazil, further strengthening a collaboration that began in 2013.

RSR and Alpha for APU MRO

RSR Aviation Services Pvt Ltd of India and Alpha Aircraft Systems the have entered into an agreement to get into the MRO sector by opening an Auxiliary Power Unit (APU) facility in India by the second quarter of 2026. Under the agreement, RSR Aviation and Alpha Aircraft Systems will jointly set up an APU overhaul and testing centre in India, preferably in a designated aerospace industrial cluster in India.

Rosoboronexport hands over Project 11356 frigate Tamal

Rosoboronexport JSC (part of Rostec State Corporation) handed over another Project 11356 frigate, built by United Shipbuilding Corporation, to the Indian Navy on 1 July 2025. The ceremony took place in Kaliningrad. The eighth Project 11356 frigate, built in Russia for the Indian Navy, was christened Tamal, which means "Sword" in Sanskrit. The ship has a reliable air defence system based on the Shtil–1 vertical launch SAM system developed and manufactured by Almaz–Antey Air and Space Defence Corporation. Its artillery armament, consisting of 100mm and 30mm artillery systems, together with an EW system, can repel UAV attacks and effectively counter unmanned surface vehicles.

The ship has a reinforced helipad, enabling it to operate a Ka–31 long–range early warning helicopter. The delivered frigate Tamal has excellent seaworthiness: it is able to travel 4,850 miles without refueling and stay at sea for 30 days without resupply. Currently India is already operating 7 Project 11356 frigates.

Project 17A frigate Udaygiri delivered

Yard 12652 (Udaygiri), the second ship of Project 17A stealth frigate, being built at Mazagon Dock Shipbuilders Limited (MDSL), was delivered to the Indian Navy on 1 July 2025.

The Project is a follow–on of the Shivalik class (Project 17) frigates active in service.

Udaygiri is the second among the seven P17A frigates under construction at MDL, Mumbai and GRSE, Kolkata. The weapon suite comprises supersonic surface–to–surface missile system, medium–range surface to air missile system, 76 mm gun, and a combination of 30 mm and 12.7 mm rapid–fire close–in weapon systems.

INS Arnala commissioned

INS Arnala, the first of the Anti–Submarine Warfare Shallow Water Craft, was commissioned into the Eastern Naval Command of the Indian Navy on 18 June 2025. Designed for a broad range of anti–submarine operations, INS Arnala is equipped to conduct sub–surface surveillance and interdiction, search and rescue missions; and low–intensity maritime operations (LIMO).

This 77 meter long warship, with a gross tonnage of over 1490 tonnes, is the largest Indian naval warship to be propelled by a diesel engine–waterjet combination.

Steel cutting of 4th FFS

'Steel Cutting' ceremony of fourth of the five Fleet Support Ships (FSS) was held at Hindustan Shipyard Limited (HSL) on 19 June 2025. The Indian Navy had signed a contract with HSL for acquisition of five Fleet Support Ships (FSS) in Aug 2023, with delivery commencing mid–2027.

Keel laying of last ship (BY 530) of ASW SWC

Keel Laying of the eighth and last ship (BY 530), Anti–Submarine Warfare Shallow Water Craft (ASW SWC), which is being built at Cochin Shipyard Limited, Kochi, was undertaken on 29 May 2025. The contract for building eight ASW SWC ships was awarded to CSL, Kochi by the Ministry of Defence on 30 April 2019. These ships, known as the 'Mahe' class, are being equipped with indigenously developed state of the art underwater sensors, and are envisaged to undertake anti–submarine operations as well as low intensity maritime operations (LIMO) and mine laying operations.

Keel laying ceremony of Yard 1283

Goa Shipyard Limited marked a significant milestone in the nation's maritime capability building journey with the keel laying of Yard 1283; the fourth ship in the Next Generation Offshore Patrol Vessel (NGOPV) series for the Indian Navy. The keel laying marks continued progress in the construction of seven NGOPVs, being designed and built entirely in–house by GSL under a Rs. 6,200 crore contract signed on 30 March 2023.

5th FPV 'Achal' by GSL for ICG

'Achal', the fifth Fast Patrol Vessel (FPV) in a series of eight being constructed by Goa Shipyard Ltd (GSL) for the Indian Coast Guard (ICG), was ceremoniously launched on 16 June 2025, in Goa. Designed and constructed under stringent dual class certification from the American Bureau of Shipping and Indian Register of Shipping, the FPV features over 60% indigenous content. The vessel measures 52 meters in length and 8 meters in breadth, with a displacement of 320 tons. Powered by a CPP–based propulsion system, the vessel can reach a top speed of 27 knots.

ICG inducts 'Adamya' FPV

'Adamya' the first Fast Patrol Vessel (FPV) under the eight FPV Project at Goa Shipyard Limited (GSL) was inducted in the Indian Coast Guard (ICG) on 26 June 2025, in Goa. The FPV is the first ship in its class within the ICG fleet to feature Controllable Pitch Propellers (CPPs) and indigenously developed gearboxes, offering superior maneuverability, operational flexibility and enhanced performance at sea. The vessel is equipped with state–of–the–art technology, including a 30mm CRN–91 gun, two 12.7mm stabilised remote control guns with fire control systems, an Integrated Bridge System (IBS), an Integrated Platform Management System (IPMS) and an Automated Power Management System (APMS).

IndiGo adds 2 more Boeing 787–9's

IndiGo is further expanding its long–haul capabilities by signing another firm agreement with Norse Atlantic Airways for the damp lease of two additional Boeing 787–9 Dreamliner aircraft. These aircraft, the fifth and sixth in this partnership, are expected to start operations by early 2026, serving long haul routes out of India. The total number of widebody aircraft under this strategic collaboration now stands at six, one of which has already arrived and operating on IndiGo's Delhi–Bangkok route from 1 March 2025.

IndiGo and Adani Airports join hands

IndiGo and Adani Airport Holdings Ltd. (AAHL) announced the commencement of commercial flights from Navi Mumbai International Airport (NMIA). IndiGo will be the first airline to commence commercial flight operations from NMIA with over 18 daily departures (36 ATMs) to over 15 cities from day one, increasing it to 79 daily departures (158 ATMs), including 14 international departures, by beginning of November '25 and further scale up to 140 departures (280 ATMs) by November 2026.

Pieter Elbers, CEO, IndiGo and Arun Bansal, CEO, Adani Airport Holdings Ltd.

DAC clears 10 capital acquisition proposals worth Rs 1.05 lakh crore

Defence Acquisition Council, under the chairmanship of Raksha Mantri Rajnath Singh on 3 July 2025, accorded Acceptance of Necessity (AoN) for 10 capital acquisition proposals amounting to Rs 1.05 lakh crore through indigenous sourcing. AoNs were accorded for procurement of Armoured Recovery Vehicles, Electronic Warfare System, Integrated Common Inventory Management System for the Tri–Services and Surface–to–Air Missiles. These procurements will provide higher mobility, effective air defence, better supply chain management and augment the operational preparedness of the Armed Forces.

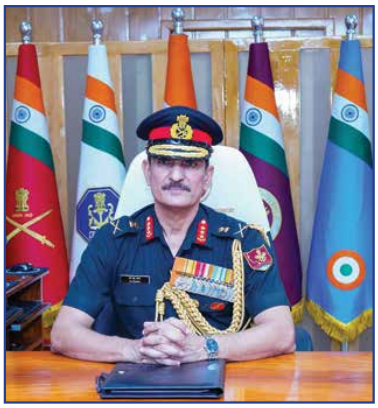
AoNs were also accorded for procurement of Moored Mines, Mine Counter Measure Vessels, Super Rapid Gun Mount and Submersible Autonomous Vessels. These procurements will enable mitigation of potential risks posed to the Naval and Merchant Vessels. To provide further impetus to indigenous design and development, AoNs were accorded under the Buy (Indian–Indigenously Designed Developed and Manufactured) category.

APPOINTMENTS

Air Marshal Jasvir S. Mann is SASO, WAC, IAF

Air Marshal Jasvir Singh Mann took over as Senior Air Staff Officer of Western Air Command, Indian Air Force on 1 June 2025. The Air Marshal is an alumni of the National Defence Academy and was commissioned as a fighter pilot in the IAF on 16 December 1989. He has flown over 3000 hours primarily on various types of fighter aircraft. He is a pilot Attack Instructor and in his operational career, he has commanded a fighter squadron, been Chief Operations Officer of a forward base and Air Officer Commanding of a premium fighter base. Prior to taking over as Senior Air Staff Officer, Western Air Command, Indian Air Force, he was Director General (Weapon Systems) at Air Headquarters.

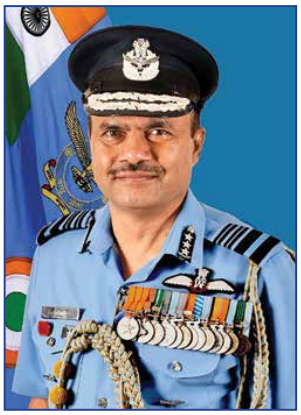
Lt Gen Dinesh Singh Rana takes over as CINCAN



Lt Gen Dinesh Singh Rana assumed charge as the 18th Commander–in–Chief of the Andaman & Nicobar Command (CINCAN) on 1 June 2025. The Andaman and Nicobar Command (ANC), based at Sri Vijaya Puram, is India's first and only joint services operational command, integrating the Army, Navy, Air Force and Coast Guard to safeguard national interests in the strategically vital Indian Ocean Region.

Lt Gen Rana was commissioned into the 10th Battalion of The Garhwal Rifles on 19 December 1987 and later had the honour of commanding the same battalion. In a career spanning over 37 years, the General Officer has held diverse operational, instructional, and staff appointments across various terrains and theatres.

Air Marshal Balakrishnan Manikantan is AOC–in–C, CAC



Air Marshal Balakrishnan Manikantan assumed the appointment of Air Officer Commanding–in–Chief of Central Air Command on 1 May 2025. He was commissioned in the Indian Air Force on 7 June 1986. The Air Marshal is a Helicopter Combat Leader and a type Qualified Flying Instructor and has more than 5500 hours of flying experience to his credit.

During his illustrious career spanning more than 38 years, the Air Marshal has tenanted a number of significant field and staff appointments. He commanded a Mi–17 1V Helicopter Unit in Western Air Command and two air bases at Bamrauli (in Prayagraj) and Leh (in Ladakh). The Air Marshal has held varied staff appointments at all levels at Command and Air HQ. He was also the SASO at HQ Eastern Air Command. Prior to assuming the present appointment as AOC–in–C CAC, the Air Marshal was tenanting the appointment of AOC–in–C SAC.

Air Marshal S Sivakumar is AOA Administration

Air Marshal S Sivakumar assumed the appointment of Air Officer–in–Charge Administration (AOA) at Air HQ, New Delhi on 1 July 2025. The Air Marshal was commissioned in Administration branch of the Indian Air Force in June 1990. In a career spanning over 35 years, the Air Marshal has held a number of important Command and Staff appointments which include Senior Air Traffic Control Officer of a forward base, represented IAF in the UN Mission at Congo, Air Force Examiner, Chief Administrative Officer of a premier Flying Station, Command Works Officer and Command Personnel Staff Officer at two Operational Commands, Air Officer Commanding of an Equipment Depot, Assistant Chief of Air Staff (Air Force Works) at Air Headquarters and Senior Officer–in–Charge Administration of an Operational Command.

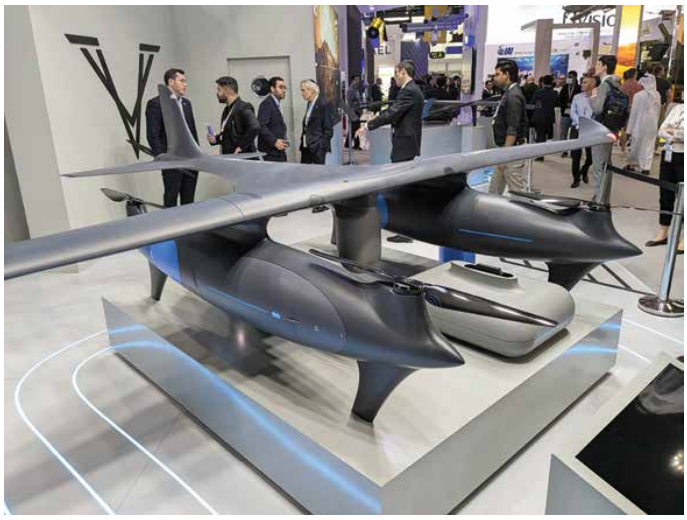
Drone/UAV/ C–UAS news from India

BBBS's Vajra Sentinel System for IAF

Big Bang Boom Solutions (BBBS) announced the successful delivery of the first lot of its Vajra Sentinel Systems, a next generation counter–unmanned aerial system (C–UAS), to the Indian Air Force, marking a key technological milestone in response to Operation Sindoor. Big Bang Boom Solutions had secured an order worth over Rs. 200 crore in 2024 from the Indian Air Force and Indian Army.

Paras DSTL in JV with Heven Drones Israel

Paras Defence and Space Technologies has announced a strategic joint venture with Heven Drones Israel that is recognised for its autonomous, hydrogen powered and mission specific drones. The JV will establish a new entity in India to design, manufacture and supply next generation drone systems tailored for India's defence and homeland security landscape, with long term plans to address global markets.



IG Drones and VoxelSensors join forces

IG Drones, an Indian drone technology company, has announced a strategic collaboration with Belgian DeepTech pioneer VoxelSensors to integrate next generation 3D perception systems into its UAV platforms. At the heart of this partnership lies the integration of VoxelSensors' SPAES (Streaming Perception for AI Enhanced Systems) technology—renowned for its ultra–low latency and high–precision spatial sensing—with IG Drones' fleet of unmanned aerial vehicles.

DroneAcharya tests Kamikaze drone

Indian Army recently conducted high altitude FPV drone trials at an aerial elevation of over 12,500 feet MSL. This series of trials marked the successful deployment of FPV drones in collaboration with DroneAcharya Aerial Innovations, which specialises in custom UAVs and solutions. The company successfully demonstrated its range of indigenously developed drone variants, including 10–inch first–person view (FPV) drones and optical fiber–enabled kamikaze drones. The open trials were conducted in Uttarakhand at high altitudes, in adverse weather conditions, and in electronic warfare (EW) environments.

Bharat Forge in MoU for Aarok MALE

Bharat Forge and French aerospace firm Turgis Gaillard have signed a memorandum of understanding to jointly manufacture the Aarok Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV) in India. Aarok is capable of operating at altitudes between 10,000 and 30,000 feet and remaining airborne for up to 48

hours. Designed for long range surveillance and offensive operations, the UAV carries a payload of over 1.5 tonnes and is integrated with command and control systems to deliver real time tactical intelligence.

RVAG debuts new products

Hyderabad based Raghu Vamsi Aerospace Group (RVAG) unveiled its latest defence and propulsion technologies at the 55th International Paris Air Show.

From indigenous micro turbojet engines to high performance kamikaze drones, the company's showcase reflected "its expanding global footprint and deep commitment to India's defence self–reliance".

Zuppa drone MRO lab at Madras Regimental Centre

In alignment with the Indian Army Chief's visionary call in November 2024 for "A drone for every soldier" Dakshin Bharat Area, MRC in collaboration with Zuppa Geo Navigation Technologies Pvt Ltd has taken up the responsibility of establishing a Maintenance, Repair and Operations (MRO) Lab at the Madras Regimental Centre (MRC). This milestone comes in the wake of Operation Sindoor, a mission that underscored the urgent need for Indian soldiers not only to operate drones but to independently maintain and troubleshoot them during active conflict scenarios.

ideaForge in EP order from IA

ideaForge has secured a significant win through the emergency procurement route. The order, valued at approximately Rs. 137 crore, has been placed by the Indian Army for its high performance hybrid mini UAV systems, which are already battle tested and inducted into the Army's inventory for ISR (Intelligence, Surveillance and Reconnaissance) operations. Owing to the sensitive nature of the engagement with the armed forces, the company "is unable to disclose the actual product name".

Representational photo of the Switch UAV

Nagastra–1R LM for IA

The Indian Army has placed an order with Solar Defence and Aerospace Limited to procure around 450 Nagastra–1R loitering munitions (LM). The Nagastra–1R is a cost effective system with full re–usability of launcher systems. The advanced loitering munition system has a 360–degree gimbal camera, with the option of putting a thermal camera for night operations.

The system has proprietary encryption for video and telemetry communication, comes with a high precision targeting system with 2 metres CEP, and has more than 80% indigenous content. The systems have been tested at various locations, including Ladakh and Babina near Jhansi in Uttar Pradesh.

Raphe mPhibr raises $100 million in funding

Raphe mPhibr, an Indian defence technology and aerospace startup, has raised $100 million in a funding round led by General Catalyst. Founded almost a decade ago by siblings CEO Vivek Mishra and Chairman Vikash Mishra, the Noida based startup designs and manufactures a range of unmanned aerial vehicles (UAVs), including the mR10 drone swarm platform, the mR20 high altitude logistics drone, Bharat (a man portable surveillance drone), and X8 (a compact maritime patrol system).

TASL UAV portfolio just gets "bigger" and "better"

Tata Advanced Systems Limited (TASL) has expanded its range of unmanned aerial vehicles (UAVs), introducing additions in both loitering munitions and intelligence, surveillance and reconnaissance (ISR) platform categories. The company's latest UAV portfolio includes the ALS 50, ALS 250, ALS 50 MkII and the IVTOL, each offering distinct operational strengths ranging from surveillance and reconnaissance to precision strike capabilities.

ALS 50: A vertical take–off and landing (VTOL) UAV equipped with all–weather Electro–Optical (EO) guidance for targeting and striking targets within a range of 50 kilometres. The munition is capable of carrying a 5 kg HEPF (High Explosive–Pre Formed) warhead suitable for soft–skinned vehicles, enemy personnel, and light structures.

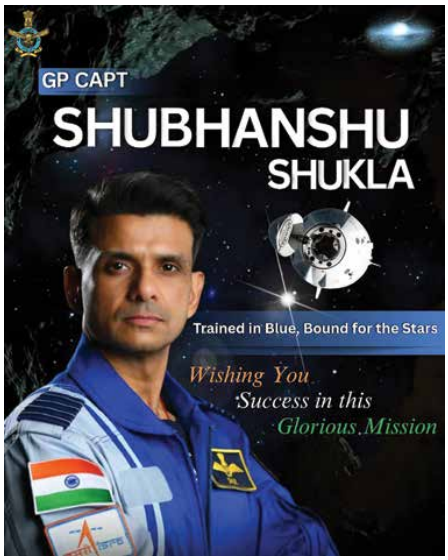
ALS 50 MkII: An upgraded version of the ALS 50 with improved performance and features, including payload, precision and avionics systems. It has undergone extensive flight testing and leverages technology already in deployment. ALS–50 family also has the capability to operate in contested and GPS denied environments, possibly relying on visual based targeting.

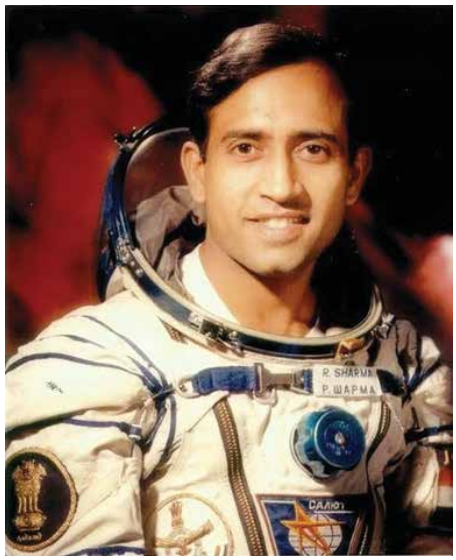
ALS 250: A long range loitering munition with a 250 km operational envelop, developed from the ALS 50 platform. It incorporates an internal combustion engine and conventional takeoff ability, unlike the ALS–50 that is battery operated and features VTOL. It boasts enhanced capabilities for extended mission requirements and also the ability to conduct operations in high altitude regions with a service ceiling of 10,000 ft.

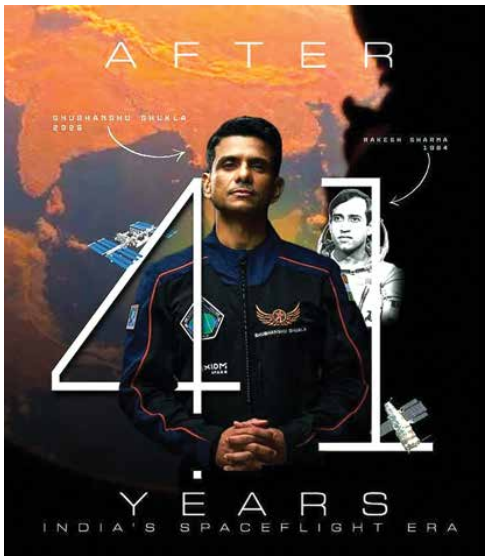
IVTOL UAV: A fixed–wing VTOL surveillance drone designed for operations in unprepared environments, it offers over 20 km of operational range and more than 120 minutes of endurance, making it suitable for extended deployments. Equipped with advanced electro–optical/infrared (EOIR) sensors, the IVTOL provides high quality day and night surveillance, enabling real time intelligence gathering in diverse operational conditions.

In recent years, India has witnessed a significant shift in its approach to precision strike capabilities, with loitering munitions emerging as a critical force multiplier across services. The Indian Armed Forces can be observed increasing the procurement of these systems, recognising their utility in engaging targets, especially along contested borders and in counter–insurgency operations. In the recent Operation Sindoor, loitering munitions played a key role in conducting Strike and Suppression of Enemy Air Defence (SEAD) missions.

41 years later!





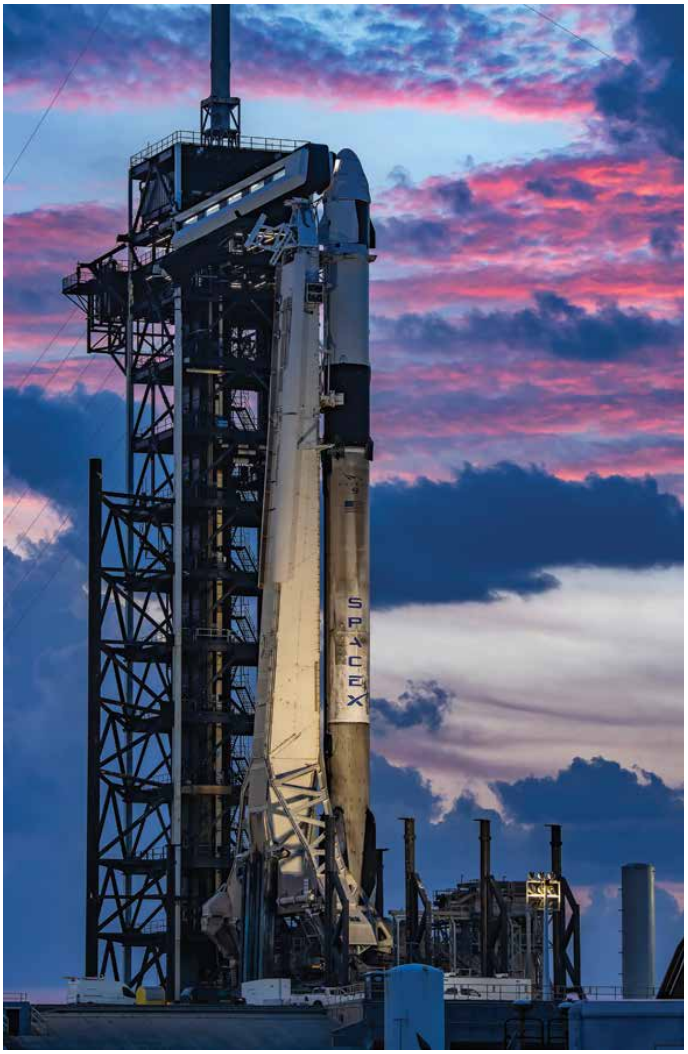


"Axiom–4 Mission heralds India's ascent to Viksit Bharat". This was the instant reaction of Union Minister Dr Jitendra Singh, as he led the cheering audience in giving a standing ovation to Shubhanshu Shukla and three other astronauts when the real–time visuals of successful Axiom 4 launch flashed during the special live screening of the event at Bhatnagar Auditorium of Anusandhan Bhavan, on 25 June 2025.

In a historic and proud moment for India, the launch of the Axiom–4 Mission marked a giant leap in the country's journey towards becoming a Viksit Bharat. Indian astronaut Group Captain Shubhanshu Shukla, serving as the Mission Pilot, was part of a four member international crew heading to the International Space Station (ISS).

Dr Jitendra Singh stated, "This is the realisation of the dream of the founding father of India's Space programme, Dr. Vikram Sarabhai and Satish Dhawan—now being fulfilled under the leadership of Prime Minister Narendra Modi."

Inside the Dragon spacecraft enroute the ISS (Photo: SpaceX)



Falcon 9 before liftoff (Photo: SpaceX)

Highlighting India's contribution to the mission, Dr. Jitendra Singh shared that Group Captain Shukla was carrying indigenously developed experiment kits, created by leading Indian institutions like IITs, IISc and the Department of Biotechnology (DBT). These kits were used to conduct advanced experiments at the ISS. "The biotech experiments aim to study the effects of microgravity and cosmic radiation on the growth of edible microalgae—a nutrient–dense, sustainable food source rich in proteins, lipids, and bioactive compounds, ideal for long duration space missions," the Minister stated.

These studies are expected to significantly contribute to future deep space missions and the long term sustainability of human presence in space, including India's much awaited Gaganyaan mission.

The Dragon spacecraft successfully docked with the International Space Station (ISS) on 26 June at around 7 am EDT, i.e. 4.30 pm IST.

An ecstatic IAF statement on 25 June 2025: "From conquering the skies to touching the stars— a journey

Falcon 9 lands at LZ–1 after launching Axiom Space's fourth mission to the ISS (Photo SpaceX)

The Prime Minister interacted with Group Captain Shubhanshu Shukla, who was aboard the International Space Station.

powered by the indomitable spirit of the IAF Air Warrior. Group Captain Shubhanshu Shukla sets forth on a landmark Space Mission, carrying the pride of the nation beyond Earth. This is a deja–vu moment for India, 41 years after the mission of Sqn Ldr Rakesh Sharma, who first carried our Tricolour beyond Earth. Being more than a mission, it is reaffirmation of India's ever expanding horizon. Gp Capt Shubhanshu Shukla becomes the first Indian to visit the ISS (International Space Station), piloting the historic Axiom Mission 4".

India's Prime Minister N. Modi: "We welcome the successful launch of the Space Mission carrying astronauts from India, Hungary, Poland and the US. The Indian Astronaut, Group Captain Shubhanshu Shukla is on the way to become the first Indian to go to International Space Station. He carries with him the wishes, hopes and aspirations of 1.4 billion Indians. Wish him and other astronauts all the success!"

General Anil Chauhan, Chief of Defence Staff: "All Personnel of the Indian Armed Forces wish him and the Axiom–4 crew a safe and successful mission to the International Space Station for a 14 day scientific mission in Low Earth Orbit (LEO)".

41 years ago after the mission of Sqn Ldr Rakesh Sharma, the first Indian in space; extensively covered in our Vayu Issue 2 Mar/Apr 1984 and subsequent issues as well.

MoD approves AMCA programme execution via industry partnership

In a significant push towards enhancing India's indigenous defence capabilities and fostering a robust domestic aerospace industrial ecosystem, Raksha Mantri Rajnath Singh, on 27 May 2025, approved the Advanced Medium Combat Aircraft (AMCA) Programme Execution Model. The Aeronautical Development Agency (ADA) is set to execute the programme through Industry partnership. The Execution Model approach provides equal opportunities to both private and public sectors on competitive basis. They can bid either independently or as joint venture or as consortia. The entity/bidder should be an Indian company compliant with the laws and regulations of the country.

This is an important step towards harnessing the indigenous expertise, capability and capacity to develop the AMCA prototype, which will be a major milestone towards Aatmanirbharta in the aerospace sector. ADA will shortly issue an Expression of Interest (EoI) for the AMCA Development Phase.

GE Aerospace and HAL celebrate 40 years of partnership

With a defence budget of more than $78 billion, India is modernising and expanding its military capabilities, and the potential for business investment is immense. The country is seeking trusted, highly capable companies willing to support its defence ecosystem in ways that align with the Indian government's "Make in India" initiatives.

GE Aerospace has played a significant role in building India's defence sector over the past 40 years. Since 1985, when the company first began discussing opportunities with Hindustan Aeronautics Limited (HAL), India's government owned aerospace company, the partners have nurtured an enduring alliance that continues to grow. GE Aerospace now provides the Indian military with globally proven aircraft and marine engines, avionics, and maintenance, repair, and overhaul (MRO) services. Meanwhile, an increasing amount of engineering, manufacturing and material sourcing for this work is taking place in India. It's a highly valued relationship that benefits both countries, economically and beyond.

"It's not just a business thing – there is a higher purpose and mission to the work we do with HAL," stated Shawn Warren, vice president and general manager of combat and trainer engines at GE Aerospace. "India is a strategic partner to the US in the Pacific region, and our relationship with HAL supports that broader global relationship."

The American and Indian companies have worked collaboratively from the very beginning. "We've never had a customer–supplier relationship," stated Rahul Gadre, the Bengaluru based sales director for military engines and systems at GE Aerospace. "It's more of a partnership – a joining of hands."

Although GE Aerospace is also working with private–sector partners in India, Gadre explains, the relationship with HAL is foundational. "HAL is the backbone for defence in India," he says. "They have experience and expertise from the past 85 years. They literally started from scratch to develop an in–country aerospace industry."

The partners' first official contract, a licensing agreement signed in 1986, saw HAL begin assembling, inspecting, and testing GE's LM2500 marine gas turbines in India. The LM2500, an aero–derivative marine engine prized around the world for its performance and reliability, has since become a cornerstone for the Indian Navy, powering its stealth P17 frigates, advanced P17A frigates (the first of which was commissioned this January 2025), and India's first domestically built aircraft carrier, the INS Vikrant, commissioned in 2022.

The companies launched their aero partnership in 1986 as well, when HAL, working with India's Aeronautical Development Agency, integrated GE Aerospace's F404 engines into the country's landmark Light Combat Aircraft (LCA) programme. India's ambitious effort to develop and build its own world class fighter jet reached a milestone in 2016 when the first Tejas – Sanskrit for "Radiance" – LCA Mk.1 single–engine multirole combat aircraft roared into service with the 45th "Flying Daggers" squadron of the Indian Air Force.

GE Aerospace has so far delivered 65+ F404 engines for the LCA Mk1 programme, and another 99 are on order for the LCA Mk.1A variation. Meanwhile, the company's higher–thrust F414–GE–INS6 afterburning turbofan has been selected to power the next–gen LCA Mk.2, which has increased range, and for the prototype development, testing, and certification of fifth–generation fighter jets — the most advanced class of military jets flying to date — for India's Advanced Medium Combat Aircraft (AMCA) programme. The first AMCA jets will be twin engine aircraft, and initially each will be powered by two F414s.

In a groundbreaking agreement announced during Prime Minister Narendra Modi's official state visit to the United States in June 2023, GE Aerospace and HAL are now working towards joint production of GE Aerospace's F414 engines in India.

While GE Aerospace has the US government's approval to share engine technology with other allied countries, such as South Korea, the new agreement with India is notable for its scope. "We were asked to push the limit in terms of technology transfer," said Warren, who sees the move as an exciting next step for both companies and both countries.

According to Dr. D K Sunil, Chairman and Managing Director of HAL, "Our collaboration with GE Aerospace integrates cutting edge technologies, such as additive manufacturing, advanced materials, and digital design techniques, into India's aerospace sector. These advancements enable HAL to manufacture state–of–the–art defence products, further boosting the operational readiness of the Indian Armed Forces."

"We've been working with HAL for 40 years, and we're set up for another 40 year run," Warren said. "India is a huge market and a huge opportunity. We're building on a legacy."

By Dianna Delling

Photos: Vayu Aerospace Review

Indian Army conducts trials of next–gen defence technologies

Post Operation Sindoor, the Indian Army is currently undertaking extensive Capacity Development Demonstrations at key locations across the country, including the Pokhran Field Firing Ranges, Babina Field Firing Ranges, and Joshimath, with dedicated air defence equipment demonstrations also scheduled at Agra and Gopalpur. These field trials are being conducted under near–combat conditions, integrating electronic warfare simulations to assess the performance of cutting–edge defence systems rigorously. On 27 May 2025, General Upendra Dwivedi, Chief of the Army Staff, visited Babina Field Firing Ranges and reviewed the ongoing demonstrations and interacted with all stakeholders.

The demonstrations feature a wide array of advanced technologies developed under the Aatmanirbhar Bharat initiative, aimed at accelerating indigenous capability development.

The trials mark a significant step in the Indian Army's roadmap for a "Decade of Transformation" and are designed to ensure rapid absorption of emerging technologies to meet evolving battlefield requirements. A large number of defence industry partners are taking part in the demonstration, reflecting the increasing synergy between the Indian Army and domestic manufacturers.

Key platforms undergoing evaluation include: Unmanned Aerial Systems (UAS), UAV Launched Precision Guided Munition (ULPGM), Runway Independent (RWI) Remotely Piloted Aerial Systems (RPAS), Counter–UAS Solutions, Loitering Munitions, Specialised Vertical Launch (SVL) Drones, Precision Multi Munition Delivery Systems, Integrated Drone Detection and Interdiction System (IDDIS), Low Level Light Weight Radars, VSHORADS (Next Generation) IR Systems and Electronic Warfare (EW) Platforms.

Through these evaluations, the Indian Army "aims to strengthen its technological edge, enhance operational readiness, and reaffirm its commitment to indigenous innovation and self–reliance in defence capability development".

Dassault Aviation partners with TASL to manufacture Rafale fuselage for India and other global markets

Dassault Aviation and Tata Advanced Systems Limited, on 5 June 2025, signed four Production Transfer Agreements to manufacture the Rafale fighter aircraft fuselage in India, marking a significant step forward in strengthening the country's aerospace manufacturing capabilities and supporting global supply chains. This facility represents a significant investment in India's aerospace infrastructure and will serve as a critical hub for high precision manufacturing.

Under the scope of the partnership, Tata Advanced Systems will set up a cutting–edge production facility in Hyderabad for the manufacture of key structural sections of the Rafale, including the lateral shells of the rear fuselage, the complete rear section, the central fuselage, and the front section.

The first fuselage sections are expected to roll off the assembly line in FY2028, with the facility expected to deliver up to two complete fuselages per month.

"For the first time, Rafale fuselages will be produced outside France. This is a decisive step in strengthening our supply chain in India. Thanks to the expansion of our local partners, including TASL, one of the major players in the Indian aerospace industry, this supply chain will contribute to the successful ramp–up of the Rafale, and, with our support, will meet our quality and competitiveness requirements", stated Eric Trappier, Chairman and CEO of Dassault Aviation.

Sukaran Singh, Chief Executive Officer and Managing Director, Tata Advanced Systems Limited, stated, "This partnership marks a significant step in India's aerospace journey. The production of the complete Rafale fuselage in India underscores the deepening trust in Tata Advanced Systems' capabilities and the strength of our collaboration with Dassault Aviation. It also reflects the remarkable progress India has made in establishing a modern, robust aerospace manufacturing ecosystem that can support global platforms."

The signing of these contracts reflects Dassault Aviation's strong commitment to India's 'Make in India' and AtmaNirbhar initiatives. This partnership aims to strengthen India's position as a key player in the global aerospace supply chain while supporting its goal of greater economic self–reliance.

Text courtesy: Dassault Aviation

(L–R): Mr. Masood Hussainy, Executive Director, Tata Advanced Systems Limited, and Mr. Bruno Coiffier, Senior Executive Vice President – Head of Purchase & Procurement, Dassault Aviation, at the official signing ceremony formalising the partnership. (Photo: Tata)

Rafale rear fuselage section to be manufactured in the Hyderabad facility. Copyright: Dassault Aviation (Photo: S. Rande)

Dassault Aviation partners with Reliance Group to manufacture Falcon 2000s in India

Representational photo of Falcon 2000DX

Dassault Aviation and Reliance Infrastructure Ltd subsidiary, Reliance Aerostructure Limited (RAL), on 18 June 2025 announced at the Paris Air Show the execution of an agreement to manufacture Falcon 2000 LXS business executive jets in India for the global market.

This is for the first time that Dassault Aviation will manufacture Falcon 2000 jets outside France, positioning India as a strategic global aviation hub. This is an epic moment for India as it joins the elite club of countries manufacturing next generation business jets after United States, France, Canada and Brazil. For Dassault Aviation, DRAL will become Center of Excellence (CoE) for Falcon series, including Falcon 6X and Falcon 8X programmes, the first such CoE outside France.

Eric Trappier, Chairman and CEO, Dassault Aviation stated, "This new agreement, which will make DRAL the first centre of excellence for Falcon assembly outside France and which will eventually enable the establishment of a final assembly line for the Falcon 2000, illustrates, once again, our firm intent to meet our 'Make in India' commitments, and to contribute to the recognition of India as a major partner in the global aerospace supply chain. It marks the ramp–up of DRAL, in line with the strategic vision shared with our partner Reliance, which led to its creation in 2017 and is a testament to our unwavering belief in our future in India and serving India."

Anil D. Ambani, Founder Chairman, Reliance Group stated, "This collaboration reflects our commitment to Prime Minister Mr. Narendra Modi's vision of 'Atmanirbhar Bharat (Self Reliant India)' and 'Make in India for the World'. Our partnership with Dassault Aviation for manufacturing of Falcon Business Jets in India is a defining moment for the country, aviation industry and the Reliance Group. This will help position India as a key force in the global aerospace value chain."

Anil Ambani, Founder Chairman, Reliance Group along with Eric Trapper, Chairman, Dassault Aviation at the Paris Air Show.

The transfer of full fuselage and wing assembly operations combined with major facility upgrades, will pave the way for the first flight of "Made in India" Falcon 2000 from DRAL Facility at MIHAN, Nagpur in the Western State of Maharashtra, India by 2028. The partnership represents a significant step in advancing India's aerospace manufacturing capabilities, while strategically integrating into global aviation supply chain. It will be for the first time in the storied history of Dassault Aviation, that it will manufacture Falcon 2000 jets outside of France. Dassault will also transfer the assembly of the front section of Falcon 8X and Falcon 6X, in addition to the wings and complete fuselage assembly of the Falcon 2000 to DRAL.

The joint venture between Dassault Aviation and Reliance Aerostructure – DRAL – was established in 2017. The operations commenced with the setting up of a state–of–the–art manufacturing facility at Mihan, Nagpur, later that year. Since delivering its first Falcon 2000 front section in 2019, DRAL has assembled over 100 major subsections for the Falcon 2000, underscoring its world class precision manufacturing capabilities and playing an integral role in Falcon global production programme.

DRAL is expected to recruit several hundred engineers and technicians over the next decade to support its expanding operations. This growth underscores Dassault Aviation's deep commitment to strengthening India's aerospace manufacturing ecosystem and advancing the nation's emergence as a global center of excellence for high precision aviation production.

Text: Dassault Aviation

Safran and HAL strengthen cooperation to produce LEAP forged parts

At the 55th edition of the Paris Air Show, Safran Aircraft Engines signed an agreement with Hindustan Aeronautics Limited (HAL) for the industrialisation and production of rotating parts for LEAP engines. This agreement supports the government's "Make in India" policy and follows the memorandum of understanding signed by Safran Aircraft Engines and HAL in October 2023 to develop industrial cooperation in LEAP engine parts manufacturing, as well as the contract signed last February by both partners to produce forged parts. Safran Aircraft Engines is thus continuing to expand its footprint in India and is extending the scope of its cooperation with HAL through the production of Inconel parts.

The objective is to support the strong growth of the Indian aerospace market and ensure the ramp–up of LEAP engines powering single–aisle civil aircraft. To this end, Safran Aircraft Engines is developing a complete aerospace ecosystem based on the creation of new facilities in India and closer cooperation with its major Indian partners such as HAL.

"We are really proud to expand this long–standing partnership with Safran and to develop our industrial expertise in forging processes for Inconel parts for the LEAP programme", stated Dr. D K Sunil, Chairman and Managing Director of HAL.

"We are pleased to extend our collaboration with HAL, a key player of the Indian aerospace industry," stated Dominique Dupuy, Safran Aircraft Engines' Purchasing VP. "This industrial cooperation is part of our roadmap to diversify our production sourcing and strengthen our industrial footprint in India, so as to support the growth of domestic air traffic with our LEAP engine and prepare for future requirements of the M88 engine powering the Rafale."

Safran Aircraft Engines is thus boosting its capabilities and presence in India, where it already operates five production sites in Hyderabad, Bengaluru and Goa. A sixth site dedicated to maintenance, repair, and overhaul (MRO) of LEAP engines will open in Hyderabad by the end of the year. In 2022, Safran and HAL also set up the Safran HAL Aircraft Engines joint venture in Bengaluru, specialising in manufacturing components for the LEAP engine as well as the M88 engine.

India is CFM's third largest market in terms of the number of engines in service, with 75% of the Indian commercial fleet equipped with CFM engines. Today, of the 500 aircraft operated by 7 Indian airlines with CFM engines, over 370 are LEAP powered, and over 2,000 engines on order are for Indian airlines. In addition, Safran Aircraft Engines plans to develop its military collaboration with India on the M88 engine.

Safran signs MoU with Maini Precision Products Ltd

Safran Aircraft Engines and Maini Precision Products Limited have signed a new long term agreement to supply assembled products for the CFM LEAP Engine. This announcement marks a significant milestone in the collaboration between Safran Aircraft Engines and Maini Precision Products Limited (MPPL), with MPPL already providing the aircraft engines manufacturer with a variety of turbine vanes, forged and machined metallic products. The agreement further highlights the growing integration of India's aerospace manufacturing to the global supply chain and deepens SAE's Make in India initiative. The Memorandum of Understanding (MOU) was signed by Mr. Dominique Dupuy, Safran Aircraft Engines' Purchasing VP and Mr. Gautam Maini, Managing Director, MPPL, in the presence of Mr. Gautam Singhania, Chairman & Managing Director, Raymond Group, at the Paris Air Show, Le Bourget 2025.

HAL is powering ahead with multiple projects

Hindustan Aeronautics Limited (HAL) participated at the Paris Airshow recently, with an intent to grow the company's international presence and enter into new partnerships for the Indian market. HAL is the sole manufacturer of fighter aircraft, military helicopters and military transport aircraft in India.

In an exclusive interview with Atul Chandra of GBP Aerospace & Defence, Dr. DK Sunil, HAL's Chairman & Managing Director with Addl. Charge of Director (Engg and R&D) outlined the plans to increase Tejas Mk.1A deliveries to the Indian Air Force. Dr. Sunil also confirmed that the roll–out of the first prototype LCA Mk.2 fighter aircraft is planned for next year.

Edited excerpts from the interview:

Please provide an update on HAL Tejas Mk.1 and Tejas Mk.1A and steps taken to meet IAF production rates.

The production activities for the LCA Tejas Mk.1 have been completed. Production under the Initial Operational Clearance (IOC) contract and Final Operational Clearance (FOC) is complete. HAL initiated the series production of LCA Mk.1A concurrently with design and development. However, the series production has been affected due to a delay in the supply of engines by General Electric (GE). Efforts are currently underway to accelerate engine deliveries from GE to meet the production requirements.

HAL has established two production lines in Bengaluru. A third production line is being established at HAL Nasik to increase the total production capacity to 24 aircraft per year and ensure delivery as per contract timelines. HAL is set to roll out the first Tejas Mk.1A from the third line in 2025. With the supply chain stabilising, aircraft manufacturing is on course to achieve the rated capacity well beyond the contracted schedule and HAL aims to complete the deliveries to Indian Air Force at the earliest.

Please provide an update on LCA Mk.2 and plans prototype roll–out and maiden flight.

HAL is the principal partner to the Aeronautical Development Agency (ADA) in the indigenous design and development of LCA Mk.2, a 4.5 generation multirole combat aircraft. The structural assembly of the first prototype aircraft is under progress and the roll out of the prototype aircraft is planned for 2026.

What is the current status of ALH Dhruv helicopters and what are total orders on hand and deliveries due?

The contract for the supply of 25 ALHs to the Indian Army and nine to the Indian Coast Guard is currently being executed. To date, 16 helicopters have been produced and the production of remaining 18 helicopters is in progress.

Please provide an update on IMRH/DBMRH programme.

The Indian Multi–Role Helicopter (IMRH) and the Deck–Based Multi–Role Helicopter (DBMRH) are 13 ton medium lift helicopters being developed by HAL to fulfill various military aviation requirements. Currently, design and development activities are progressing with internal funding from HAL, while we await government approval. Long lead activities for the project have been identified and are being executed in parallel to ensure timely completion. Additionally, to design, develop and supply the engines for the IMRH and DBMRH, a joint venture has been established with Safran Helicopter Engines, named SAFHAL Helicopter Engines Pvt Ltd, in November 2023.

By Atul Chandra (Twitter @CheckSix_Bison)

Interview with Larry Culp, Chairman & CEO of GE Aerospace

GE Aerospace, which marked its first anniversary as a standalone public company on 2 April 2025, is soaring to new heights. The company had a "monumental" financial performance in 2024, which included $1.7 billion of profit growth and $1.3 billion of free cash flow growth. In this interview, Chairman and CEO Larry Culp explains why GE Aerospace's success is about more than just the numbers, and shares insights into the company's journey, its unique culture of innovation, and his vision for the future of flight.

Larry, congratulations on GE Aerospace's first year as a standalone public company. How would you sum up the past 12 months?

Culp: Thank you. It's been an incredible journey. I couldn't be prouder of what our team has accomplished together with our customers and industry partners — and we're only just getting started. Our launch as a standalone public company was the springboard for a monumental first year for GE Aerospace. Since this time last year we have increased our market cap by approximately $65 billion while delivering strong financial results in 2024, with total orders up 32% to $50.3 billion, revenue up 9% to $38.7 billion, and profit up 27% to $7.6 billion. And along the way we've achieved significant milestones, including US Federal Aviation Administration (FAA) and European Union Aviation Safety Agency (EASA) certification for the updated high–pressure turbine (HPT) hardware for our CFM LEAP engine programme — extending time on wing and delivering more value for our customers.

But there's a story beyond the numbers and business achievements, and that's the passion and commitment of our people. Every day, our teams around the world are living our purpose to invent the future of flight, lift people up, and bring them home safely. Using FLIGHT DECK, our proprietary lean operating model, we are focused on driving continuous improvement. It's about SQDC –safety, quality, delivery, and cost–always in that order, with safety as our top priority. I'm proud of the progress we have made and even more excited for the opportunities ahead of us.

You wrote about feeling a special sense of purpose on the podium of the New York Stock Exchange. A year on, how do you remember the company's launch day?

Culp: That day was more than 100 years in the making. Filled with pride in GE's history and excitement for our future, GE Aerospace's launch day was all about the team — our 53,000 employees around the world who are inventing the future of flight for generations to follow. I was honoured to share the podium with several of those employees for the NYSE opening bell that morning, and then flew straight to our headquarters in Evendale, Ohio, to continue the celebrations. We were joined virtually by our global teammates around the world, from Lynn, Massachusetts, to Bengaluru, India. I will never forget the sense of pride and purpose I felt across the team that day, and still feel to this day.

And now, a year later, how are you and the GE Aerospace team marking the occasion?

Culp: Following a year of so many historic moments for the company, perhaps what stands out most is the way our GE Aerospace team shined brightest in one of our darkest hours: Hurricane Helene and the devastation it left behind in western North Carolina, including for our employees and their families in Asheville. Through the darkness, it was remarkable to see our team members and the impacted community come together to support one another — providing everything from food and water to portable showers and generators. Even those who had suffered loss were selflessly looking to help others. They represented GE Aerospace at its finest.

With the spirit of Asheville in mind, we are proud to celebrate our first anniversary as a standalone business by giving back to the communities where we live and work. During our first–ever Volunteer Week, our teams around the world are participating in more than 80 volunteer activities with local food banks, schools, veterans' centers, and other organisations across nearly 40 of our global facilities.

You talked earlier about safety as GE Aerospace's top priority, certainly a major focus for the industry over the past year. How do you maintain GE Aerospace's safety culture?

Culp: There are approximately 950,000 people in the sky at any given moment with technology made by GE Aerospace and our joint venture partners under wing. We think about that every single day at GE Aerospace. We have a tremendous responsibility to our customers and the flying public that each member of the team takes very seriously. Each of us owns safety — at all levels of the organisation, from the shop floor to engineering and sourcing to the leadership team. We operationalise safety through our Safety Management System and Quality Management System — enabling us to identify safety risks and actively work to mitigate those risks through root cause and problem–solving.

In addition to using FLIGHT DECK to improve your own operations, you are also using it with your customers and suppliers. Can you tell us more about that?

Culp: A great example of FLIGHT DECK in action is the work we've done with our suppliers. At the start of 2024, we realised 80% of material shortages were tied to 15 priority supplier sites. Using FLIGHT DECK, we brought their best people together with ours — deploying more than 550 of our engineering and supply chain resources into the supply base to problem–solve together. As a result, we increased material input by 26% across these priority supplier sites from the first half of the year to the second half, and saw a step–change improvement in our priority suppliers meeting their volume commitments from about half in early 2024 to more than 90% today. Ultimately, this has supported significant growth in total engine deliveries across GE Aerospace in support of our customers. While we still have more work to do, this is the power of FLIGHT DECK.

Shifting to innovation, what progress has GE Aerospace made in advancing aviation technology over the past 12 months?

Culp: With our roots going back to Thomas Edison, innovation has always been core to GE Aerospace's DNA. We constantly push the boundaries of what's possible for the future of flight — and we'll continue to do so with safety at the forefront. In addition to the HPT certification I mentioned earlier for our CFM International LEAP engine programme, which continues to set new standards for fuel efficiency and reliability in narrowbody aircraft, another great example of our innovative spirit is the Catalyst engine, which also recently received FAA certification. This is the first clean–sheet turboprop engine to hit the market in over 50 years, showcasing our commitment to developing next–generation propulsion systems.

In defence, we achieved successful ramjet ground level tests that have advanced the goal of hyper efficient, high speed, and long range hypersonic flights, and our engineers are preparing to prove their breakthrough technologies in the skies. The T901 engine has successfully completed

initial ground runs on a Black Hawk helicopter, marking a significant step forward in the US Army's Improved Turbine Engine Programme.

What about investing in the business? Will the company continue its strong research and development (R&D) commitment?

Culp: Absolutely. In 2024, we spent approximately $2.7 billion in R&D (including customer and partner funding), driving breakthroughs in Open Fan engine architecture through the CFM RISE (Revolutionary Innovation for Sustainable Engines) program, as well as hybrid electric propulsion, hypersonics, and next–generation adaptive cycle engines, among others.

We're also making substantial efforts to expand and modernise our manufacturing and maintenance capabilities to better serve our customers and drive innovation. We also launched a $1 billion investment in our maintenance, repair, and overhaul (MRO) facilities and capabilities through 2029.

How is GE Aerospace addressing the increasing focus on new technology innovation to drive greater efficiency in aviation?

Culp: Our long term focus on innovation is a key differentiator, and we've always prioritised better fuel efficiency in our engines to meet our customers' needs. Our engineering teams around the world have advanced new technologies to support current engine programmes and continue to look at how we can improve our product performance and maintenance. A great example of this is the LEAP engine, which is 15% more fuel efficient than the engine it replaces and for which we recently introduced new high pressure turbine (HPT) hardware to further improve durability. But we're not stopping there. As we look to the future of flight, we're also investing heavily in the development of new technologies. With our CFM RISE programme, we're maturing and testing a suite of new engine technologies including Open Fan, compact engine cores, and hybrid electric systems with the goal of creating a future engine that has more than 20% better fuel efficiency than engines today.

Let's look to the future. What's your outlook for the commercial aviation market, and how is GE Aerospace positioned to capitalise on it?

Culp: We're seeing strong recovery and growth in commercial aviation, particularly in the narrowbody segment. Our LEAP engine is uniquely set to capitalise on this trend. We have a substantial backlog and are ramping up production to meet demand. In the widebody market, our GE9X engine for the Boeing 777X is progressing well, and we're excited about its potential. Overall, we're well positioned across all segments of commercial aviation, from regional jets to the largest widebodies.

Finally, have you got a message for GE Aerospace employees and business partners as you look ahead?

Culp: To our employees, thank you. Your dedication, innovation, and commitment to our purpose are what make GE Aerospace a leader in our industry. To our partners: We're excited about the future and confident in our ability to deliver long–term value. We have a strong foundation, a clear strategy, and the right team to execute it. As we continue to invent the future of flight, we remain focused on FLIGHT DECK, serving our customers, and driving innovation. Together, we're not just shaping the future of aviation — we're lifting the world to new heights.

Interview by Chris Noon

Operation Sindoor: Everything You Need to Know

The Indian Armed Forces launched 'Operation Sindoor' in the wake of the barbaric Pahalgam terrorist attack on 22 April 2025, in which twenty five Indians and one Nepali citizen were murdered. India responded on the early morning of 7 May by hitting nine terrorist infrastructures in Pakistan and Pakistan–occupied Jammu and Kashmir. Witnessing the terror facilities dusted to the ground, Pakistan launched another attack on India, which was continued for four days (till 10 May). Pakistan used a large array of weapons, including swarm drones, unmanned combat systems, loitering munitions, artillery firing, and even missiles against Indian military and civil structures. However, India's integrated air defence and counter–unmanned aircraft system neutralised the threats using both kinetic and non–kinetic ways.

In response, India continued the operation involving the Indian Army and the Indian Air Force, resulting in extensive damage to the Pakistani military and other terror facilities, rendering offensive and defensive capabilities of Pakistan ineffective. Inflicted by the heavy damage, the Director General of Military Operations (DGMO) of Pakistan called the Indian counterpart and requested a ceasefire. It was agreed between them that both sides would stop all firing and military action on land and in the air and sea with effect from 1700 hours (05:00 PM) Indian Standard Time (IST) on 10 May 2025.

What were the targets?

India's initial targets were nine terrorist camps. These locations were key command centers of the three terrorist organisations: Jaish–e–Mohammad (JeM), Hizbul Mujahideen, and Lashkar–e–Taiba (LeT). Five of these were inside the Pakistan–occupied Kashmir, and four were in Pakistan. Markaz Subhan Allah at Bahawalpur, Sarjal at Tehra Kalan, Markaz Abbas in Kotli, and Syedna Bilal camp in Muzaffarabad (JeM); Markaz Taiba at Murdike, Markaz Ahle Hadith at Barnala, and Shwawai Nalla camp in Muzaffarabad (LeT); and Makaz Raheel Shahid in Kotli and Mehmoona Joya in Sialkot (Hizbul) were targeted and destroyed. The operation lasted for only 25 minutes (01:05 AM to 01:30 AM). After Pakistan's attack on the Indian civil and military facilities, Indian retaliation decimated more terror facilities and launch pads, military bunkers and other infrastructure, and some Pakistani Air Force and army bases. These bases include Arifwala, Bholari, Chunian, Dha, Jacobabad, Looni, Murid, Noor Khan, Parsur, Rafique, Rahim Yar Khan, Sargodha, Sialkot, Skardu and Sukkur. During the press briefing, India provided videos of the strike on enemy targets and satellite photos asserting damage as an aftermath.

Damage inflicted upon Pakistan

The exact nature of the loss for Pakistan is being analysed and has yet to be asserted officially. However, satellite images and photos and videos available on the public platform assert extensive devastation and damage to the targets. It is estimated that more than one hundred terrorists were killed during the air strike conducted on 7 May. Several high value targets, including Yusuf Azhar, Abdul Malik Rauf, and Mudassir Ahmad were eliminated. At least 50 individuals lost their lives at Bholari Air Base. So, the overall casualties are much higher. Some of the air defence systems of the Chinese origin were jammed, and some of them even got hit. Besides, Pakistan lost a few

radar facilities as well. Analysing the photos and videos of the aftermath, it is estimated that Pakistan has lost at least 9 aircraft in the air and on the ground, including transport platforms, electronic warfare, Airborne Early Warning and Control (AWACS) and fighter jets. However, the exact nature of the damage and losses suffered by Pakistan has yet to be officially released by India.

Effect on the PAF bases

One can argue that the damage inflicted upon the PAF bases has a temporary effect only. But that is incorrect. The Indian response was punitive in nature and precise in manner. The aim was to deny the PAF any further operational capabilities, and the objective was achieved by damaging the runways and hangars. In case of a full scale war, the response would be much bigger.

Questions regarding the Indian losses

During the first mission conducted by the IAF, on 7 May, only terrorist infrastructure were targeted, and no Pakistani military assets were harmed. This manner was taken for two main reasons. One, to limit the tension between two nuclear rivals potentially as low as possible; and two, not to lose the surprise element factor. Any such attack on Pakistani military structures to lower the risk of the operation would alert the terrorists of the nearby areas. This would provide them a window of opportunity to escape from the terror centers. This forced the IAF to conduct a high risk mission without conducting the SEAD/DEAD (Suppression of Enemy Air Defences, Destruction of Enemy Air Defences) in a highly sensitive area to inflict the maximum damage.

Was there any military loss to the Indian side? Details have not been officially released yet (as of June 2025) by the Ministry of Defence (MoD). While there's no clear evidence of the IAF losses, they are minimal nevertheless. For an example, we can look at the futile Israeli "Operation Model 5" in 1973 against Syrian surface–to–air missile sites, where Israel lost at least six fighter jets. It took Israel nine years to develop a robust SEAD strategy to apply in "Operation Mole Cricket 19" in 1982, which was successful. The US lost one F–117, a stealth combat platform, in 1999 during air operations against Serbia, while another F–117 was damaged.

Operation over the enemy territory, covered by a network of modern air defence, is always highly risky. And the IAF did the job successfully in the first such encounter. It has been clearly stated that all pilots are safe and back home. This is the most important thing. One or two pieces of equipment, for debate if lost, can be replaced by a financially strong nation, but a trained pilot is an asset. And they are safe. And they are back home after conducting at least two high risk missions, defying the best weapons Pakistan has! This is not possible without having the best of the best on your side. Such an operation was conducted without any fifth generation fighter jet. No other air force in the world has demonstrated (till now) such a dominating capability against a near peer adversary in the twenty first century. Undoubtedly, some other air forces are also capable, but they are yet to be proven. Yes, Russia–Ukraine could be another example. But, in that conflict, neither side has established air superiority to such a degree that the other side loses offensive capabilities.

In the case of India, the IAF neutralised the counterattack capacity of a nuclear armed state! And this is what makes the IAF the sole such example. Any loss suffered in the combat should be considered against the losses inflicted upon the enemy and the achievements of the objective. Neither should the loss be neglected, nor should it unnecessarily be the prime focus. We should learn and adopt in the next venture.

The significance—ten points

One: The "Operation Sindoor" marked India's first major introduction to twenty first century warfare on a massive scale. In this brief conflict, Pakistan used, arguably, fourth generation warfare involving non–state actors along with the armed forces, long range standoff munitions, integrated air defence and unmanned platforms. And India triumphed over every challenge with flying colours.

Two: It was a tri–service operation by India. Instead of each of the three branches working individually with their own targets, an integrated force pursued a common goal with coordination between different branches. This allowed India to conduct the operation with much accuracy.

Three: It witnessed an intelligence operation on a massive scale. India identified twenty one terror infrastructures and selected nine of them for the maximum outcome. It also provided an opportunity for India to test twenty first century intelligence measures (ELINT, SIGINT, COMINT, satellite, etc.), which will be crucial to shaping India's future tactics for a much bigger threat situation.

Four: India had an experience of operation in a sensitive area without sanitation of the enemy air defence. It will allow India to mature tactics in a similar future situation.

Five: Following the experience of 7 May, India set up a new strategy for neutralisation of enemy air assets. It allowed India to conduct a strike that slipped through the HQ–9 and HQ–16 air defence systems in service with Pakistan.

Six: The operation provided an opportunity to use, validate, and analyse armament in service with the Indian Armed Forces. Any drawback, if detected, will be addressed accordingly for better performance in future operations.

Seven: This was India's first encounter with unmanned warfare on such a large scale. Pakistan used swarm drones, unmanned combat vehicles and loitering munitions to saturate Indian air defence, exploring an opportunity to strike with more potent munitions. However, India's integrated air defence system and counter–unmanned system stood like an impenetrable wall and rendered most of the attacks ineffective. Thus, India's fully indigenous, automated air defence control and reporting systems, Akashteer (Indian Army), IACCS (IAF), and TRIGUN (Indian Navy), and indigenous counter–unmanned aircraft system (C–UAS) got combat proven and validated. Most significantly, India used non–kinetic measures as well in the neutralisation of the drone attacks.

Eight: Some of India's indigenous systems are now battle–proven—most importantly the BrahMos supersonic cruise missile, Akash air defence system, and D4 C–UAS. The combat experience will allow further improvements and will enhance importance in the export market.

Nine: India got its hands on many enemy platforms that were neutralised or fell flat without reaching the target. Most important of it will be the PL–15E, the long range air–to–air missile of Chinese origin, which apparently failed. A good number of it was recovered by India, including in intact or almost intact conditions. Besides, parts of Pakistani rockets and Turkish origin drones were recovered. All of these will allow a thorough analysis.

Ten: This also was India's first introduction to narrative warfare. Pakistan unleashed waves of fake news and tried to set up a false narrative to turn sympathy and confidence towards it. But India nullified the effort by professional media briefings and photo and video evidence. The release of the satellite images further solidified India's claim of success.

Importance of the Indian air defence

The operation saw extensive action of India's air defence system. This involved both indigenous and foreign platforms in service with India. Akashteer, IACCS, and Trigun are integrated into India's larger C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) ecosystem, ensuring seamless coordination, early detection of the incoming enemy projectiles, and accurate interceptions. Besides the S–400, Spyder and Barak, they also witnessed action against different kinds of threats. Interestingly, heavily modernised legacy platforms like Pechora and OSA–AK also played crucial roles. So, India's IADS (integrated air defence system) proved its mettle. India's D4 C–UAS

(Drone, Detect, Deter, Destroy) and LLADG (low–level air defence gun) systems, in accordance with the IADS, played a key role in neutralising the wave attacks of the Pakistani drones.

Performance of Pakistan in this conflict

Let's be honest here. Making fun of the failure of Pakistan and the shabby performance of China & Turkiye origin platforms is one thing. But Pakistan is a strong adversary. It is a "near–peer" enemy in many fields. And exactly this is why it needed grit and determination to outwit a powerful and intelligent enemy. Their military (read terrorists in uniform) and terrorist (read mercenaries) facilities were under the protection of a densely arranged integrated air defence system consisting of cutting edge Chinese air defence systems.

These systems are presumed to have good detection and tracking. Other than radar for various purposes, Pakistan has good electronic warfare and airborne early warning and control systems as well. Besides, they were being fed satellite intelligence by friendly nations too. In short, Pakistan potentially has the capability to track any movement of the Indian Armed Forces and respond within minutes. During the night of 7 May, upon detection of the IAF jets, the PAF scrambled J–10CE in good numbers and launched PL–15E in large quantities in hopes of scoring a "kill." While the performance of the PL–15E is debatable, it showcases that PAF will try to score kills as much as possible from the possible longest distance to reduce the offensive thrust. This tactic also can be attributed to the use of the AWACS in a much more efficient way for the guidance of the long range missile. Pakistan also likely tried to saturate the Indian air defence system with swarm attacks, rocket artillery, short–range ballistic missiles and air–launched munitions. However, this was made futile by the Indian defence, and the counteroffensive forced Pakistan to request peace.

Lessons for India

Many experts believe that India made a mistake by distinguishing the military from the terrorists, which reportedly cost India some losses. India has asserted that from now on, no more Pakistani military establishment will be considered different from the terrorists. Besides, India will need standoff platforms in large numbers for a successful and quick SEAD/DEAD operation.

It will be wrong to say that the new tactics used by the PAF will make India induct longer range air–to–air missiles in combat, as such projects are already in progress, but likely this will make the progress faster. And it has to be in large numbers. The operation showcases the significance of the IADS and C–UAS. The Russia–Ukraine conflict and the Iran–Israel conflict clearly demonstrate the need for a dense, multi–layered network of air defence systems along with C–UAS in large numbers. A successful saturation strike can allow an adversary to exploit the situation and launch a mass strike, resulting in casualties in huge numbers as well as devastation on a large scale. India must address this issue. As financial viability is a concern, India will need to explore an innovative solution.

Similarly, India has to increase its own assets for gathering information and intelligence. Without robust and extensive INTEL equipment and platforms, detection, identification, tracking, and engagement will not be possible. In the era of multi–domain collaborative combat situations, India must be prepared for network–denied environments. Navigation and positioning jamming, electronic warfare, signature concealment, and use of new–generation offensive platforms like directed energy weapons will be increased. India must increase the pace of the fifth generation fighter jet development. A delay will bring nothing but disadvantages only. At the end, India should focus on countering false narratives as well. A victory in combat should not be lost at the narration!

Conclusion

The tri–service synergy, in a coordinated, principled and calibrated manner, conducted an action that was punitive, precise and decisive in nature. Not only were the terrorist camps destroyed, but around a dozen of the Pakistan Air Force bases were decimated, their latest air defence systems humbled, assets charred and military infrastructures dusted to the ground.

At the same time, this conflict also highlighted the fields that India must focus on to overcome the faults. In the end, I convey my gratitude to the Indian scientists and the Indian Armed Forces for their sacrifice, valor and contribution.

Article by Sankalan Chattopadhyay (Twitter/X: @vinoddx9)

Representational photos by MoD

INS Sharda in Maldives for HADR

In line with India's commitment towards regional cooperation, INS Sharda arrived at Maafilaafushi Atoll, Maldives, for a Humanitarian Assistance and Disaster Relief (HADR) exercise from 4 to 10 May 2025. This HADR exercise aimed to enhance interoperability between the Indian Navy and the Maldives National Defence Force (MNDF). It focussed on actions like disaster response coordination, search and rescue operations, medical assistance, logistical support, joint drills, training sessions, and community engagement following a major natural disaster.

INS Sunayna returns after deployment

Indian Navy's maiden initiative of Indian Ocean Ship Sagar, jointly crewed by personnel from nine IOR Navies, concluded its month long deployment in SW IOR region and returned to Kochi on 8 May 2025. Vice Admiral V Srinivas, Flag Officer Commanding–in–Chief, Southern Naval Command congratulated the crew of India and nine friendly foreign countries during the grand reception ceremony held at Naval Base, Kochi.

India–Mongolia Exercise Nomadic Elephant

The Indian Army contingent departed on 29 May 2025, for the 17th edition of India–Mongolia Joint Military Exercise Nomadic Elephant. The exercise was conducted in Ulaanbaatar, Mongolia from 31 May to 13 June 2025. The exercise is an annual event conducted alternatively in India and Mongolia. Last edition of the same exercise was conducted at Umroi, Meghalaya in July 2024. The Indian contingent comprising 45 personnel was represented mainly by troops from a battalion of the Arunachal Scouts. The Mongolian Armed Forces contingent, also comprising similar strength, was represented by 150 Special Forces unit.

Indian Army exercises

Mechanised Forces of Battle Axe Division conducted a rigorous field firing exercise and demonstrated "exceptional standards in the deserts". Execution of accurate and effective firepower drills enhanced their operational preparedness. It assisted in honing tactical skills and battlefield drills for conducting sustained operations through day and night.

Maiden visit of EUNAVFOR ships to India

ESPS Reina Sofia, commanded by Cdr Salvador Moreno Regil, Spanish Navy and ITS Antonio Marceglia, commanded by Cdr Alberto Bartolomeo, Italian Navy, were in Mumbai from 26 May to 1 June 2025 for an operational turn around. Both ships presently operate under European Union Naval Force (EUNAVFOR). The visit is significant being the first such visit to India conducted under the aegis of the European Union. During the ships' stay in harbour, activities such as Subject Matter Expert Exchanges (SMEEs) and a Table Top Exercise (TTX) were conducted between the two sides, aimed at refining key issues necessary for tactical–level cooperation at sea.

India–Mongolia Exercise Khaan Quest

An Indian Army contingent reached Ulaanbaatar, Mongolia for the Multinational Military Exercise Khaan Quest, which was conducted from 14 to 28 June 2025. The exercise brought together military forces from around the world to collaborate and enhance their peacekeeping capabilities. Last edition of Exercise Khaan Quest was conducted in Mongolia from 27 July to 9 August 2024. The exercise first started as a bilateral event between USA and Mongolian Armed Forces in the year 2003. Subsequently, from the year 2006 onwards the exercise graduated to a Multinational Peacekeeping Exercise with current year being the 22nd iteration. The Indian Army contingent comprising 40 personnel was represented mainly by troops from a Battalion of the Kumaon Regiment.

India–France Exercise Shakti

An Indian Army contingent departed to participate in the 8th edition of the biennial India–French Joint Military Exercise Shakti. The exercise was conducted at Camp Larzac, La Cavalerie, France from 18 June 2025 to 1 July 2025. The Indian contingent comprising of 90 personnel was represented primarily by a Battalion of the Jammu and Kashmir Rifles besides personnel from other arms and services. The French contingent comprising of 90 personnel was represented by personnel from the 13th Foreign Legion Half–Brigade (13th DBLE).

INS Teg arrives at Port Louis, Mauritius

INS Teg, on her Operational Deployment to the South West Indian Ocean Region, visited Port Louis, Mauritius from 19–22 June 2025. The ship undertook joint surveillance of Mauritian EEZ along with the Mauritius National Coast Guard (NCG) ships and aircraft, reaffirming "India's commitment towards ensuring safety of the global commons and to combat Illegal, Unreported and Unregulated (lUU) fishing". INS Teg, a stealth frigate of the Western Fleet of the Indian Navy, was commissioned on 27 April 2012.

France hosts Indo–French Army exercise Shakti 2025

The 13th French Foreign Legion Demi–Brigade (13th DBLE) hosted the eighth edition of the Indo–French Army exercise Shakti from 18 June to 1 July 2025 in France. The exercise involved more than 500 legionnaires and military personnel from various units of the French Army, the Foreign Legion, as well as the French Air and Space Force, and the French Navy. The Indian contingent of 90 personnel primarily comprised a Battalion of the Jammu and Kashmir Rifles besides personnel from other arms and services. About 50 armoured and tactical vehicles and fighter jets were deployed in this exercise.

The joint drills were held in two phases. The first, which took place from 18 to 21 June in Aveyron, Monclar district, focused on ramping up joint training on shooting, issuing orders and combining units. The second phase, from 22 to 26 June in Herault, involved the deployment of the Monclar Combined Arms Tactical Group (GTIA) as part of an open–field exercise in semi–urban combat training during both day and night.

Denmark MoD/LM Skunk and F–35

Lockheed Martin Skunk Works and the Danish Ministry of Defence (MoD) completed a successful live F–35 interoperability demonstration. This is another success in a series of Multi–Domain Operations (MDO) demonstrations proving the F–35's ability to "serve as a powerful force multiplier, enabling allied forces to rapidly deploy ready–now capabilities to connect systems across the battlespace".

13th AN/TPY–2 radar for US MDA

Raytheon has delivered the first AN/TPY–2 radar to the US Missile Defence Agency with a complete Gallium Nitride, or GaN, populated array. The AN/TPY–2 is a missile defence radar that is "ready to defend the US homeland and American allies by detecting, tracking and discriminating ballistic missiles in multiple phases of flight".

QinetiQ delivers 10,000th Banshee

QinetiQ has produced its 10,000th Banshee aerial training target, reinforcing its "position as a world leader in advanced threat representation and mission–readiness training". The Banshee is a cost–effective Uncrewed Aerial Vehicle (UAV) designed for threat representation and operational training. It is used by more than 40 nations and can emulate crewed aircraft, missiles and other UAVs.

NASA X–59's latest milestone

NASA's X–59 quiet supersonic research aircraft successfully completed a critical series of tests in which the airplane was put through its paces for cruising high above the California desert – all without ever leaving the ground.

The goal of ground based simulation testing was to make sure the hardware and software that will allow the X–59 to fly safely are properly working together and able to handle any unexpected problems.

250th RAM launcher for US Navy

Raytheon and German industrial partner RAM–Systems GmbH, delivered the 250th RAM MK49 Guided Missile Launching System (GMLS) to the US Navy. It will be deployed on the USS Pittsburgh, a new–construction San Antonio class amphibious transport dock.

GA–ASI ground testing of YFQ–42A CCA

General Atomics has moved into the ground testing phase of development on the YFQ–42A production–representative test vehicle for the Collaborative Combat Aircraft (CCA) programme in preparation for its planned first flight later this summer. YFQ–42A represents the third uncrewed jet type developed by GA–ASI.

NGSW type classified

Sig has congratulated the US Army on the milestone of officially designating Type Classification Standard (TC–STD) to the Sig Sauer Next Generation Squad Weapon (NGSW) M7 rifle and M250 (belt fed) automatic rifle– cornerstone systems of the US Army's modernisation programme and overmatch efforts.

The M7 is the M4 carbine replacement, and the M250 replaces the M249 Squad Automatic Weapon.

Barkan for the Turkish Armed Forces

Havelsan is moving into mass production of the medium class Level 1 autonomous unmanned ground vehicle Barkan, which entered the inventory in 2023, following a decision by the Presidency of Defence Industries.

Based on feedback from its field use since 2023, Barkan's operatwional capabilities have been significantly enhanced. With the integration of numerous useful payloads, Barkan has achieved successful outcomes in all activities within real operational zones.

Baha UAV inducted

The Turkish Ministry of National Defence has announced that the Sub–Cloud Unmanned Aerial Vehicle (UAV) Baha, which was procured in various quantities by the Land Forces Command, has successfully completed its inspection and acceptance procedures and has officially entered into the inventory of the Turkish Armed Forces.

Lithuania selects the C–390 Millennium

Lithuania has announced that the Embraer C–390 Millennium has been chosen as country's next generation military transport aircraft. This decision marks a significant step in enhancing Lithuania's operational readiness and interoperability within NATO countries (North Atlantic Treaty Organisation) and paves the way for the acquisition process according to national legal procedures and legislation.

Indra tests its NEMUS

Indra has successfully tested its Nemus radar for active protection against drones and projectiles on Leopard

battle tanks at the Spanish Army's Armoured Units Instruction Centre (CENAD) in Zaragoza.

D328eco test aircraft rolls out

Deutsche Aircraft has unveiled the first D328eco test aircraft (TAC 1) at their headquarters in the Airtech Campus in Oberpfaffenhofen, a transformative moment for sustainable regional aviation. Building upon the proven legacy of the Dornier 328, the D328eco is an advanced evolution, not a clean sheet aircraft. It delivers enhanced performance, fuel efficiency, an elevated customer experience and lower emissions, while retaining the versatility and reliability that airlines, operators and passengers have trusted for over three decades.

L–39 Skyfox for Hungary

Aero Vodochody Aerospace handed over the first three Aero L–39 Skyfox advanced trainer aircraft to the Hungarian Air Force. The handover of the aircraft is part of a contract signed which includes a total of 12 L–39 Skyfox aircraft, eight in training and four in reconnaissance configuration. The contract also includes the delivery of ground equipment, simulators and a training programme.

Rafael laser interceptions revealed

During the Swords of Iron War, the Israel Ministry of Defence (IMOD) Directorate of Defence Research & Development (DDR&D), the Israeli Air Force (IAF), and Rafael Advanced Defense Systems executed an accelerated development programme "to deploy revolutionary interception systems". As a result of this initiative, soldiers from the IAF Aerial Defence Array operated high power laser system prototypes in the field, successfully intercepting scores of enemy threats.

Kuwait for M1A2 Abrams sustainment support

Kuwait has requested to buy equipment and services related to sustainment support for legacy M1A2 and new M1A2K Abrams main battle tank systems. The following non–MDE items will be included: repair parts; spare parts; replacement materials; and other related elements of logistics and programme support. The estimated total cost is $325 million.

Sweden selects the LM TPY–4

The Swedish Defence Materiel Administration selected the Lockheed Martin TPY–4 next generation ground based air surveillance radar to enhance the country's long range surveillance capability, becoming the third country to choose the fifth generation radar platform.

Raytheon awarded $1.1Bn by US Navy

Raytheon has been awarded a $1.1 billion contract from the US Navy to produce AIM–9X Block II missiles. This is the largest contract awarded for the programme and will increase production to 2,500 missiles per year.

NGC successfully launches Coyote

Northrop Grumman successfully launched two threat–representative GQM–163A "Coyote" targets from Hebrides Launch Facility in Scotland during the 2025 NATO Formidable Shield demonstration to test anti–ship cruise missile defence systems and train allied forces.

Sweden for BAE Systems 155mm BONUS

BAE Systems has signed a new contract with the Swedish Defence Materiel Administration to supply additional BONUS precision guided munitions to the Swedish Armed Forces. BONUS enhances the long range capabilities of 155 mm cannon artillery by accurately destroying enemy combat vehicles, including armoured personnel carriers, self–propelled guns, infantry fighting vehicles and main battle tanks.

IAI delivers its 250th multi–mission radar

IAI (Israel Aerospace Industries) has marked the occasion of the delivery of the 250th multi–mission radar manufactured by IAI's Elta Group by sharing that the system has been used to detect and alert Israel about every missile and rocket since the war began nearly two years ago in October 2023. These radars – the most operational in the world, are responsible for detecting, classifying, and directing interceptors until all airborne threats to the State of Israel are neutralised, and are also used for similar purposes by Israel's allies.

UK commits to Typhoon's Future Radar

The UK Government has released £204.6m of funding towards the production and integration of an advanced new radar for the latest Royal Air Force (RAF)'s Eurofighter Typhoon jets. The state–of–the–art radar, known as the ECRS Mk2, will transform Typhoon's control of the air,

bringing "a world–class electronic warfare capability which will allow the aircraft to simultaneously detect, identify and track multiple targets in the air and on the ground".

Airbus unveils HTeaming

Airbus Helicopters unveiled HTeaming, its brand new modular crewed–uncrewed teaming solution. HTeaming is a range of systems that allows helicopter crews to take full control of Uncrewed Aerial Systems (UAS) in flight. The first version of HTeaming can be used as a standalone solution or integrated into a helicopter mission system.

Portugal to acquire sixth KC–390

Embraer has announced that the Portuguese State has decided to acquire a sixth KC–390 Millennium aircraft. In August 2019, the government of Portugal and Embraer signed a contract for the acquisition of five KC–390 aircraft, and with this potential additional acquisition, the Portuguese Air Force's (FAP) transport fleet will include six new generation KC–390 aircraft, expanding its capacity to fulfill the missions of the Armed Forces and other missions of public interest.

Dassault Aviation's VORTEX Spaceplane Demonstrator

At the Paris Air Show, Sebastien Lecornu, Minister of the French Armed Forces, and Eric Trappier, Chairman and CEO of Dassault Aviation, announced the signing of an agreement to support the development of a spaceplane demonstrator. This demonstrator represents the first step in an incremental and intrinsically dual roadmap for the development of a family of spaceplanes called VORTEX.

Collaboration between AMIAD and Dassault

At the Paris Air Show, Pascale Lohat, Senior Executive VP Engineering of Dassault Aviation, and Bertrand Rondepierre, Director of the French Agency for AI in defence (AMIAD), signed a memorandum of understanding to initiate research and development work on several air combat use cases.

S–400 Triumf: The 'Sudarshan Chakra'

Armed with three types of missiles to create a layered defence, the S–400 Triumf (NATO reporting name: SA–21 Growler) is an air defence missile system developed by Almaz Central Design Bureau of Russia. Alexander Lemanskiy of Almaz–Antey was the Chief Engineer on the S–400 project. Essentially an upgrade of the S–300 series of Surface–to–Air Missile (SAM) systems, the system, August 2007 onwards replaced the S–300P and S–200 air defence systems of the Russian Army.

A deal to purchase S–400 systems by India was first reported in October 2015. On 15 October 2016 (during the BRICS Summit) India and Russia signed an Inter–governmental Agreement (IGA) for the supply of five S–400 regiments to India. On 1 July 2018, the Defence Acquisition Council (DAC), chaired by the then Defence Minister Nirmala Sitharaman, cleared the procurement. On 26 September 2018, the Cabinet Committee on Security (CCS), headed by the Prime Minister Narendra Modi cleared the acquisition. The US$5.43 billion deal was formally signed on 5 October 2018.

Capable of simultaneous engagement of 36 targets, the system can engage all types of aerial targets including aircraft, unmanned aerial vehicles (UAV), and ballistic and cruise missiles within the range of 400 km, at an altitude of up to 30 km. The rapidly deployable system again is standalone in nature and integrates a multifunction radar, autonomous detection and targeting systems, anti–aircraft missile systems, launchers, and Command & Control (C&C) centre. For its stellar performance in the short yet sharp conflict with Pakistan in May 2025 an additional two regiments of the system may be procured.

The S–400 air defence missile system uses four new missile types in addition to the missiles of the S–300PMU system. The first missile inducted for the system was the semi–active radar homing (SARH) 48N6DM (48N6E3) missile. It is an improved variant of the 48N6M with powerful propulsion system to destroy airborne targets within the range of 250 km. The active radar homing (ARH) 40N6E anti–ballistic missile (ABM) of the S–400 has a claimed range of 400km and in addition specifically targets hostile airborne force multipliers at great distances like Airborne Early Warning & Control (AEW&C), Joint–Surveillance Target Attack Radar (J–STARS), and support jammer platforms.

On 10 May 2025, a 40N6E intercepted and destroyed a hostile Pakistan Air Force (PAF) Saab 2000 Erieye AEW&C aircraft approximately 314 km inside Pakistani airspace. To engage with direct impact at fast moving targets such as fighter aircraft with a high hit probability, the S–400 Triumph also launches ARH 9M96E and 120 km ranged ARH 9M96E2 medium range SAM systems. These SAM systems can engage targets flying as low as 10 metres.

The S–400 system is named Sudarshan Chakra in Indian service, after Lord Vishnu's lethal discus reflecting its precision and power and is unified with the Integrated Air Command & Control System (IACCS). Each battalion is composed of two batteries. Each battery is equipped with 6 launchers, radar and a control centre with 128 missiles. A battalion has a total of 16 vehicles. India bought a total of 60 launchers with around 6,000 missiles including 9M96E2, 48N6E2, 48N6E3 and 40N6E. In July 2024, during an air defence exercise of the Indian Air Force (IAF), the S–400 system 'shot down' 80% of the 'aggressor aircraft'.

The 55K6E Command & Control (C&C) system of the S–400 Triumf is based on the Ural–532301 mobile command post vehicle, equipped with Liquid Crystal Display (LCD)

consoles to process the air space surveillance data of the individual batteries. It controls and monitors long range surveillance radar, tracks airborne threats, prioritises the threats, and coordinates other batteries.

The fire control and target tracking multi–functional radar of the S–400 is the 340 km ranged 92N6E (NATO Codename: Gravestone) which can track up to 20 targets. The radar is based on the MZKT–7930 8×8 vehicle. The 96L6 Cheese Board 3D surveillance and tracking radar is optionally carried by the same vehicle when the S–400 battery is deployed autonomously. The panoramic 91N6E Big Bird acquisition and battle management radar of the S–400 is based on the 8×8 trailer and capable of detecting and tracking aircraft, rotorcraft, cruise missiles, guided missiles, drones and ballistic missiles within the distance of 600km. It can simultaneously track up to 300 targets and engage 72 of them.

India may also opt for integration of the S–400 system with IAF operated EL/M–2080 Green Pine and Super Green Pine radar system. The Elta Electronics subsidiary of IAI developed the EL/M–2080 Green Pine Early Warning & Fire Control (EW & FC) radar for the Arrow Anti–Tactical Ballistic Missile (ATBM) system. The Green Pine radar has a proven track record demonstrated in over twenty successful ballistic missile intercepts. The radar includes the trailer mounted antenna array, the power generator, a cooling system and a control centre. Developed from the Elta Music phased array radar, Green Pine is an dual mode, electronically scanned, solid state, phased array radar operating at L–band in the range 500 MHz to 1,000 MHz, weighs 60 t and comprises of 2,000 transmit–receive modules.

Green Pine is said to be capable of tracking ballistic missiles from a range of up to 500 km and is able to track targets up to speeds over 3 km/s while intercept of the attacking missile may occur 90 km away at an altitude of 10 to 50 km. The long range of Green Pine radar system ensures that a second shot can be taken at the incoming ballistic missile if the first shot fails to secure the "kill".

India placed an order and received its first Green Pine Early Warning & Fire Control (EW & FC) radar in 2001 and has since been integrated with the country's indigenous missile defence system as the Swordfish radar system. The Super Green Pine, also operated by India, has an enhanced tracking range of 800 to 900 km. The S–400 SP85TE2 launchers are based on the BAZ–64022 6×6 tractor truck or MAZ–79100 series Transporter–Erector–Launcher (TEL) vehicle. The TEL vehicle can carry up to four launch tubes holding a mix of missiles.

A follow on system, the S–500, is proposed by Russia for joint development with India. According to a CNBC report citing United States intelligence officials, "the S–500 surface–to–air missile system successfully struck a target 299 miles away, which the United States assessed is 50 miles further than any known test." The CNBC report suggests that the missile used to hit the target was a version of S–300V4's long–range heavy NPO Novator 9M82MD missile, which has a range of 250 nautical miles and a speed of about Mach 7.5. However, it is more likely that the missile in question is a derivative of the 250 nautical mile range 40N6 missile used on the S–400. In either case, the fact remains that the S–500 has demonstrated exceptional capabilities. When used against air breathing targets, the S–500 can use the 48N6 family of missiles, which weight about two tons and have an effective range of up to 250 km. For longer–range targets, the system uses version of the 40N6 with higher performance. It also employ the shorter range and lighter weight 9M96 and 9M100 family missiles. Against ballistic missile threats, and apparently with a secondary capability against air targets, the S–500 uses the 77N6–N and 77N6–N1 kinetic kill missiles. The missiles are capable of hitting their targets at 7 km per second, which the Russians expect would be sufficient to destroy any incoming aerial target including satellites. It apparently has the capability to engage targets as high as 200 km at ranges of 600 km. It can engage as many as 10 incoming ballistic missiles simultaneously and has a response of less than 4 seconds.

The Russians claim that the system can engage Over The Horizon (OTH) and can be plugged into an air defence network to include satellites. The S–500 can analyse information about a possible missile attack obtained by early warning satellites and OTH radars, such as the UHF band RLS Voronezh–DM and in conjunction with 1L119 Nebo SVU select targets in terms of their importance, cut off false targets at a great distance, accompany all this and finally issue target designations to various systems. RLS Voronezh–DM provides improved resolution and tracking accuracy for smaller targets, enhancing the effectiveness of the radar against various aerial threats. Designed by NPK NIIDAR, it has a range of up to 10,000 km and is capable of simultaneously tracking 500 objects. Its horizon range is 6000 km and vertical range is 8000 km. Russia claims the radar can detect targets the size of a "football" at a distance of 8000 km.

Article by Sayan Majumdar

News from MBDA

MBDA's one way effector

At the 2025 Paris Air Show, MBDA presented the One Way Effector (OWE). Development of this sovereign long range solution is taking place through an innovative production setup, in partnership with a drone manufacturer and industry players, notably from the automotive sector. One Way Effector represents a trade–off between the need for mass and performance at lower cost to meet the challenges faced by armed forces in a high–intensity context. OWE is a new attrition proposition based on feedback from the armed forces, particularly from the conflict in Ukraine. Fired from the ground in salvoes, the OWE is aimed at exhausting enemy resources by exerting constant pressure on hostile air defence systems, with a warhead large enough to compel the enemy's defences to destroy it. In so doing, the new effector is intended to force even the most sophisticated air defences to reveal themselves, making them easier to detect and neutralise, in conjunction with other long–range strike systems.

MBDA to develop FULGUR

MBDA signed a development contract to equip the Italian Army with a very short range air defence (VSHORAD) system. Announcing the contract during the Paris Air Show, MBDA also unveiled the name of the missile as 'FULGUR'; at the core of the system that is a solution to an operational requirement expressed by the Italian Army.

Modernising Taurus for the Bundeswehr

The Bundeswehr and TAURUS Systems GmbH (a joint venture between MBDA and SAAB) have signed a contract

for the maintenance and modernisation of the Taurus stand–off weapon system. The measures will ensure the weapon's operational readiness until at least 2045. A central component of the contract is the comprehensive modernisation of Taurus cruise missiles used by German armed forces.

MBDA and the new Teseo MK2/E

The Teseo MK2/E evolved missile system was successfully test fired for the first time last year as part of the multi–year development programme for the Italian Navy. Teseo MK2/E is a new generation missile that brings a substantial improvement in the anti–ship capabilities of the Teseo missile family, known abroad as Otomat.

MBDA and Matra Electronique

MBDA and its subsidiary Matra Electronique (MEL), which specialises in the manufacture of high precision electronic equipment, have jointly inaugurated the new site in Venette. The set–up of this new site, the new workplace for MEL's 440 employees, marks a milestone in the company's growth strategy; ever since its creation, MEL has been based in the heart of the Hauts–de–France industrial region.

News from Saab

Saab equips Swedish Visby class corvettes

Saab has been awarded a contract by the Swedish Defence Materiel Administration (FMV) to equip the Swedish Navy's five Visby class corvettes with the Sea Ceptor air defence system from MBDA. This upgrade, valued at approximately SEK 1.6 billion, will significantly enhance Sweden's and NATO's air defence capabilities.

Saab offers GlobalEye to Canada

GlobalEye is a leading Airborne Early Warning and Control (AEW&C) solution that combines the best of Swedish and Canadian expertise and quality to match the requirements of Canada's acquisition programme. The announcement coincides with Saab's participation at CANSEC 2025, where the company showcased its advanced multi–domain airborne surveillance solution built on a Canadian platform.

Saab AEW for MQ–9B

General Atomics Aeronautical Systems is partnering with Saab to develop Airborne Early Warning and Control (AEW&C) capability for its line of MQ–9B Remotely Piloted Aircraft, which includes the SkyGuardian and SeaGuardian models, the United Kingdom's Protector, and the new MQ–9B STOL (Short Takeoff and Landing) model currently in development. GA–ASI plans to fly AEW on MQ–9B in 2026.

Saab achieves AI milestone with Gripen E

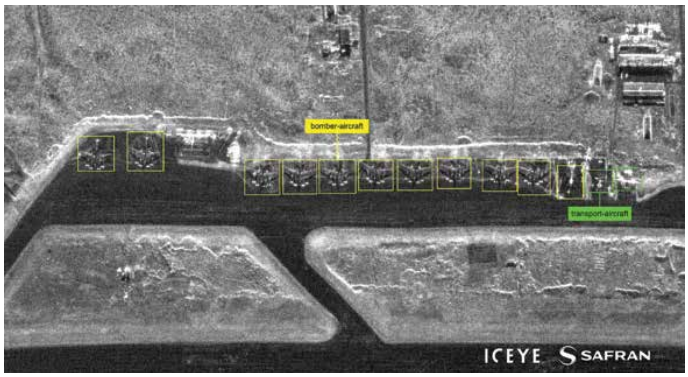
Saab, in collaboration with Helsing, announced the successful completion of the first three flights integrating Helsing's Artificial Intelligence (AI) agent 'Centaur' into a Gripen E fighter jet. As part of Saab's 'Project Beyond', the flights, where the first flight, was conducted on 28 May, mark a significant advance in bringing AI capabilities to military aircraft. It is also yet another proof point "of Gripen E´s unparalleled ability to rapidly update software without disregarding safety requirements". During the flights, the Gripen E gave control to Centaur which successfully autonomously executed complex manoeuvres in a Beyond Visual Range (BVR) combat environment and cued the pilot to fire.

News from Safran

Flynas MoU with Safran to equip its A320neo's

Flynas, the Saudi air carrier and the leading low cost airline in the Middle East and worldwide, announced signing an agreement with Safran, one of the world's leading manufacturers of aircraft seats, for both crew and passengers. This agreement is to equip the next 60 new A320neo aircraft joining Flynas fleet with the latest generation seats that set a new standard of comfort and convenience in the low cost aviation.

ICEYE and Safran announce partnership



Safran.AI and ICEYE announced a long term strategic partnership, leveraging their combined expertise to deliver advanced multisensor Artificial Intelligence (AI) solutions that enable governments to achieve faster and more accurate decision making in geospatial intelligence. This collaboration unites Safran.AI's globally recognised proficiency in vision AI with ICEYE's operation of the world's largest commercial Synthetic Aperture Radar (SAR) constellation.

Safran's composite fan blades for future engines

Safran Aircraft Engines has recently achieved major milestones in the technological readiness of large diameter fan blades developed for the Open Fan architecture of the CFM RISE technology demonstration program1. As part

of Research & Technology programmes supported by the French Civil Aviation Authority (DGAC), Safran Aircraft Engines has recently tested three fan blade configurations to demonstrate the mechanical integrity of these critical components in an unducted architecture and validate improvements in aerodynamic and acoustic performance.

Safran and Trillium announce partnership

On the first day of the Paris Air Show, Safran Electronics & Defense announced an international partnership with US based Trillium Engineering, a leader in compact, high performance electro–optical systems (EOS). This collaboration will expand Safran's Artis range of electro–optical solutions, including a variety of stabilised camera turrets from 2 to 25 inches in size. Trillium's product line enhances Safran's established focus on large gyrostabilised gimbals by introducing smaller options that are especially suited to drones, light aircraft and helicopters.

Safran and Saft to co–develop high voltage battery system

Safran Electrical & Power, a world leader in electric aircraft systems, and Saft, a subsidiary of TotalEnergies, which develops advanced batteries for a wide range of industrial sectors including aerospace, have signed an exclusive partnership to develop a high voltage battery system for aviation, paving the way for the next generation of aircraft.

Safran unveils higher–thrust M88 T–REX

At the Paris Air Show, Safran unveiled the M88 T–REX, an evolution of its M88 engine. Compatible with future standards of the Dassault Aviation Rafale, this engine will build on the proven reliability and performance of the M88, while taking it to new limits with a thrust increase to 9 metric tons with afterburner.

To achieve this level of performance, the M88 T–REX will incorporate significant, targeted upgrades. The improved low pressure compressor will allow greater airflow intake. The high pressure turbine will incorporate new materials and next generation cooling circuits and the nozzle will benefit from optimised aerodynamics. With these enhancements, the M88 T–REX will retain the key advantages of the current M88 in terms of size, modularity, fuel efficiency and cost of ownership, while delivering 20% more thrust. Maintainability and fleet management will also be simplified thanks to compatibility between the modules of the M88 T–REX and those of the current M88. Safran is currently conducting risk reduction studies ahead of the engine's development. Qualification of the M88 T–REX is aligned with the planned entry into service of the Rafale F5 standard.

Safran and Babcock strengthen collaboration

Safran Electronics & Defense, a leader in high tech defence solutions, and the defence company Babcock International Group (Babcock), announced plans to increase collaboration across multi–domain mission systems, aircraft engines, space systems, tactical and strategic communications. The Memorandum of Understanding (MOU), signed at the Paris Air Show, aims to combine the world class expertise of Safran and Babcock to deliver advanced, competitive, and innovative solutions for the UK, France, and international defence markets.

Kongsberg and Safran for NSM propulsion

Kongsberg Defense & Aerospace and Safran Power Units have renewed their long term cooperation agreement for Naval Strike Missile (NSM) propulsion, reinforcing a successful partnership. The agreement includes an order for hundreds TR40 turbojet engines. For several years, Safran Power Units has been supplying Kongsberg with the TR–40 engine powering the Naval Strike Missile. The success of this programme within the European Union and NATO has ushered both companies to deepen their relationship and increase coordination on production ramp up.

Avio Aero partners with Safran and MTU

Engine experts Safran Helicopter Engines, MTU Aero Engines and Avio Aero have joined forces to strengthen European sovereignty. The three aerospace companies plan to develop the future ENGHE (European Next Generation Helicopter Engine), a new 100% European engine for Europe's next generation of military rotorcraft, scheduled to enter into service around 2040. At the Paris Air Show, a long–term partnership agreement was signed to this effect.

The future ENGHE (European Next Generation Helicopter Engine) will feature breakthrough technologies that will considerably increase its efficiency while reducing its operating and maintenance costs. It will be particularly well suited to the ENGRT (European Next Generation Rotorcraft Technologies) and NGRC (Next Generation Rotorcraft Capability) projects.

Boeing's 20–year forecast

Emerging markets, with expanding middle classes, dynamic and competitive airline networks and sustained aviation investment, will play an outsized role in global air traffic growth, helping drive a need for 43,600 commercial airplanes over the next 20 years.

These markets will represent over 50% of the global commercial fleet in 2044, up from nearly 40% in 2024. Ahead of the Paris Air Show, Boeing released its 2025 Commercial Market Outlook (CMO), which also predicts airplane supply will catch up with market demand around the end of the decade, enabling carriers to increasingly renew and grow their fleets.

"Throughout the first quarter of this century, passenger air traffic tripled and the global airplane fleet more than doubled as the commercial aviation industry navigated significant challenges," stated Brad McMullen, Boeing senior vice president of Commercial Sales and Marketing. "Resilience will remain a hallmark of this growing industry as we continue to see strong demand for new airplanes with commercial aviation returning to its pre–pandemic growth trajectory."

CMO forecast highlights through 2044:

- Passenger traffic is forecast to grow 4.2% annually – more than doubling in size as it continues to outpace global economic growth.
- The global fleet will nearly double to more than 49,600 commercial airplanes as airlines add capacity to meet travel demand.
- About 80% of in–service airplanes will be replaced with more than 21,000 deliveries, improving fleet efficiency and capability.
- Single–aisle airplanes will make up 72% of the global fleet, up from 66% in 2024, driven largely by short haul travel and low–cost carriers in emerging markets.
- The global passenger widebody fleet will increase to approximately 8,320 airplanes, up from roughly 4,400 in 2024 – growth increasingly driven by carriers in emerging markets expanding their long–haul fleets.
- Supply chain diversification and expanding express cargo networks will drive a nearly two–thirds expansion of the global freighter fleet and the need for 2,900 production and converted freighters.

Boeing at Paris Air Show 2025

Boeing focussed on advancing innovation, partnerships and collaboration at the 2025 Paris Air Show. "We continue to make fundamental changes across Boeing to strengthen safety, quality and our culture, and we are seeing steady improvement in our performance," stated Boeing President and CEO Kelly Ortberg. "We look forward to connecting with our customers and partners at Le Bourget to demonstrate the work underway to restore trust and move Boeing forward."

Boeing exhibited various commercial and defence capabilities, autonomous technologies and comprehensive services. The static displays featured customer commercial jets and defence fixed and rotary wing aircraft.

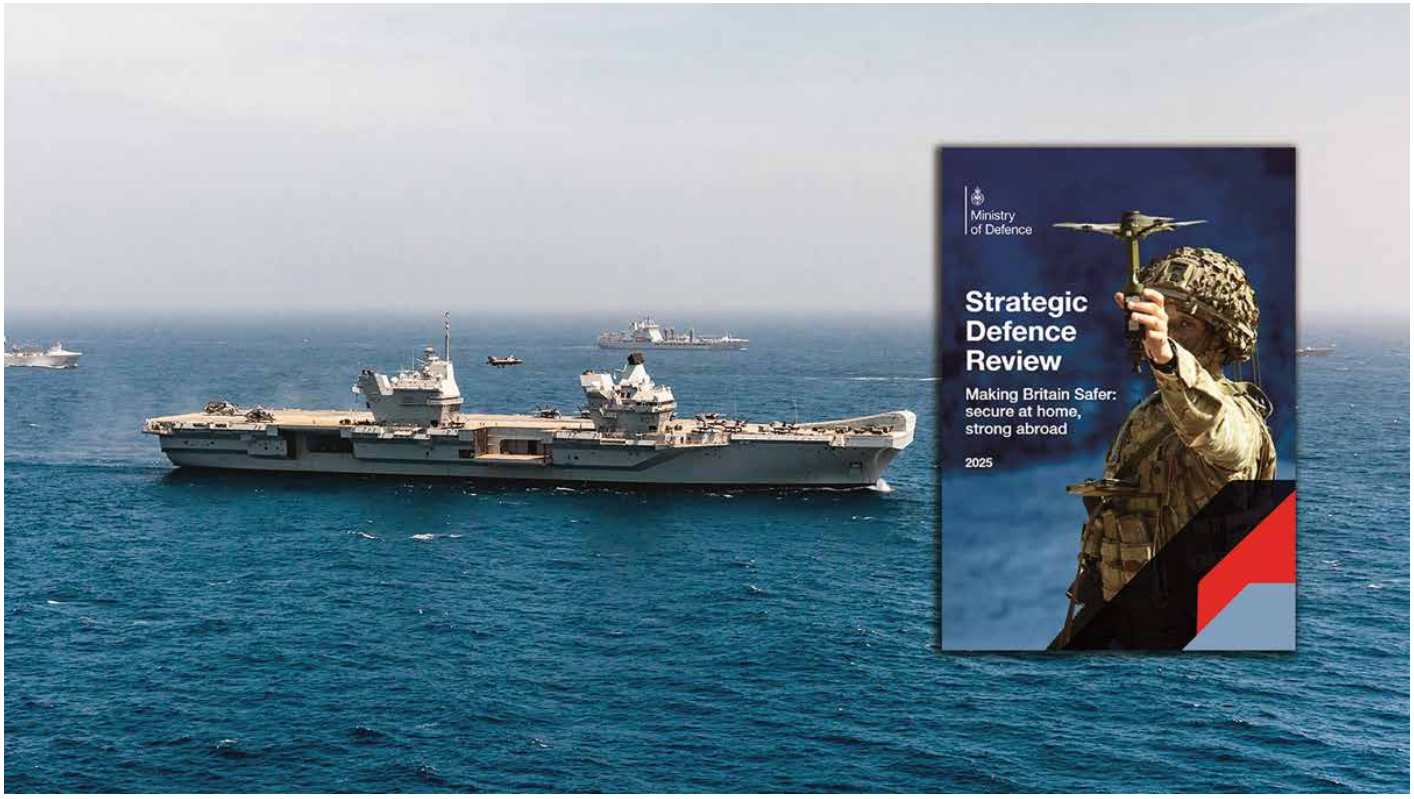
Visitors to the Boeing Pavilion (C–2) could experience immersive and fully interactive product and technology displays spanning Boeing's portfolio, along with a full–size 777X interior section with its wider cabin and spacious architecture and the 777–8 Freighter Theater. A broad range of products and services were highlighted, such as defence integrated and mission critical capabilities, global parts resources, sustainment services, maintenance and training solutions, commercial airplane modification services and cutting edge cabin interiors designs. The exhibits also hosted the Boeing Cascade Climate Impact Model, a data–modeling and visualisation tool that assesses options to reduce aviation's footprint.

The adjoining Wisk Aero Pavilion showcased its 6th generation all–electric, autonomous passenger aircraft. Visitors could explore the innovative design and technology behind this Advanced Air Mobility solution, reinforcing Wisk's leadership in the market.

Qatar Airways displayed its special liveried 777–300ER showcasing the Paris Saint–Germain team. The US Department of Defence corral featured a range of Boeing products including the C–17, CH–47, F–15, F/A–18, KC–46 and P–8.

UK strategic defence review signals change

Richard Gardner reports from London



An F–35B fighter jet lands on the flightdeck of HMS Prince of Wales. (Image credit: James Clarke/Crown Copyright) Inset: Cover page of the Strategic Defence Review. (Image credit: UK Government).

June 2025 saw the UK's long awaited Strategic Defence Review (SDR 25) finally breaking cover with an announcement by Prime Minister, Kier Starmer, of a very wide ranging list of planned changes in policy direction and a significant uplift in across–the–board operational capabilities. This will shift the UK defence priority back to home and NATO defence, in the face of the growing Russian threat in Europe, while maintaining support and investment in countering Chinese military expansion across the Asia Pacific region.

The review was welcomed as a recognition of the fact that the post–Cold War status quo was no longer relevant for realistic and relevant defence planning in a climate of such massive geo–political uncertainty. The recent full–on skirmishes between India and Pakistan in recent months indicate how this trend is truly international. Since the return of President Trump in the United States long established defence and trade alliances are being turned upside down and few experts can predict with any certainty how this will impact on longer term global agreements. The UK is caught between still evolving post Brexit relations with Europe and the ages old Special Transatlantic relationship with the USA. The enduring NATO safeguards are now being challenged as never before by a US President who keeps talking of putting America first.

This latest SDR was stated to be "transformational" in its approach, designed to go well beyond just a reversal of two decades of UK military shrinkage following the post–Cold War Peace Dividend. This false degree of confidence was finally laid to rest in February 2022 when Russian tanks swarmed into Ukraine.

The UK was quick to react in sending war materials and provide operator training to help Ukraine resist the Russian invasion, but it did not provide a direct intervention, and in the process has seen a serious depletion of national ammunition and weapon stocks. This has now become a potential threat to the ability of its own forces

to provide adequate replacements quickly enough in the eventuality of any future Westward Russian aggression. The urgent need for a defence policy and action plan re–set, has spread across NATO, especially as the new Trump Administration has said that European NATO nations must do more themselves as his own defence priority is now in the Indo–Pacific to counter Chinese expansion. As modern weapons and platform systems can take many months, and often years, to progress through the usual supply chains to meet new orders, and are very expensive, a radical re–appraisal became very urgent in the UK concerning how to speed up the entire supply system from procurement to manufacture and delivery into service. Six new ammunition factories are to be constructed so that an "always on" production capacity is available to rapidly ramp up production. More self–sufficiency in essential supply chain activities is also called for added to the challenge facing military planners and industry resulting from the rapidly changing nature of modern warfare itself, as seen daily in Ukraine. The huge increase in the use of unmanned air vehicles, small drones, stand–off precision weapons, electronic warfare, cyber–attacks and autonomous assets for air, sea and land use, means that increased speed in decision–making must be assisted by Artificial Intelligence exploiting the greater use of autonomy. A new Defence AI Investment Fund is being set up with the aim of exploring and promoting the innovations emerging that will help transform data gathering, sharing and use within conventional forces. The report describes how contested the space domain is becoming with Russia and China increasing their operational satellite fleets by 70% in 2019–21, and it calls for close partnering on work in the space domain to develop next–generation intelligence, surveillance and reconnaissance capability and to protect assets in space.

The SDR states an ambition to build 'up to' 12 new–generation nuclear–powered attack submarines. Credit: UK MoD Crown Copyright.

Providing solutions to meet all these new requirements, now required on a previously unimaginably large scale, has prompted the UK to look "out of the box" of conventionality to be able to acquire and deliver at a pace while keeping costs to a more affordable level, and to be more agile in reacting to continuously evolving new threats and opportunities. The outcome announced in the SDR represents a major tilt towards a more tri–service integrated framework enabled by transformational digital assets including AI and Cyber so that data can be made available across domains allowing the most appropriate use regardless of which delivery route is taken. This means that building more industrial capacity is now a top priority alongside the speeding up of advanced technologies and systems. This will extend into specialised training for those who will work in the digital battlefield and within the industry supply chains alongside new cyber and weapon systems, and the introduction of more autonomous platforms. Some of the other key programme decisions within the 147 pages of the report are described here. The recent article in Vayu described how Europe's MBDA specialist weapons centre–of–excellence is already considerably boosting investment in new systems and capabilities to provide much faster scaling up of production of missiles and other weapons and systems.

F–35B Lightning jet launches from HMS Prince of Wales, as it transits South in the Red Sea, 26 May 2025. (Image credit: Amber Mayall RAF/Crown Copyright).

Boosting UK naval shipbuilding capacity

One of the most interesting SDR announcements was the decision to double the UK capacity for building nuclear powered submarines. At present the UK production centre is Barrow–in–Furness where the final assembly halls are currently full of work on the last Astute Class attack submarines and the first of the four Dreadnought Class Trident SSBNs. It has long been a concern how sufficient capacity at Barrow can be provided to increase the delivery throughput of new nuclear attack submarines to meet the expectations relating to the Australia/UK/US alliance. According to UK Defence Secretary, John Healey MP, the extended shipbuilding facilities at Barrow when completed will allow for a new nuclear submarine to emerge every 18 months when the programme is fully underway. Timescales remain rather vague at present however, beyond the statement that first deliveries of the new attack submarine class will be in the next decade. The UK media reports suggested that the Royal Navy is going

to increase its attack fleet to 12 SSNs but this MOD quoted figure might also include at least some of those destined for Australia as well. Further clarification no doubt will be forthcoming on this.

The SDR also described how it is committed to evolving the Royal Navy into a "new hybrid navy" which would include equipping the two QE Class aircraft carriers with a hybrid air wing. This would comprise manned F–35Bs and helicopters as today but with additional unmanned air platforms to operate alongside, increasing combat mass, providing offensive and defensive capability searching for and attacking targets in the air, on land or at sea. New fixed wing unmanned types will operate and the carriers will be modified to maintain, launch and recover them. The report says that the Royal Navy must move towards a mix of crewed, unmanned and autonomous aircraft, surface and sub–surface platforms. It claims that it will be the world's first to deploy hybrid aircraft carriers in this way.

UK Prime Minister Keir Starmer gives a briefing as he and the Defence Secretary John Healey visit HMS Glasgow, as the government unveils its defence spending plans. (Image credit: Lauren Hurley / No 10 Downing Street).

Another major announcement was that confirming that the UK's Dragonfire Directed Energy Weapon is going to equip UK warships with increased urgency now that extensive trials against varied targets have shown the development units to be highly accurate and reliable. These laser weapons are claimed to be not only highly effective, they will drastically reduce the cost of destroying incoming threats such as drone swarms and high speed missiles, and can react far quicker than missiles or guns. But development of a new family of long range hypersonic attack missiles as well as producing more Storm Shadow cruise missiles is also going ahead and an initial 7,000 are quoted as being ordered to replenish those depleted stocks left after supplying Ukraine and others used by the RAF in the Middle East.

An air–launched nuke come–back?

During the 1990s the UK government decided to allow its large stock of free–fall tactical nuclear weapons (the WE177 Special Weapons) to lapse without replacement as European front–line East–West confrontation was thought to be history. Now that once again Russia is becoming highly aggressive in Europe, and expanding its air force and navy well out over the Atlantic, threatening vital undersea communications, the UK is increasing its use of autonomous underwater assets alongside surface warships and submarines. New systems to protect key bases and important ground targets are also due to receive appropriate funding. This will probably comprise a mix of mobile surface–to–air missile and laser defence systems. The RAF no longer operates dedicated bombers, and its current F–35B and Typhoon fleets both require considerable air tanking to undertake long range missions, so the SDR suggests investing in a restored air launched tactical nuclear capability that would be delivered, perhaps by the F–35A, which has a greater payload and unrefuelled range than the F–35Bs flown by the RAF and Royal Navy. However, integrating British controlled nuclear weapons on a US built fighter such as the F–35A might be a non–starter without a special exemption under the ITAR restrictions that might be expected to be imposed. It might also be a very costly exercise as the UK will probably have to duplicate the integration work that has already been carried out on US F–35s that carry US nuclear free–fall weapons.

Artist's rendering of SSN–AUKUS, due to enter service in the late 2030s. (Image credit: BAE Systems via Royal Navy).

Longer–term the GCAP/Tempest sixth generation air combat aircraft might become the UK's long range tactical nuclear weapon launch platform, operating alongside unmanned air platforms, as it is being designed to have a big payload bay and 3000 mile unrefuelled range. Freedom from ITAR restrictions could be a deciding factor regarding which next generation platform might carry tactical nuclear weapons if the proposal goes ahead. There can be little doubt that that armed drones are now playing a decisive role in the Ukraine conflict. They are being produced very quickly, often in unconventional manufacturing facilities, and costs are low, but attrition rates are very high so sustained, robust supply chains are essential. The SDR recognises that these

developments represent a realistic route to keeping defence capability valid as new threats emerge, especially extending into cyber and space activity, but numbers still count and faster procurement and delivery are more essential than ever.

China is expanding every aspect of its defence industrial base as has been described in Vayu over recent months, and all regional nations are expressing their concern as so many pointers suggest an attack on Taiwan

RAF Brize Norton, the UK's air transport and refuelling hub. (Image credit: SAC Matthew Aherne/Crown Copyright).

may well go ahead within a 2027–30 timeframe. The US is determined to do all it can to convince Chinese leaders that any such move will be resisted at all levels, perhaps the most effective being the potential for a global financial and trade sanctions response alongside appropriate military support. Not so long ago it seemed unthinkable that in the 21st Century in such a highly inter–connected world, Russia would start a new era of global conflict as it did. It may also seem unlikely to some that China will put at risk its global trade leadership and growing political influence by causing another major war in the Pacific, but the West has to up its guard and old ways of planning for, and conducting, deterrence, and retaining air, land and sea dominance, is going to require some radical changes in defence thinking sooner rather than later. It remains to be seen if the UK can live up to all the promises and hopes

that are contained in its latest SDR, not the least being whether it is prepared to pay the costs involved, and how to recruit and retain all the specialised personnel that go with the new requirements, but at least it does set out in considerable depth a new direction of travel that breaks with decades of hollowing–out defence capabilities and the bottom line is that updated UK force levels are to grow again.

Article by Richard Gardner

Ramstein Flag 25

NATO's Allied Air Command, in cooperation with the Royal Netherlands Air Force (RNLAF), conducted Ramstein Flag 2025 (RAFL25) from 31 March to 11 April 2025. The exercise brought together over 90 aircraft from more than 15 Allied nations, operating from 12 Allied air bases across Europe. This large scale, tactical level training exercise aimed to strengthen multi–domain operations, interoperability and rapid response capabilities among Allied forces. The Royal Netherlands Air Force has many years of experience with the high–quality Frisian Flag exercise. That was precisely the reason why NATO Air Command asked the armed forces to jointly set up Ramstein Flag.

History

In 1975, the US Air Force began holding Flag series exercises after identifying a need to provide realistic training against a realistic threat to test hardware and tactics. Exercise Red Flag was established at Nellis Air Force Base. It was a trailblazer for a completely new type of fighter jet training to help the US Air Force to "train as you fight".

A Flag exercise involves participants from the US and allied air forces and provides them with lifelike training in a complex, contested environment. The exercise aims at offering pilots and weapon systems officers the opportunity to fly ten realistically simulated combat missions in a safe training environment with measurable results improving

survivability and skills. International examples of Flag Series exercises are Israel–led exercise Blue Flag or Canada–led exercise Maple Flag.

In 2024 NATO Allied Air Command organised the first Ramstein Flag exercise. The name Ramstein Flag refers to Ramstein Air Base in Germany, headquarters of NATO Allied Air Command. The first Ramstein Flag was hosted in Greece. It involved 130 aircraft and over 2,000 sorties were flown. NATO AIRCOM has now adopted the Flag principle for its main training event. As geopolitical tensions continue to evolve, so too must NATO exercise design. Ramstein Flag signifies the future of NATO exercises, focusing on current and future threats. Lessons

from the war in Ukraine and elsewhere in the world are taken into account, such as achieving air superiority and the use of drones in air defence and warfare in general. For this reason, units from the navy and army were also deployed.

12 Air Bases

This year's exercise involved 12 Allied air bases across the Alliance. Distributing air operations across various locations across NATO requires speed, flexibility and adaptability, which was exercised during Ramstein Flag 2025. Allied bases included in the exercise were Leeuwarden (host) and Eindhoven in the Netherlands, Skrydstrup in Denmark, Avord and Istres–Le Tube in France, Husum and Geilenkirchen in Germany RAF Lossiemouth, RAF Marham plus the US air bases at Lakenheath, Mildenhall and Fairford in the UK.

In terms of combat aircraft, 26 fifth generation fighter aircraft (such as the F–35) and 62 fourth generation fighter aircraft participated. Also seven different tankers participated to include the Multinational Multirole Tanker Unit (MMU) out of Eindhoven in The Netherlands.

Naval involvement

Standing NATO Maritime Group 1 (SNMG1) played a complementary and dynamic role in the exercise, bringing a critical maritime dimension to NATO's integrated air and missile defence training. Composed of HNLMS Tromp (Netherlands), BNS Louise–Marie (Belgium), and FGS Rhon (Germany), SNMG1 not only contributed to the realism and complexity of the scenario but also took advantage of valuable high–end training opportunities for its crews and staff. HNLMS Tromp, an Air Defence and Command Frigate, provided essential command and control functions to support air operations. The ship's fighter controllers actively guided allied aircraft and ensured seamless coordination between the maritime and air components of the exercise.

Exercise Objectives

This year's exercise was designed to provide Allied forces with advanced training in a complex, contested operational environment. Priorities for RAFL25 included exercising:

- Improving Integrated Air and Missile Defence (IAMD) tactics, techniques and procedures (TTPs) by conducting close coordination between Defensive Counter Air (DCA) and Surface–Based Air and Missile Defence (SBAMD) missions.
- To exercise 4th and 5th Gen intergrated COMAO mission planning and execution against semi–permanent IADS environment.
- To improve the understanding and application of joint and combined air operations concepts, doctrine and procedures.
- Portions of Counter Anti–Access/Area Denial (C–A2AD) tactics, procedures and techniques: secure airspace, deny the enemy access to the airspace and eliminate enemy threats to the airspace.
- Exercise interoperability for flying air defence assests and SBAMD in a Joint Engagement Zone (JEZ): in different layers of the defence the threat of destroying own troops and assets must be eliminated.
- Exercise the Agile Combat Employment (ACE) at Leeuwarden and other Air Bases: stay unpredictable for the enemy. If you move aircraft around a base and between bases the enemy is uncertain of where the actual aircraft are.
- Improve 4th, 5th generation aircraft and joint fires integration in a complex and dynamic operational environment.
- Enhance the intel and information sharing and coordinating among NATO air forces in the planning and execution of operations in a semi/non permissive environment.
- To experiment with live virtual construct in execution: weapons used by air force, army and navy can be deployed virtually in the exercise. They can be seen, but are not actually in the air.

Scenarios

The objectives reflect AIRCOM's focus on ensuring the air component's readiness to respond rapidly in Article 5 scenarios, where NATO's collective defence commitments are invoked. Additionally, RAFL25 exercised the NATO air component's agile and immediate ability to execute the first five days of an Air Tasking Order (ATO) during such a scenario.

During Ramstein Flag a large scenario was executed. This scenario was divided in 3 parts, in which Blue Forces battle with Red Forces. Participating aircrews switched sides between Red and Blue forces regularly during the exercise.

Scenario day 1, 2 and 3: Integrated Air and Missile Defence (IAMD) in a semi permissive (i.e. potentially hostile) environment.

Scenario day 4, 5, 6 and 7: Counter Anti–Access/Area Denial (C–A2AD) in a non–permissive environment, where non–permissive stand for under effective enemy fire/threat.

Scenario day 8 and 9: Air Power Contribution to Counter–Land Operations (APCLO) in a semi permissive environment.

Missions

During the exercise days two missions were flown. One mission in daylight, starting at 4.30 am local time and ending at 7.30 pm. The night mission started at 8.30 pm and lasted until 11.30 pm. Planning for a mission takes no less than eight hours. The flight lead (the leader of a group of four aircraft) attends the initial planning. He is responsible for briefing the other pilots in the flight. The pilots are at the aircraft 45 minutes before take–off. After take–off the fighters rendezvous with a tanker to take fuel, after which the actual exercise starts. Pilots only flew one mission per day, as the debriefing of the first mission took well past the start of the second mission. The actual end time of the second mission, including debriefing, lasted up to 04.00 am of the next day.

The exercise took place mainly above the North Sea, from the Dutch Wadden Islands to Denmark. In addition, above Friesland and Groningen. The size of the training area was approximately 300×200 kilometers. Most of the flying exercise took place above an altitude of 1.7 kilometers. Above the sea, flights were also flown lower, down to sea level.

An important aspect of the exercise was also interoperability. Examples of this interoperability were: Danish 5th generation F–35s met up with a Turkish KC–135 at 18000 feet above the North Sea. The Turkish Air Force's ability to seamlessly integrate with fifth–generation platforms like the F–35 reflects the Alliance's commitment to continuous adaptation and collaboration. Another example is during the training, two F–35s assigned to the 495th Fighter Squadron at Royal Air Force Lakenheath, England, and two RNLAF Air Combat Command F–35s were launched by crew chiefs from the opposite nations to fly counter anti–access/area denial, or C–A2AD, training missions. After landing, logistics and maintenance crews from both Allied nations reciprocally recovered, refuelled and inspected the other nation's aircraft. The successful cross–servicing at Ramstein Flag is an example of the importance of integrated logistics and maintenance training.

Keystone

During the exercise, Dutch F–35As, for the first time in Europe, used the Keystone system to transmit targeting coordinates in real time to a ground artillery unit equipped with the PULS system. This integration enabled rapid and precise strike, demonstrating the effectiveness of combined arms coordination and the growing importance of advanced communications systems in modern military operations. The integration of the F–35, the Keystone system and the PULS represents a significant step forward in joint coordination. It enables rapid and precise response to threats, combining the advanced detection capabilities of the F–35 with the firepower of the PULS. This capacity is particularly relevant in the current context of geopolitical tensions, particularly in Eastern Europe. It provides armed forces with increased flexibility and long range strike capability, which is essential to deter potential aggression and respond effectively to threats.

Future

As NATO AIRCOM works to improve Ramstein Flag each year, 2026 will be in combination with US exercise Astral Knight, and the exercise will span across all three joint operations areas: north, center and south. Ramstein Flag planners are also currently discussing how to make the live–fly environment more realistic.

We would like to thank Captain Jose R. Davis, Public Affairs Officer of NATO Allied Air Command, Commodore Marcel "Bo"van Egmond, Commander Air Combat Command the Netherlands and all personnel involved for their hospitality, time and help during our visit at Ramstein Flag 25.

Article by Peter de Vos, Lowpass Aviation.com

Photos by Peter de Vos, Bram Marijnissen, Rene Sleegers, Lowpass Aviation.com

Falcon Spring 2025
Dutch–US air mobility training

Army forces have a wide scope of essential trainings requirements to skill them for their potential missions, which can be called upon in national settings and certainly in international cooperation. This is not different for the Dutch ground forces and one of their objectives is to remain trained in air mobility missions for which regular trainings initiatives are in place together with the Dutch Helicopter Command (DHC). One of these regular initiatives are the Falcon Autumn exercises which are annually planned during fall and see, besides national troops and assets, also international support. With the Russian invasion into Ukraine and ongoing war, but also a growing number of disrupting incidents on European territory and furthermore a raise of tensions word wide, there was need to adjust the trainings capacity accordingly. These developments were base to start scheduling an additional training in between the winter and summer period. This year the result was shown with "Falcon Spring 2025" coming alive.

Spring

During 9–23 May, the northern provinces of The Netherlands were the playground for the ground troops working together with a considerable force of helicopters to train on various "Falcon Spring" (FS) scenarios. Essential element was to have quickly forces with their equipment and supplies in, or out of, specific appointed areas. During the exercise we have an engagement with Major Mark Bakker, deputy commander of 11th Air Mobile Brigade (11 AMB), in a rural area somewhere between Groningen and Assen. Here we will see the drop–off of a considerable force of troops in the field, which have to secure a nearby "high value" enemy object. In his role as Falcon Spring exercise director, major Bakker tells us more about the 2025 spring time exercise. "Due to the increasing need to train our troops, we planned the Falcon Spring exercise and as air mobility is a main element, we work, like in the Falcon Autumn exercises together with our colleagues of DHC who will support us with their AH–64E "Apache" attack helicopters, as well with their CH–47F "Chinooks" for troop and cargo movement".

Big Windy

As the exercise scenarios included medium force missions, the Dutch defence invited the US army to join the exercise and train together. "Our available exercise

helicopter force now counts, besides 3 Dutch Apaches and 4 Chinooks, another 13 US Army helicopters from the 12th Combat Aviation Brigade (12 CAB) based at the German Katterbach Army Airfield, joined FS", as major Bakker explains.

The US detachment included 5 CH–47F Chinooks from B Company "Big Windy" and 8 Black Hawks from A and C Company, all from the 214th Aviation Regiment. Major Bakker continues: "the 12th CAB helicopters are temporary deployed to trainings area 'The Marnewaard' from where they are assigned to fulfil their FS tasks. The Dutch helicopters moved from their home base Gilze–Rijen to Leeuwarden air base. Over the road, a cologne of about 150 supporting DHC vehicles moved along from Gilze–Rijen to the north of The Netherlands for the duration of the exercise, so the unit could be completely self–supporting and act independently".

FOB and FARP

After several familiarisation flights the days before, the exercise started want an order to install a Forward Operating Base (FOB) for the helicopters at the small airport of Drachten. Additionally various locations in the north of The Netherlands were installed as a Forward Arming and Refuelling Point (FARP). Such a set–up makes it possible to operate closer to the troops in the field, although not that near and being vulnerable for enemy attacks.

The FARP's provide the helicopters a fast option to refuel and re–arm, without losing to much precious time for follow–on operations. A FARP also gives the flexibility of quickly moving to another location, for eg, in cases when being discovered by enemy forces or when battle areas are changing.

11th AMB LSV

From the moment the FOB Drachten is operational, 12th CAB Black Hawks are ordered to pick up front line 11th AMB troops with their light tools and armour, such as grinders and mortars. While major Bakker describes how these first troops are moving forward to their target, another wave of multiple Chinooks arrive at the provisional Landing Zone (LZ) carrying extra vehicles underneath in a sling load and more troops inside. The majority of vehicles include the "Luchtmobiel Speciaal Voertuig" (LSV), or airmobile special vehicle made by the French Lohr, of which the 11th AMB has about 200 in use in 3 versions.

The LSV versions, which can carry 850kg and have a maximum speed of 70 kmph,

are available for general purpose services, casualty transport and Anti–Tank (AT). Additional small vehicles include KTM Enduro motorcycles for fast movement.

TCCC

In a matter of minutes, the empty helicopters leave the hostile area and the troops move quickly with their equipment into cover of the woods towards their target. Some more helicopters take care of logistic flights to secure munition and other replenishments for the troops. Furthermore a complete medical unit is airlifted into "theatre". Two more US Army Chinooks carry each a Mercedes–Benz 290GD terrain truck with a small lorry underneath the helicopter, while the medical crews are onboard the CH–47's. Again in a very short while after the helicopters have left, the medical units find themselves a suitable location where they set up a medical facility on site, which is operational within an hour. Major Bakker mentions that the medical unit is fully equipped to operate 48 hours independently at their site. The military define the medical routing in the field as Tactical Combat Casualty Care (TCCC), which knows 3 specific areas, namely Care Under Fire (CUF), Tactical Field Care (TFC) and Tactical Evacuation Care (TACEVAC). The medical unit flown in by the helicopters, is the TFC unit where casualties from the front line are transported to. At this facility they are assessed according the MARCH protocol to prioritise casualties for further treatment. The MARCH protocol follows a standardised way to assess casualties on Massive bleeding, Airway, Respiration, Circulation and Hypothermia prevention.

MedEvac

Shortly after becoming operational, the Falcon Spring medical TFC unit assessed one of the incoming casualties, played by an actor, for urgent follow–on hospital treatment and applied TACEVAC, appropriate medical care during transport from the field to the hospital. Meanwhile a US Army HH–60M Black Hawk, which was on standby as "DUSTY", after their C Company nick name "Dust Off", at FOB Drachten, was called upon by the TFC unit in the field to execute a Medical Evacuation (MedEvac). In less than 10 minutes the HH–60M approaches the TFC location, while flying tactical at low treetop level. With the casualty onboard, the Black Hawk is requested to await the arrival of additional casualties, according a sudden development in the battle scenario. Several Mercedes assault vehicles provide additional protection for the vulnerable helicopter while waiting at the provisional LZ. Finally the HH–60M lifts off and disappears, while flying again tactical, quickly out of sight.

Secure the locks

The next day we are invited by Major Bakker to monitor the developing Falcon Spring scenario which foresaw the troops to secure the locks of Ossesluis against a new evolving enemy threat. As the threat at the initial location of the day before had been neutralised, the helicopter force was ordered to re–locate the majority of the troops and their equipment from their previous location to Ossesluis. When the main force had secured the new location as a new base for further actions, the FOB at Drachten was abandoned for a new more nearby FOB at Havelte. Similar movements continued with the 1500 involved servicemen for the duration of the Falcon Spring exercise, which took place during day and night, as did the helicopter operations.

Text and photos by Peter ten Berg

Guardians of the Mont Blanc Skies
The Gendarmerie Air Section in Chamonix

Nestled in the heart of the French Alps, the Gendarmerie Air Section (SAG) of Chamonix stands as a lifeline for those who dare to venture into the treacherous beauty of the Mont Blanc massif. Working in seamless coordination with the Peloton de Gendarmerie de Haute Montagne (PGHM), a specialised high mountain rescue unit, these airborne heroes ensure that mountaineers, skiers and hikers receive swift and expert assistance when danger strikes. But what is behind these operations? Roelof–Jan Gort visited the SAG Chamonix and spoke with Captain Herman who has been Squadron Leader since 2019 and pilot at the FAGN since 2005. As qualified pilot on the AS350 Ecureuil and the EC145 he has over 4700 flight hours.

This morning, Captain Herman, the Commander and squadron leader of the Gendarmerie Air Section in Chamonix, is sitting at his desk with a view of the platform where EC145 is being prepared by the ground crew behind him. In the background, the mountains are gradually becoming visible as the mist clears. “It’s going to be a busy day today with various training missions, and we may also have some additional rescue missions to carry out,” stated Commander Herman as he reviews today’s schedule.

As Commander of the SAG Chamonix section, Captain Herman is responsible for flight safety, effective management of technical resources, operational response and crew preservation. Chamonix SAG offers a 24/7 alert system that includes a pilot, an on–board mechanic, and additional radio alert personnel. SAG Chamonix employs three pilots, four winch–on–board mechanics, and one aero surveillance operator, in addition to office staff.

The assignment to SAG in Chamonix is based on volunteer participation. It is not possible to assign personnel who are not volunteers due to the technical demands and commitment required for this role. Additionally, candidates typically need to have served at one or two other mountain bases before being eligible for assignment in Chamonix to ensure they have sufficient experience.

A legacy of aerial rescue

The need for specialised mountain rescue services in France became evident in the mid–20th century as alpine tourism and mountaineering gained popularity. The treacherous conditions of the high mountains necessitated a dedicated force trained to manage emergencies in such environments.

The history of aerial rescue in the Gendarmerie dates to 6 May 1954, when France set up its first airborne unit, ushering in a new era of mountain rescue. Just three years later, in 1957, the introduction of the Alouette II helicopter revolutionised high altitude operations, providing rescuers with the ability to reach climbers stranded on sheer rock faces or deep within icy crevasses.

In response to this need, the PGHM was established in 1958, focusing on mountain rescue operations. Recognising the importance of aerial support in such missions, the Gendarmerie Air Section in Chamonix was subsequently formed. This collaboration between ground and air units revolutionised mountain rescue operations, allowing for quicker response times and more efficient rescues.

As technology advanced, so did the Gendarmerie's fleet. The AS350B Ecureuil, introduced in 1978, brought increased agility and power, while the EC145, added in 2002, became the ultimate workhorse for high altitude rescues. These state–of–the–art helicopters, equipped with advanced medical and rescue gear, allow SAG to execute missions in some of the most challenging conditions on Earth. These aircraft are equipped with specialised gear such as winches, stretchers, and navigation systems tailored for mountain operations.

A highly trained, elite team

Operating in the extreme environment of the Mont Blanc region requires skill, precision and courage. The SAG of Chamonix consists of eight elite military personnel, including highly trained pilots and expert winch operators. These professionals undergo rigorous training, often boasting years of experience in both military aviation and mountain flying.

Mechanics in the unit serve dual roles, not only ensuring that the aircraft stay in peak condition but also acting as in–flight winch operators, lowering rescuers into perilous situations where every second counts. Their ability is critical when evacuating injured climbers from near vertical rock faces or extracting skiers caught in avalanches.

To get more information about the pilot training and mountain training within the FAGN, Roelof–Jan asked Captain Herman about the pilot training at the FAGN (Forces Aeriennes de la Gendarmerie Nationale). He explained: "The pilot training in the FAGN begins with an 18 month basic training course in the Army's aircraft school based in DAX to obtain a pilot's license. It continues with five to six weeks of additional training at CNIFAG to obtain the qualifications required for the gendarmerie (winching, camera, type qualification, etc)".

He continued: "Then assigned to a unit, the young pilot will have to continue his training by completing around fifty hours of operational flight in dual control. He will then be released on a mission. If he wishes to become a mountain pilot, he will have to, after a detection phase, confirm a mountain flight qualification provided in four 2–week courses spread over the 4 seasons. This training is given at the Mountain Flying Training Center in Briançon, which is also situated in the French Alps, but more to the South".

The role of the CNISAG

Central to the effectiveness of the PGHM and SAG is the Centre National d'Instruction de Ski et d'Alpinisme de la Gendarmerie (CNISAG), located in Chamonix. Established in 1988, CNISAG is responsible for training gendarmes in mountain operations, including skiing, alpinism and aerial rescue techniques. The rigorous training ensures that personnel are well prepared for the challenges of high altitude rescues.

The PGHM and SAG units are composed of highly trained professionals, including mountain guides, pilots, flight engineers and rescue specialists. Their combined expertise allows for seamless coordination during complex rescue missions.

Rescue missions

The primary mission of the SAG in Chamonix is to conduct aerial rescues in the Mont Blanc massif and surrounding areas. These missions often involve evacuating injured climbers, skiers, or hikers from

inaccessible locations. The unit operates year round, with increased activity during peak tourist seasons. Beyond rescue operations, SAG also assists in law enforcement activities, including surveillance of protected areas, monitoring of illegal activities, and support during major events in the region.

Roelof–Jan asked Captain Herman about these rescue missions they perform. He explained how the rescue missions take place at the SAG: "Mountain rescue missions are conducted under the authority of the PGHM, which determines the necessary resources for each operation. If a helicopter is deemed the most effective option, the PGHM coordinates with SAG for assistance. During the day, the helicopter can be airborne in just a few minutes, while at night, a delay of approximately 40 minutes is typical. We can respond anywhere in the territory, both day and night, and at all altitudes. The only limitations we face are adverse weather conditions, such as intense winds, clouds, fog, and snow".

And to conduct these rescue missions successfully they need a crew made up of a pilot and a winch mechanic. They have equipment to perform each type of rescue mission like a camera, Night Vision Goggles (NVGs), thermal binoculars, searchlight, winch, etc. Depending on the type of mission they can take rescuers, doctors, investigators, intervention teams (GIGN) with them. They only take off at night for verified life–threatening emergencies and with stricter weather conditions than during the day.

Captain Herman says: "The personnel from the PGHM (Peloton de Gendarmerie de Haute Montagne) are trained first aiders, judicial police officers, and high mountain guides, and they are responsible for conducting the rescue operations. Additionally, the doctor is an emergency physician who can work independently in mountainous and high–altitude environments, and he or she oversees making medical decisions. About the clothing, the following. We carry a survival kit in case we get stranded in the mountains. To prepare for this, we undergo all mountain survival training".

The helicopters are equipped with skis, winches, and an aluminum floor. This setup allows for climbing with crampons and includes rescue and survival equipment. Their performance is consistent, but working at high altitudes necessitates taking off at a light weight. Therefore, we only carry the equipment, personnel and fuel that are strictly necessary to maintain this lightness.

Swift response in the face of tragedy

The SAG's work is more than just technical ability—it is a mission of life and death. On 9 April 2023, the SAG was instrumental in responding to a massive avalanche on the Armancette Glacier, which tragically claimed several lives. The swift action and coordination between aerial and ground units highlighted the critical role of the SAG in managing large scale mountain emergencies. Their rapid response allowed rescuers to reach survivors

trapped beneath tons of snow, showing the vital role of aerial intervention in mountain emergencies. Beyond rescue missions, the unit is also instrumental in medical evacuations, law enforcement support and high risk interventions, ensuring that no corner of the Mont Blanc massif is beyond reach.

The lifeline of the Mont Blanc massif

With over 60 years of experience in mountain rescue, the Gendarmerie Air Section of Chamonix is more than just a unit and is a symbol of dedication, skill, and heroism. Their presence enhances the region's safety, giving adventurers the confidence to explore the majestic yet unforgiving landscapes of Mont Blanc. Whether soaring through stormy skies or hovering inches above a frozen peak, these airborne rescuers embody the spirit of mountain rescue, proving that when disaster strikes, help is never far away.

Routine rescues

The SAG conducts numerous rescues annually, ranging from assisting injured hikers to evacuating stranded climbers. For instance, in August 2022, the unit conducted multiple operations, including rescuing paragliders and elderly hikers, showcasing their versatility and readiness.

Increasing tourist activity

With the growing popularity of mountain tourism, SAG faces the challenge of managing an increasing number of rescue operations. Ensuring the safety of both tourists and residents requires continuous training and resource allocation. The SAG is continually updating its equipment and training protocols to incorporate the latest technological advancements, ensuring that they remain at the forefront of mountain rescue operations.

Future outlook

The Gendarmerie Air Section of Chamonix stands as a testament to France's commitment to mountain safety and rescue excellence. Through rigorous training, advanced equipment and unwavering dedication, the SAG continues to safeguard the lives of those who explore the majestic yet perilous terrains of the French Alps.

Captain Herman about the future expectations of the SAG Chamonix: "First I want to continue to thrive at SAG in Chamonix and prepare for the arrival of the next helicopter scheduled for 2026 (H145D3). This is another positive advancement with a helicopter that is in many ways superior to the current EC145. We rely on manufacturers to provide us with innovative technologies that will help us maintain a high level of flight safety while carrying out our missions. Therefore, FAGN must adapt to these changes by continuing to develop its equipment, ensuring that we excel in this challenging environment, just as we have for the past 60 years".

I would like to thank Captain Allerme from the Headquarters at BA107 Villacoublay and Captain Herman from the Gendarmerie Air Section Chamonix for making this article possible.

Article and photos: Roelof–Jan Gort

Exercise Anatolian Eagle from the lens of Cem Dogut

(Instagram: cem_dogut and twitter/X: DogutCem)

Anatolian Eagle 2025

The international edition of the Anadolu Kartalı (Anatolian Eagle) exercise took place from 23 June to 4 July at the Anatolian Eagle Training Center (AETC), located within the command of the Third Jet Air Base (3'üncü Ana Jet Üs Komutanlığı) in Konya, located in Central Anatolia.

Konya is home to one of NATO's four major tactical training centers, along with Nellis (Red Flag exercise), Eiselson + Elmendorf–Richardson (Red Flag–Alaska exercise, formerly known as Cope Thunder), and Cold Lake in Canada (Maple Flag exercise).

The 2025 edition saw the participation of seven countries (Azerbaijan, Hungary, Jordan, Qatar, Saudi Arabia, United States) and NATO. Malaysia, the Sultanate of Oman, the Republic of Singapore, and the United Arab Emirates participated as observers. 40 aircraft from the Turkish Air Force and 30 aircraft from guest countries participated in the exercise.

In addition, during the exercise, two drones belonging to the Turkish Aerospace Industries were also employed: one Anka–3, a flying wing stealth UCAV (unmanned combat aerial vehicle), currently being developed by TAI, which unfortunately was lost on 25 June after crashing upon landing, and one UCAV Aksungur (previously known as Anka–2). Finally, four ships represented the naval platforms.

To enable aviation enthusiasts and representatives from the specialized press and radio/television broadcasters, a spotter day was organized on July 2nd, while the press/media day took place on July 3rd.

In his concluding remarks before the press, Maj. Ekrem ÇEKİN, Turkish air force Anatolian Eagle Training Command squadron commander, reminded that "during the training, 415 sorties were successfully conducted, totaling 786 hours of flight time – demonstrating not only the scale, but also the intensity and operational quality of the exercise". In addition, for the first time since the first international edition of the exercise took place, in June 2001, "this year's training was based on the realities of modern, dynamic, and multidimensional warfare. The scenarios reflected a high–threat environment, incorporating advanced air defence systems and asymmetric threats. One of the most prominent and the first scenarios ever involved was the interception of cruise missiles, emphasizing early detection, identification, and neutralization. Low radar cross–section cruise missiles were engaged through joint missions involving airborne and ground–based systems, requiring full coordination".

“When Gorilla’s Fly…..MiGs Die” Visit to Eglin Air Force Base

On the vast emerald coast of Florida, where pine forests stretch as far as the eye can see and the Gulf of America glistens in the sunlight, lies a place where the sound of thunder isn’t always from the sky.

Eglin Air Force Base

“This time of year, the weather can change quickly, one moment it’s sunny, and the next, sea mist rolls in. That’s because the sea water is still colder than the land,” Lieutenant Colonel ‘Duffle’ explains. Ten minutes later, we’re indeed hit by the sea mist, and ‘Duffle’ leads us into the squadron building for the interview. The weather service has told us the sun should return within the hour, and flights are scheduled to resume shortly after. As we walk into the squadron building, the first thing we see is the prominently displayed squadron emblem — featuring a gorilla at its center. “Our motto here is: When Gorillas Fly... MiGs Die”. Lieutenant Colonel “Duffle” tells us, before leading us into the briefing room. There, we’re given all the time we need to ask our questions about the 58th Fighter Squadron.

Lieutenant Colonel “Duffle”, can you tell me more about the day–to–day tasks and what you do at the 58th Fighter Squadron?

Absolutely. The 58th Fighter Squadron is primarily focused on the training of F–35A Lightning II pilots, so our daily operations revolve around that mission. We provide initial qualification training (IQT) for new pilots as well as pilots who convert from other types within the US Air Force and from allied nations participating in the F–35 programme. For experienced fighter pilots transitioning from another aircraft (such as the F–16, A–10 or F–15) to the F–35A, the process is much shorter than for new pilots. This is called the F–35A Transition Course, and it typically takes 4 to 6 months to complete. Many transition pilots say that while the flying itself is easier in the F–35 due to its advanced systems, the challenge lies in managing the sensors, tactics, and data fusion, which are far more complex than in older 4th generation jets.

As an instructor, my day typically starts with briefings and mission planning. First of all we teach them to fly the F–35 and make them comfortable with the jet. In a later stage of the syllabus, we prepare training scenarios that simulate real world combat situations, often involving complex air–to–air or air–to–ground missions. Pilots then fly those missions using either the actual F–35A or advanced flight simulators that replicate combat environments in detail. The pilots fly approximately 140 hours a year, divided over 60 hours physically in the F–35 and 80 hours in the simulator. After each flight or simulator session, we conduct a comprehensive debrief, where we review everything from tactical decisions to aircraft system performance. These debriefs are a critical part of the learning process, helping pilots develop the decision making and situational awareness they'll need in operational squadrons. In addition to flight training, there's a strong focus on academic instruction. We teach subjects like F–35 systems, weapons employment, threat analysis and multi–domain integration. There's also coordination with maintenance teams, intelligence staff, and mission support to ensure everything runs smoothly. Every day is dynamic. One day we might be flying a close air support mission in the simulator, and the next we're rehearsing complex air interdiction scenarios with multiple aircraft. What makes the 58th so unique is that we're not only flying one of the most advanced fighter jets in the world—we're also shaping the next generation of combat ready pilots.

There are also foreign F–35 pilots being trained within the 58th Fighter Squadron. Can you tell us more about that?

The 58th Fighter Squadron plays a key role not only in training US Air Force pilots, but also in preparing international F–35 pilots from partner and allied nations. We currently have a number of Polish pilots retrained to the F–35A. And in the future pilots from Germany, Singapore, Switzerland and Finland will join us. This training of foreign pilots will be moved to Ebbing AFB, but will be under the command of the 33rd Fighter Wing here at Eglin AFB. The plan is that they doing here at Eglin the training in the simulator and the real flying at Ebbing AFB in Arkansas. This training ensures that all pilots (regardless of nationality) receive a standardised, high level education and flight training experience, so they can safely and effectively operate the aircraft in a variety of missions. The international pilots train side–by–side with US pilots, using the same simulators, academic instruction, and flight syllabus. This not only strengthens pilot skills, but also fosters interoperability between allied air forces. It builds trust, enhances cooperation, and ensures that when allied F–35 units operate together in multinational exercises or operations, they're working from a shared foundation. Instructors within the 58th FS are trained to support both US and foreign pilots, and there's close coordination with international military liaisons on base. In the future some partner nations even have embedded instructor pilots working within the squadron. So in short, the 58th Fighter Squadron is a key hub of international collaboration, preparing a new generation of F–35 pilots from across the globe and helping ensure that allied forces are ready to operate together in complex, high threat environments.

Is there a difference in terms of tasks between what the 58th Fighter Squadron does and what the 60th Fighter Squadron does?

Yes, there are differences. Both squadrons operate the F–35A Lightning II and are part of the 33rd Fighter Wing at Eglin Air Force Base, The 58th Fighter Squadron is primarily focused on training F–35A pilots. This includes initial qualification training (IQT) for US Air Force pilots as well as those from allied nations. Pilots who come to the 58th are often transitioning from other aircraft or completing their first fighter assignment, and our role is to ensure they gain the skills, tactical knowledge and confidence to operate the F–35A in a combat environment.

The 60th Fighter Squadron, on the other hand, has a more operational and combat focused role. While it also supports training, its primary mission includes combat readiness and deployment preparation. The 60th is tasked with maintaining a higher state of operational readiness, meaning they focus more on advanced tactics, mission rehearsal, and real world deployment scenarios. In short, the 60th is closer to an active combat unit, whereas the 58th is more of a formal training unit (FTU).

So while both squadrons fly the same aircraft and often work closely together, the difference lies in the stage of the pilot's journey—training at the 58th, and advanced operational preparation or readiness at the 60th.

The F–35 is a 5th generation fighter aircraft. Can you tell us more about it?

Absolutely. The F–35 Lightning II is a fifth generation multirole fighter jet, and it's one of the most advanced combat aircraft in the world today. What makes it a fifth generation aircraft are several core features that go far beyond traditional fighter capabilities.

First and foremost, the F–35 is stealthy by design. Its shape, surface coating and internal weapons bays allow it to operate in heavily defended airspace without being easily detected by radar. That gives it a massive tactical advantage in both offensive and defensive roles. Second, the F–35 is built around sensor fusion and situational awareness. It collects data from its own sensors–radar, infrared, electronic surveillance–and from external sources like satellites and other aircraft, then fuses all that information into a single, user friendly interface for the pilot. This allows the pilot to make faster and more informed decisions in complex combat environments. Third, the F–35 is fully networked. It's not just a fighter jet, it's a data node in a larger joint and multinational force. It can share information with ground forces, other aircraft, and command centers in real time, playing a key role in multi–domain operations. The F–35 also has advanced electronic warfare capabilities, precision strike ability, and can operate in air–to–air, air–to–ground, and intelligence, surveillance and reconnaissance (ISR) roles. Its versatility is a major reason it's used by the US Air Force, Navy and Marine Corps, as well as allied countries around the world. In short, the F–35 is not just about speed or firepower, it's about information dominance, survivability and adaptability. It gives pilots the tools to control the battlespace, and it's designed to evolve over time with software and hardware upgrades like the TR–3 and Block 4 enhancements.

The F–22 and the F–35 are both 5th generation fighters. Are they used in the same way and for the same tasks, or are they completely different?

While the F–22 Raptor and the F–35 Lightning II are both classified as 5th generation fighter aircraft, they were designed for different roles and are used in different ways, even though they share some overlapping capabilities. The F–22 was built primarily for air superiority. It is optimised for speed, agility and stealth in air–to–air combat. Its mission is to gain control of the skies by defeating enemy fighters before they can pose a threat. With its twin engines, thrust vectoring capability and high supercruise speed, the F–22 excels in dogfighting and intercept missions. However, it has limited air–to–ground capability and was never exported to allied nations. The F–35, on the other hand, was designed as a multirole fighter, meaning it can perform a wide variety of missions:

air–to–air, air–to–ground, electronic warfare, intelligence gathering and close air support. It's slightly slower and less maneuverable than the F–22, but its strengths lie in its sensor fusion, networked operations and versatility. It was built to operate as part of a joint and multinational force and is used by many partner countries around the world.

What we've heard is that flying an F–35 is pretty easy and flying is kind of secondary. Can you tell us a little bit more about that?

Yes, that's actually quite true. One of the major goals of the F–35 programme was to reduce the physical and mental workload required just to fly the aircraft, so that pilots could focus more on tactical decision making and mission execution. The F–35 is equipped with fly–by–wire controls and highly advanced flight software, which makes the jet incredibly stable and easy to fly, even for pilots who are new to the platform like me some years ago. I came from flying the A–10C, wich is much more difficult because they don't have fly–by–wire controls and computers that stabilises the plane. The F–35 takes care of many of the traditional flying tasks automatically, from managing stability to controlling engine power and even assisting during tricky conditions in case of bad weather of something. Because of this, pilots often say that "flying the jet is the easy part." The real challenge, and where the F–35 truly shines, is in using its sensor suite, weapons systems and information–sharing capabilities effectively in complex combat environments. Instead of worrying about throttle control or aerodynamics, the pilot can focus on processing real time battlefield data, coordinating with other units, selecting the right weapons, and making fast, high impact decisions. The jet presents all of this information through a single, intuitive interface including a helmet mounted display that shows targeting and sensor data directly in the pilot's line of sight. So yes, while the F–35 is a high–performance fighter, the emphasis is on decision superiority, situational awareness, and mission effectiveness, not just flying skills. That's a fundamental shift from older fighter generations, and it's what makes the F–35 a true fifth–generation platform.

Can you tell us a little bit more about the helmet you use in the F–35?

Yes, of course. The F–35 helmet, officially known as the Gen III Helmet Mounted Display System (HMDS), is unlike any other fighter helmet in the world. It's not just a piece of protective gear — it's an integral part of the aircraft's sensor and information system, and it gives the pilot an unmatched level of situational awareness. One of the most impressive features is that the helmet displays all critical flight data directly on the visor like speed, altitude, targeting information, threat warnings and

more. So the pilot never has to look down at traditional cockpit instruments. Everything is right in the line of sight, no matter where the pilot is looking. Even more impressive is the helmet's "see–through–the–aircraft" capability. Thanks to the F–35's Distributed Aperture System (DAS), a network of six infrared cameras mounted around the aircraft, the pilot can literally look through the jet. For example, if the pilot looks down, the helmet can show a live infrared image of the ground beneath the aircraft, as if the jet were invisible. This is incredibly useful in combat, especially during night operations or when tracking ground targets. The helmet also allows for targeting just by looking. A pilot can lock onto a target simply by turning their head and looking at it, which speeds up reaction time in fast moving scenarios. Each helmet is custom fitted to the individual pilot using 3D scans, because even small alignment issues can affect performance. It's also equipped with night vision, communication systems and built–in noise protection.

After answering our questions, Lieutenant Colonel "Duffle" takes us out to the flight line, where the sea mist has now given way to clear blue skies. This morning, ten F–35s from the 58th Fighter Squadron and ten from the 60th are flying. "That's a normal number for us," Duffle explains. He goes on to tell us that some of the aircraft here are actually older airframes. At Luke Air Force Base, where flight hours accumulate more quickly due to the high tempo of training, they often receive newer jets with lower hours. The F–35s from Luke with relatively high flight hours are then reassigned to Eglin, since the flying tempo here is generally lower. That's why you'll sometimes see F–35s here with 'LF' (for Luke) still on the tail. After major maintenance, that tail code is changed to 'EG' for Eglin.

Our visit to Eglin Air Force Base was an unforgettable experience. We were given a unique look behind the scenes of one of the US Air Force's most advanced fighter squadrons — the 58th Fighter Squadron, home to the F–35A Lightning II.

We would like to express our sincere thanks to Lieutenant Colonel "Duffle" for his time, his detailed explanations, and for personally guiding us during our visit. His passion for flying and training the next generation of fighter pilots was clearly evident throughout the day.

Our appreciation also goes out to Lieutenant Jymil, whose efforts and coordination made this visit possible. Thanks to her, we had the opportunity to gain valuable insights into the operations at Eglin AFB.

Text and Photos: Gijs ten Velde & Fred Peursem

Langkawi International Maritime and Aerospace Exhibition (LIMA) 2025

An EC725 Caracal framed by lush tropical surroundings.

The Langkawi International Maritime and Aerospace Exhibition (LIMA) 2025, held from 20–24 May 2025 on the picturesque island of Langkawi, Malaysia, marked a landmark 17th edition of this globally recognised defence and commercial event. With the theme "Innovate Today, Thrive Tomorrow," the exhibition brought together cutting–edge technology, global industry leaders, and thrilling aerial and maritime displays all under the persistent challenge of Malaysia's tropical monsoon season.

LIMA 2025 once again confirmed its position as Southeast Asia's leading aerospace and maritime exhibition, attracting delegations from over 25 countries including the United States, United Kingdom, France, Turkey, China, Russia, India, Indonesia and Italy. It featured more than 500 exhibitors and throughout the five days, almost 30,000 trade visitors and 200,000 of public attendees witnessed a compelling blend of defence capability, commercial innovation and raw flying talent.

While the LIMA 2025 exhibition encompassed a broad spectrum of defence, maritime, and aerospace sectors, it was undeniably the airshow segment that captured the spotlight. Throughout the event, multiple aerobatic teams and solo display pilots transformed the skies over Langkawi into a breathtaking spectacle of roaring afterburners, synchronised spirals and precision maneuvers.

A PC–7 Mk II turboprop trainer in special show colours, captured on approach at Alor Setar — the base from which most aircraft operated for the Opening Gambit.

Su–35S of the Russian Knights touching down at Langkawi with a heavy rainstorm looming in the background.

Opening gambit: A thunderous start

The highly anticipated Opening Gambit of the airshow began dramatically at low altitude, with a sneaky high speed pass by a Royal Malaysian Air Force (RMAF) F/A–18D Hornet, releasing a dazzling burst of flares. This was immediately followed by a tight formation flypast featuring two additional F/A–18Ds and three Su–30MKM multirole fighters. Their low–level ingress showcased sharp turning capabilities and impressive formation discipline.

Next, six PC–7 Mk.II turboprop trainer aircraft performed two full 360–degree circuits in tight formation above the lush tropical hills surrounding Langkawi International Airport. Their precision flying demonstrated the foundational skills of Malaysia's future military aviators. Not far behind, a pair of Airbus A400M Atlas tactical airlifters followed in an unusually close formation for aircraft of their size, emphasizing the RMAF's heavy–lift capabilities. A trio of ever–reliable C–130 Hercules, a longstanding workhorse of the force, rounded out the transport segment of the demonstration.

Adding a dynamic rotary wing element, two EC725 Caracal helicopters executed a simulated ground attack run while simultaneously performing coordinated aerobatic maneuvers highlighting the RMAF's combat support flexibility and pilot skill.

The Opening Gambit concluded with a well orchestrated parade flypast. All participating aircraft returned for a precison timed final formation pass, joined by three extra EC120 Colibri light utility helicopters and three AW139 multi–role helicopters, forming an impressive composite of the nation's aerial assets. Unfortunately, the BAE Systems Hawk 108/208 aircraft, normally a fixture in the RMAF's demonstration lineup, was grounded due to a technical mishap during preparations for the opening sequence.

Airshow

The Opening Gambit was only performed during the opening of the event on 20 May and in presence of the Prime Minister. However throughout the week, the skies above Langkawi remained active with international performers delivering awe–inspiring displays. Indonesia's Jupiter Aerobatic Team, flying KT–1B Wongbee aircraft, delivered consistently crowd pleasing performances. Their tight formations, graceful loops and precise barrel rolls remained impressive—even when executed under shifting winds and low visibility.

Seven PC–7 Mk II aircraft on parade at the conclusion of the Opening Gambit.

A400M Atlas departing at dusk, fulfilling a logistics role for the event.

Super Lynx Mk100 lowering special forces during a waterfront hostage scenario at Resorts World Langkawi (RWL).

The Russian Knights, operating the cutting edge Sukhoi Su–35S, stunned audiences with high energy, high alpha maneuvers. From cobra turns to vertical spirals, their sequences pushed the limits of aerodynamic performance and human endurance. Their coordinated displays of raw thrust and agility received thunderous applause from aviation enthusiasts and casual viewers alike — a reception perhaps warmer here than in other parts of the world these days.

Adding a personal touch to the solo demonstrations, the Malaysian Air Force presented two specially painted aircraft. One F/A–18D Hornet featured a vibrant yellow "Pikachu" livery (a playful nod to pop culture) while a Su–30MKM was adorned in a deep blue "Toruk Makto" scheme inspired by the Avatar film franchise.

While the F/A–18D impressed with traditional high speed passes, high–G turns, loops and flare releases,

It doesn't get more tropical than this – coconuts and a Su–30MKM on approach at Alor Setar after Opening Gambit training.

Malaysian Police AS555 SN Fennec helicopter flying low over the sea at Resorts World Langkawi (RWL) during the hostage demonstration.

the Su–30MKM showcased its unique thrust vectoring capabilities with maneuvers such as the "Cobra", "Half–Loop Tumble Yaw" and "Falling Leaf".

In addition to the specially painted aircraft, a second F/A–18D and Su–30MKM performed solo flight demonstrations in standard tactical grey liveries, providing a striking, more traditional contrast to the themed displays.

One notable absence was the Surya Kiran Aerobatic Team (SKAT) of the Indian Air Force. Known for their nine red Hawk Mk132 jet trainers and precise diamond formation flying, their withdrawal was confirmed shortly before the show. While no official reason was provided, it is widely speculated that political sensitivities—possibly related to recent regional tensions with neighboring Pakistan—contributed to the decision.

F/A–18D entering the runway in the soft light of early morning at Langkawi.

Russian Knights take off between thunderstorms to perform their display.

This KC–390, set to become a staple in European air forces, has never looked better than in tropical camouflage at Langkawi.

Su–30MKM in standard grey livery launching into a low–level takeoff ahead of its display.

Despite the Surya Kiran team's cancellation, India was still represented with this HAL Do–228.

Each morning and evening, four C–130 Hercules aircraft supported LIMA's logistics with arrivals and departures at Langkawi.

Helicopter demonstrations at LIMA 2025

While fighter jets roared over Langkawi's skies above the international airport of the island, a different kind of spectacle captivated audiences along the waterfront at Resorts World Langkawi (RWL): a series of tightly choreographed helicopter demonstrations showcasing the versatility and tactical strength of Malaysia's rotary–wing forces.

The centrepiece was a dramatic airborne insertion and rescue simulation, carried out by elite units from the Royal Malaysian Navy (RMN) and Malaysian Maritime Enforcement Agency (MMEA). The action began with a low hovering AW139 from which special forces fast–roped into the sea, swimming silently toward a simulated hostile vessel. Simultaneously, AS555 SN Fennec and Super Lynx Mk100 helicopters swept overhead, providing mock close air support and overwatch.

Each maneuver was executed under challenging tropical conditions strong winds, shifting cloud cover, and intermittent rain showers. Yet, the crews adapted fluidly, using the weather to demonstrate their real–world readiness. Hover stability, precision rope deployment, and synchronised flight patterns were flawlessly delivered despite the elements.

Beyond the combat simulation, the helicopters performed a series of aerobatic passes, tight turns, and formation transitions. The Fennec's agility was particularly impressive, while the AW139's stability under low–altitude hover reinforced its role in search–and–rescue and special operations. With the emerald coastline of Langkawi as a backdrop and thousands of spectators in attendance, the helicopter segment at RWL served as a powerful reminder that air mobility is a cornerstone of modern military response, especially in maritime environments.

Malaysian Navy AS555 SN Fennec flying low along the waterfront at Resorts World Langkawi (RWL) during the hostage demo.

Conclusion: Resilience in the skies

Despite the logistical and meteorological challenges posed by the monsoon season, LIMA 2025 delivered an exceptional air display programme that demonstrated not only the technical capabilities of the participating aircraft and helicopters but also the extraordinary skill and adaptability of the pilots behind them. The event succeeded in reinforcing Malaysia's position as a key regional hub for aerospace and defence innovation, while offering the public and industry alike an unforgettable glimpse into the dynamic world of military aviation.

From the rumble of afterburners over misty mountains to the gleaming silhouettes of fighter jets cutting through tropical rain clouds, LIMA 2025 was a resounding reminder that even in the wettest skies – precision, power, and passion can soar.

Text and pictures by: Johan Franken & Frank Van Der Avoort

Ramstein Flag 2025 and “Refueling Fighter Aircraft”

The Multi MRTT Unit (MMU) at Eindhoven Air Base plays a crucial role in the Ramstein Flag 2025 exercise, operating Airbus A330 MRTT multi–role tanker and transport aircraft. The unit is led by German Colonel Ludger Bette, who has been in command for two years and will serve a total of three years. His successor, a Belgian officer, is already known and will take over in March 2026. Bette, who joined the Air Force in 1981, has extensive experience flying the C–160 Transall and Airbus A400M. He emphasises the importance of readiness for a major large scale conflict in Europe by 2029. Major Benjamin, another pilot on the A330 MRTT, heads the integrated planning team, preparing all flights related to Ramstein Flag 2025. This exercise is an excellent opportunity for the team to test their readiness and ensure all members have the necessary tools.

Mission planning and objectives

Six nations form the MMU, which has a steering group providing guidance to the commander. Ramstein Flag (RAFL25) is a high end exercise involving multiple nations and requiring significant skills. The involved nations have transferred operational control to the European Air Transport Command (EATC), which tasks the MMU daily during the exercise. The air task order is prepared by the planning team in Leeuwarden, with liaison officers coordinating the details. The MMU received the first request to participate in Ramstein Flag in the second half of the previous year. The unit executes two missions per day with one aircraft, adapting to last minute changes and re–tasking as needed. The main objective is to evaluate the unit’s readiness for handling a major conflict in Europe. Lessons learned are documented in reports by tanker captains, which help identify areas for improvement.

The refueling process

The A330 MRTT is a state–of–the–art tanker in Europe, capable of refueling aircraft without reconfiguration. It can carry passengers, cargo and refuel aircraft simultaneously. The aircraft can take 109 metric tons of fuel onboard and offload the entire fuel capacity minus the amount needed for its own flight. The A330 uses about six tons of fuel per hour, with the rest available for offloading to receivers. The average fighter has a capacity of around six metric tons of fuel, allowing the A330 to serve many aircraft in one refueling flight. There are two refueling systems onboard: the hose and drogue system, with a maximum fuel flow of 1.5 metric tons per minute, and the boom system, with a maximum fuel flow of 3.5 metric tons per minute. The hose and drogue system is used by aircraft like the EF2000 Eurofighter, Dassault Rafale and F/A–18 Hornet, while the boom system refuels fourth and fifth–

generation fighters like the F–35A Lightning II and F–16C Fighting Falcon.

Refueling operations are affected by weather conditions and technical failures. Pilots need visibility to join the tanker, which can be achieved by radar, though this is not always tactically desirable. Icing and thunderstorms are significant challenges, and technical failures require disconnecting the receiver from the tanker to stay safe. Night operations are more complex for receiver pilots due to limited visibility, requiring more training and skills. Pilots must judge the attitude of the aircraft and the tanker, which is difficult at night when only silhouettes are visible. The refuelers fuselage has lights to aid pilots, but the 2D image at night makes coupling to the probe challenging.

The unique MMU concept

The MMU is an example of pooling and sharing assets among NATO and European nations. The unit's aircraft are registered in the Netherlands and audited by Dutch military authorities. The MMU fleet is growing, with plans for additional aircraft and bases to accommodate new partner nations. The procurement agency calculates that for every 1100 flying hours per year, one aircraft is needed. Currently, there are nine aircraft in the fleet, with the tenth expected in 2026. If more nations join, additional aircraft will be added based on flying hours. The Germans currently need 5500 flying hours per year, requiring five planes. Scandinavian countries are interested in joining, which may lead to a third forward operating base in the north. This would be beneficial for serving Norwegian receivers, reducing fuel consumption and flight time.

The MMU's aircraft have no fixed base, switching tails between locations as needed. Eindhoven and Cologne are nearing maximum capacity, with plans for reconfiguration to accommodate more aircraft. Eindhoven will be closed for six months in 2027 for reconstruction, which will provide more space for aircraft. The MMU is a symbol of European air forces working together on the same mission.

RAF participation

RAF Typhoons from Scotland participated in Ramstein Flag 2025, flying daily missions from RAF Lossiemouth. Flight Lieutenant Dan Hall, assigned to the No. 1 (Fighter) Squadron, highlighted the importance of working closely with NATO allies. The exercise provided valuable opportunities to integrate with other nations' support assets, like air–to–air refueling. Hall emphasised the professionalism and communication discipline required during busy exercises. The RAF crews learned valuable lessons from proactive air–to–air refueling assets, which benefited real–life scenarios. Hall described the challenges of night refueling, requiring calm and smooth movements to avoid disorientation.

Canadian tanker operations

Canada deployed a CC–150 Polaris tanker, refueling various NATO aircraft. Major Scott Woods emphasised the integration with NATO allies and the benefits of participating in large scale exercises. Lieutenant Alex Campbell detailed the planning and execution of refueling missions, highlighting the importance of liaison officers and maintenance engineers. Canada's preparation for Ramstein Flag 2025 involved attending key planning conferences and maintaining standard NATO procedures. The exercise served as a training platform for junior members, with liaison officers ensuring real–time communication and synchronisation. The CC–150 Polaris refueled Hungarian and Swedish Gripens, Finnish and Spanish F/A–18 Hornets, French Rafales B/C, German Eurofighters B/C, and British Eurofighters B/C. The exercise allowed Canada to qualify junior members and gain valuable experience.

The CC–150 Polaris will be replaced by CC–330 Husky, enhancing Canada's refueling capabilities. Major Woods praised A330 MRTT's capabilities, benefits of integrating Husky into the Canadian fleet. First airframes delivered, one supporting mission transport plane. Unit still building standard operating procedures Husky, probe drogue boom capable. This allows Canada to service any aircraft type NATO, representing a significant step forward for Canadian forces.

Turkish tanker operations

Turkish Air Force deployed KC–135 tanker RAF Mildenhall, providing air–to–air refueling support. Major Huseyin Ozdemir emphasised the importance mission readiness challenges night refueling. Exercise enhanced interoperability tactical skills NATO allies. Turkish KC–135 served as a critical enabler, extending operational range mobility participating aircraft. Exercises like these involve complex planning meticulous execution, ensuring readiness personnel.

Text and photos: Joris van Boven and Alex van Noije

Steven de Vries ‘VRIESKE’: Eyes on the prize. Always.

Commander pilot (commandant vlieger) Steven de Vries (callsign Vrieske) is a Belgian F–16 pilot with the most operational F–16 flying hours in Europe: 5489 hours. In March 2021, he reached the magic border of 5000 F–16 flying hours. During his operational life, he participated in many exercises like Red Flag and in deployments over Bosnia, Kosovo, Serbia, Afghanistan, the Baltic States, Iraq and Syria. During the last 2 display seasons (2022, 2023), he flew the famous black/green ‘Dream Viper’ F–16 at many airshows in Europe. In April 2025, he retired from flying after 31 years and in May 2025, we had a long interview at Kleine–Brogel airbase with Vrieske about his life as F–16 pilot.

Q: How did you get involved in aviation?

My name is Steven de Vries, but within the Air Force everyone knows me as Vrieske , that is my callsign in our limited circle. I am also known as a demo pilot. The last year that I flew was actually only a small part of my entire career, and it was not even my core business. Ever since I was a child I have been fascinated by fighter planes. I wanted nothing more than to fly one myself. That was really my goal, although that idea was not really in my head at first. It was something that did not seem obvious; you cannot just become a fighter pilot.

Q: How did you start in the Belgian Air Force?

When did I start and how did my training go? I started in 1990 and I made my first flights in May 1991, on the SIAI–Marchetti. At that time the training was still in Goetsenhoven AB, a location I remember well. In Goetsenhoven, I was selected as one of the possible candidates to study in the United States. That was not a standard procedure at the time; there were only two spots available for our group. I was chosen from about twenty

candidates for this opportunity. I thought that was quite special.

Q: Can you tell more about your 5000+ operational F–16 hours?

Five thousand hours in an F–16. That sounds like a number. A milestone. But in reality it's much more than that: it's a story of dedication, of availability. And important to me: they are five thousand hours flown in an operational squadron. Because tactical flying is not a hobby. You don't fly for an hour "to keep in touch". Every flight is a Champions League match. You prepare for those days in advance. You think up scenarios, analyse targets, coordinate with colleagues. And yes, that applies even more when you are a leader – then you carry the mission. Then you have everyone with you. There is no flying "to do something" and then into the bar. There is always a goal. An objective. A lesson for someone. Every sortie is training, evaluation, education. For yourself and for others.

You brief the least experienced member of your formation. Not because he is youngest, but because the one who sets the standard. Can you get him or her on board? Then you get the whole group on board. And then you make every pilot stronger. That's what it's all about. That's how you build a squadron, a culture of professionalism. And that's how you stay sharp yourself. Because when you coach others, you're constantly testing your own knowledge. And the questions they ask? They keep you awake.

Q: Can you tell more about your role as demo pilot?

I knew exactly what I wanted to do with the demo story. Those who want to participate get into a moving train. As soon as you're in, you're off. And that train? It doesn't stop anymore. For me it was simple: if I was going to do it, it had to be good. No half measures. I grabbed it with both hands. Everything was focused on recruitment. That plane, it had to carry a message. No stickers, no 'quick something nice'. It was going to be a story. And that's how Dream Viper came into being.

I built that entire branding myself. From the design to the narrative. No three proposals, just one vision. Take it or leave it. But I wasn't reckless. No child's drawing or joke on a fighter jet. This must be professional. Impactful. With a message. I had support from a few people around me, I still remember how the first months were, with trial and error. Many weekends we are working on the concept and against a timeline.

And then comes the second part: to be present. Not just flying. Also getting out of your cockpit after the show, going to your tent, talking to people. Being approachable. When you recruit, you have to be visible. Then you have to be real. You have to take pictures with children, explain to parents, inspire young people. That is part of the job. And for me: just as important as the air show itself.

You can say what you want. Difficult person? Too old? Well. But I have filled this role with honour and conscience. With respect. With content. And no room for excuses. If it had failed, then it was my fault, and I was prepared to bear that. So Dream Viper is more than a name. It's a message: dare to dream. And when you get a chance, grab it. With both hands.

Q: Can you tell more about your farewell flight?

There is something special between Belgium and Switzerland. Something that goes beyond airspace and engines. Something human. Because the bond with the Swiss — just like with the Dutch and the French — has always been there. And with Switzerland, it just clicks. Maybe because we speak the same languages. Maybe because we understand each other, even without words.

When my last flight was coming up, the Tiger community knew Vrieske will stop. People were invited. Unfortunately busy schedules, operations, training…and the fact that it is simply not easy to just come here from Greece for an evening. But still Fonsi (Yannick "Fonsi" Zanata), my Swiss colleague demo pilot, he found a way. He himself is not a Tiger, but he could arrange it. And so he stood there: with two F–18s, especially for that one flight.

That last flight itself? Nothing spectacular, no complicated scenario with maximum number of planes. Just a navigation flight to France. But very thankful that Fonsi, my demo buddy from Switzerland, could still join me in a formation flight. Grateful that he had made the effort to make this happen!

Q: Can you give an example of a remarkable demo in Switzerland?

I think of Mollis. Switzerland in a nutshell: mountains, precision and challenge. An air show there is not self–evident. The valley is narrow, the space limited. But that forced me to be creative. My entire demo approach was atypical anyway: I didn't want to do the show the way it had always been done. No standard loops. No 'look at me' moments. My starting point was: close to the audience, be present, bring energy.

In Mollis I had to adapt my show. The mountains determined the rhythm. But I used them precisely: as a backdrop, as a contrast. A manoeuvre upwards? With that wall behind you it looked twice as powerful. The spectators were full of praise. They didn't get a moment to get bored. And that was what it was all about for me. Keeping attention. Touching people.

The technical adjustments seemed small, but were well thought out. No improvisation– optimisation. Approaching things a little differently. Using vertical where horizontal was not possible. And always with safety as a limit. Because that is what it must be. Demo flying is not just pulling and tugging at the flight controls. There are a lot of rules that you have to adhere to. And they are also checked for compliance. And rightly so.

Text and photos by Joris van Boven and Alex van Noije

Exercise Anatolian Phoenix

from the lens of Cem Dogut

(Instagram: cem_dogut and twitter/X: DogutCem)

FireBlade 2025: A Triad of Team, Training & Trust

In May 2025, Hungary hosted FireBlade 2025 at Papa Air Base, a multinational rotary wing tactical exercise under the Multinational Helicopter Training Centre (MHTC). The exercise reflected Europe's commitment to enhancing helicopter training, rooted in standards established by the European Defence Agency (EDA). It focused on collective multinational aircrew training in tactics, techniques, and procedures within a realistic combat environment.

FireBlade follows the MHTC's Standard Operating Procedure and employs the Air Force Planning Method based on the "4Ts" (Task, Target, Threat, Tactics), integrating the COMAO (Composite Air Operations) structure. Each year, a member nation hosts the event. Hungary hosted in 2025, including live–firing exercises. The structure of FireBlade builds from basic to complex missions in a "crawl–walk–run" approach.

According to Lt. Col. Zoltan Szili, deputy commander of the MHTC and former Mi–24 'Hind' pilot: "If I have to define FireBlade in only a few words, it will be three words: Team, Train, Trust".

Szili emphasised the importance of training entire crews, not just pilots. At FireBlade, graduates of the Helicopter Tactics Instructor Course (HTIC) mentor participants from mission planning to execution and debriefing. He explained: "They mentor the crews from the moment they

receive the mission task, through planning and execution, and finally during debriefing. They highlight strengths and areas for improvement. This is not just about flying, it's about operational learning."

Hungary as Host Nation

Operational leadership was under Colonel Zoltan Rolko, deputy commander of Hungary's 86th Helicopter Base. A veteran Mi–24 pilot with over 3000 hours, he is now Hungary's most experienced pilot on the Airbus H225M Caracal. Rolko explained: "The first time we hosted the exercise here was in 2017. It is the second time that I am the director of this exercise."

He outlined a dual structure for organising: logistics and operations. Papa Air Base's proven experience in hosting large exercises made it an ideal location. Scenarios were coordinated with MHTC mentors to align training goals in advance. On Hungary's motivation to host again, Rolko said: "Hungary is a country on the border of the European Union and NATO territory. We feel the need to be ready at all times, and the best way to prepare our helicopter crews is by participating in this MHTC programme."

Hungary also provided access to the Koroshegy live fire range, vital for nations lacking such facilities. Rolko noted: "Specialised training, such as live firing, is crucial for the survival of the crews in real scenarios. That is the specialty of this exercise. The name FireBlade is chosen for that reason."

The Hungarian Air Force played multiple roles: flight ops, planning, issuing orders, and providing instructors like Rolko himself. He stated: "I instruct only in the training part as an instructor, so I'm doing that."

Swiss participation: Focus on tactics

Lieutenant Colonel Lukas Rechsteiner, Detachment Commander for Switzerland, brought over 6,000 rotary wing and 2,000 fixed–wing hours. This was Switzerland's third Blade exercise after two years in Portugal. "This is the third time we are doing a helicopter

detachment on a blade exercise. This is in view of the improvement of the defence capability, in view of international cooperation and a better cooperation between ground and air forces."

Switzerland deployed three AS532 Cougar helicopters. Rechsteiner acknowledged the aging fleet but emphasised their continued effectiveness. He credited logistics, maintenance, and support teams for ensuring operational success: "Thanks to their efforts, the crews could focus entirely on their missions".

FireBlade provided Switzerland with a chance to improve tactical helicopter operations and integrate into international efforts.

Austria: Multiple helicopter types

Major Chris Kappl, commander of Austria's armed multi–role helicopter squadron, led the Austrian detachment. A veteran Bell OH–58B pilot, he emphasised the Kiowa's reliability: "The helicopter entered service in 1976, which means that it is older than myself, but it is an easy to maintain and reliable helicopter."

Austria participated with multiple aircraft including the OH–58B, UH–1N Huey, and UH–60 Black Hawk. Kappl praised the high quality of national preparation: "Our crews have an easy ability to work in a multinational environment and provide solid solutions as well as good products." He also prepared to convert to the new AW169 platform.

Slovakia: From observers to full participants

Captain 'Pablo', a Slovakian UH–60M Black Hawk pilot, represented the new generation. Trained in Slovakia

and the US, he praised the US course: "That was a six month course in Alabama—academic sessions, simulator time and live flights. It was perfect. I have to say that it was perfect." Since returning, he accumulated 300 Black Hawk hours. Slovakia's participation reflects its growing rotary wing capabilities and deeper NATO integration.

Serbia: A delayed but strong debut

Though a founding MHTC member, Serbia made its first Blade appearance in 2025. Lt. Col. Szili explained: "Serbia has been a part of MHTC since its inception. Their integration began during the early years when MHTC was still in its formative stages." Serbia deployed a Mi–17 and an H–145M helicopter from the 890th Squadron. The H–145M supports fire support, SAR and reconnaissance. Serbia's involvement marks a new stage in regional cooperation and modernisation.

Final demonstration and bad weather

A large scale demonstration was planned during the last week at the Koroshegy range. Although weather cancelled the VIP event, a full rehearsal took place the day before. It included JAS–39 Gripen gunnery, Hungarian and Serbian H145M fire support, Austrian Kiowa reconnaissance, landings by Hungarian H225M, Austrian UH–1N, Swiss Cougar, Slovak UH–60 MEDEVAC mission and a final exfiltration by a multinational helicopter formation.

Text and photos by Joris van Boven and Alex van Noije

15 years of TLP at Albacete

Late 2024, the final TLP flying course of that year took place and ran as usual at Base Aerea de Albacete – Los Llanos in Spain. In this Flying Course (FC) 2024–4 edition, 6 NATO members were present with a variety of aircraft, of which the Eurofighter Typhoon with more than 25 examples appeared to be the main asset in this force. Additional Italian F–35A's and Greek Rafale EG's as newcomers as well as the show up of French upgraded Mirage 2000D RMV's, the last 2024 TLP edition was again very interesting.

Evolving

The Tactical Leadership Programme and its flying courses found its origination back in 1978 when seven NATO nations shared the West German airspace as a European defensive collective during the cold war period. They recognised the need for joint operations, the need to train together and the need to generate leaders for challenging multinational air defence and air strike missions. The first TLP edition was held at Furstenfeldbruck air base in Germany and a year later the courses where executed at Jever air base, also in Germany until 1988. Around that time it was obvious, while having delivered more than 2000 graduated NATO air crews, that the course and its structure would have to be adjusted to the new requirements. That was why it moved by 1989 to Florennes Air Base, Belgium, which offered a larger air space and had growing potential to facilitate the increasing organisation and keep it adequate for the coming years.

With more flying courses a year and delivering an increasing number of graduates, the TLP continued with its successful course in Belgium. Nevertheless, the general environment around the TLP also changed through the years, like the disappearing cold war threat and therefore a changed defensive air space need over Germany. Also the growth of the commercial aviation was causing a further pressure on the available military air spaces over northern Europe, the training air spaces of the TLP. These reasons contributed to the making of a new Memorandum of Understanding (MoU) of the 10 participating nations (Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, United Kingdom and the United States of America) in 2009. While NATO moved away from a potential conflict in central Europe and the desire to train in a less occupied air space under more favourable weather conditions, hardly affecting mission planning, the

TLP choose to leave Belgium and move to Albacete Air Base, Spain.

Albacete

In 2024, the TLP had its 15th anniversary being based at Albacete. The base is shared with Ejercito del Aire (Spanish Air Force) frontline unit Ala (wing) 14, and its 141 Escuadron (squadron) flying the Eurofighter. Additionally you can find here a facility of Airbus Helicopters as well as the general aircraft maintenance organisation of the Spanish Air Force, MAESAL. When having a TLP flying course running on base, the other flight operations like from the homebased Eurofighters are focusing at the morning. This provides a lot of flexibility of the TLP mission which sees more than 30 aircraft taking of and landing in large patterns during the afternoon. TLP commander Colonel Cesar Oscar Acebes Puertas, refers to the large scale of its current organisation by mentioning that even with an on base hotel facility for 450 TLP participants, the TLP is making use of an approximate equal number of facilities at commercial hotels in the city of Albacete. The air base is located in the Castilla–La Mancha region, known from the old tales of the otherworldly knight Don Quixote in his fight against wind mills. Nowadays the air space over La Mancha is the training area of the TLP fighter pilots to make them capable to work together and re–act to real threats in potential conflicts.

Aims

Colonel Acebes explains that the TLP course aims at educating tactical fast jet aircrews in the joint environment of Composite Air Operations (COMAO). The TLP lectures and missions are designed for the junior tactical aircrew or individuals with limited COMAO experience, especially senior First Lieutenant or young Captain level with more than 500 flight hours on type and/or in role. Next to these junior participants, the course is also designed for support personnel which is likely to be involved in a COMAO in the future, including intelligence officers, fighter controllers and Command Control Intelligence Surveillance Reconnaissance (C2ISR) operators. The common TLP route progression of the courses starts with the Support Course, followed by the COMAO Synthetics Course and finally the COMAO Flying course.

The TLP obliged itself to 4 main tasks, which at first includes the preparation of NATO and allied forces flight leaders to be Mission Commanders and to lead coalition force air strike packages. Second to be mentioned is the instruction of allied flying and non–flying personnel in all matters related to tactical composite air operations. Furthermore, the introduction of new NATO partners and allies to NATO tactical air operations is a key task as well as the provision of tactical air expertise to NATO agencies.

The TLP achieves these tasks by training and instructing allied personnel in the flying and academic courses and providing an international forum to discuss tactical issues.

The 10 nations which participate in the TLP are entitled to send a number of students and participants to the respective course and have the right to influence the TLP's activities. Nowadays it is also common that other than the 10 named MoU nations are invited to join a TLP course as a guest. Samples of these invited countries include Switzerland, Poland, Turkey and Romania.

Portugal

Colonel Acebes mentioned that per January 2025 the list of the 10 TLP MoU countries was added with a new nation, as Portugal formally joined the organisation per that date. Next to the fact that Portugal will be entitled to send students to the future planned courses, the country will also provide staff to the organisation like experienced instructors. With the developing and increasing TLP community, the organisation expresses to have a flexible approach towards future course requirements. According Colonel Acebes it means that in the event of additional requests, his organisation will discuss how to meet such requests and will include considerations as how to physically accommodate aircraft and crews, developing new mission scenarios and adjusted operational planning.

FC 2024–4

On 11 November, the last Flying Course of 2024 started and scheduled to last until the 29th of that month. As normally scheduled, the first week is reserved for all academic elements of the course and includes furthermore 3 synthetic missions in a flight simulator. During the following 2 weeks, 9 live flying missions are scheduled. The TLP Chief Flying Branche, Lt. Col Fond, tactical name "Skid", informs that a day with a live mission start at 10.00 hours with a meteo, scenario and mission brief and continues with planning from 10.45. By 14.00 "stepping" will start and from 15.00 the take–offs. Return to base of the aircraft is starting from 16.45 and by 18.00 all aircraft should be back at Albacete. At 19.00 the planning debrief takes place and from 20.30 the execution debrief. Before the flight day is closed at 22.00, the last 15 minutes are reserved for the lesson identified and learned. The intense schedule also guarantees a prescribed crew rest of 12 hours before the next flight sequence is planned.

This edition had "Blue" forces formed by Germany with 8 Eurofighters and 2 Tornado IDS, Italy with 2 F–35A's and 2 Eurofighters, France with 2 Mirage 2000D's, the UK with 4 Typhoons and Greece with 2 Rafale EG's. The "Red" (opposing) forces had 2 German Eurofighters, 2 Italian Eurofighters, 2 RAF Typhoons, 2 French Mirage 2000D's and 2 Rafale EG's from Greece. Next to the above listed aircraft, the participating countries had based additional airframes at Albacete for back–up reasons. Air support assets included a Spanish C–295 for tactical transport, a civil Learjet 45 for radar jamming, a NATO E–3 AWACS for Command and Control and a Spanish MQ–9A RPAS. For helicopter duties like Rescue Mission, France had detached an EC–725 Caracal while Italy was present with 2 HH–101 helicopters.

New to the TLP were the Rafale's of the Hellenic Air Force from 332 squadron at Tanagra. The quartet single seaters were all marked with a blue–white checkered fin tip. Another first show to TLP were the F–35A's Lightning II's from 13 Gruppo–32 Stormo, based at Amendola, Italy and although the French Mirage 2000D's have been at TLP many times before, their RMV variants were rather new. The Delta D's from Nancy–Ochey air base are currently undergoing a Mid Life Upgrade programme, which, named in French "Renovation Mi–Vie" provides the RMV type addition. The upgrade includes amongst others updated avionics, a new gun pod and suitable to carry improved missiles and laser guided bombs. Lt. Col Fond, the TLP

Flying Branch Chief and French Rafale pilot, explains that every time a new aircraft type or weapon system is introduced to the TLP, the course syllabus is adjusted and new mission scenarios are developed. Also information arising out of wars and conflicts like the war in Ukraine, can be included to make new TLP scenarios. In this way the TLP course remains on track of all new developments and is able to adjust the scenarios with new elements to keep the course as realistic and challenging as can be. For the F–35 you can think of its extended flight range, making scenarios with a larger range possible, or making use of all information obtained by the powerful sensors of the F–35 for the other aircraft, as Lt Col Fond concludes.

The first Flying Course of 2025 recently took place while at the same time the second TLP FC, planned for spring time, was cancelled for unknown reasons, the next TLP course is expected to take place during September–October time frame.

Text and photos by Peter ten Berg

"Blue" forces

Number	Type	Country	Unit
8	Eurofighter EF2000	German AF	TLG 31 / 73
2	Tornado IDS	German AF	TLG 33
2	F–35A	Italian AF	13 Gruppo
2	Eurofighter EF2000	Italian AF	36 / 51 Stormo
2	Mirage 2000D / RMV	French AF	EC01 / EC02.003
4	Typhoon FGR4 / T3	Royal AF	29 Sqn
2	Rafale EG	Hellenic AF	332 MPK

"Red" forces

Number	Type	Country	Unit
2	Eurofighter EF2000	German AF	TLG 31 / 73
2	Eurofighter EF2000	Italian AF	36 / 51 Stormo
2	Typhoon FGR4 / T3	Royal AF	29 Sqn
2	Mirage 2000D / RMV	French AF	EC01 / EC02.003
2	Rafale EG	Hellenic AF	332 MPK

Support

Number	Type	Country	Role
1	E–3A	NATO / NAEW&CF	Command & Control
1	Learjet 35A	Germany / GFD	Jamming
1	C–295M	Spanish AF	Tactical transport
1	MQ–9A	Spanish AF	Intel & surveillance
2	HH–101A	Italian AF	Rescue Mission
1	EC–725	French AF	Rescue Mission

Soaring High: Inside the Turkish Air Force's Elite Pilot Training

In a world of constant geopolitical shifts and evolving aerospace technology, the Turkish Air Force (TurAF) stands at the forefront, meticulously crafting the next generation of aviators. With a fleet of modern aircraft and cutting–edge equipment, the TurAF understands the critical need for highly skilled pilots who can master contemporary tactics and techniques, anytime, anywhere. To achieve this, Turkey has cultivated a pilot training system, recognised globally, that not only nurtures its own talent but also trains pilots from allied and friendly air forces to stringent US and NATO standards.

The cradle of command: National Defence University Air Force Academy

The journey to becoming a Turkish Air Force pilot begins at the prestigious National Defence University – Air Force Academy. Here, aspiring pilots embark on an intensive four year programme that seamlessly blends rigorous academic and military instruction with invaluable practical flight training. Under the watchful eyes of seasoned instructor pilots, many of whom boast years of experience in various TurAF flight units, students take to the skies in T–41 aircraft.

The initial selection flights are a crucial hurdle: after 13 accompanied sorties with their instructors, promising candidates undertake their 14th sortie as a solo "alone flight". Throughout their academy years, they complete 15 T–41 flights and 7 glider flights, accumulating approximately 22–23 hours of flight time. The core objective of this foundational training is to meticulously assess each candidate's innate flying ability and characteristics.

Earning your wings: Graduation and beyond

Upon completing the demanding four–year curriculum, the fourth–year students proudly graduate with the rank of Lieutenant. This marks the official commencement of their pilotage training, the bedrock of the Turkish Air Force's comprehensive pilot education system.

2. Ana Jet Ussu (2nd Main Jet Base Command), Çigli

The real pilotage journey for these newly minted Lieutenants takes flight at the 2nd Main Jet Base Command in Çigli, Izmir, a vital unit under the Air Training Command. Here, they systematically progress through Initial, Basic, and Advanced training phases. Upon successful completion, they are strategically assigned to various operational squadrons. The Çigli base itself is a bustling hub, comprising five distinct squadrons.

123. Filo (123rd Squadron) Palaz: Where foundations are forged

The initial steps into jet flight training commence at the 123. Başlangıç Egitim Filo Komutanligi (123rd Initial Training Squadron Command), home to the SF–260D aircraft. Located just two miles west of the main base at Kaklıc Airfield Command, this squadron has been a training ground since 1989. The SF–260D, introduced in 1991, brought a faster and more modern edge to their training.

The focus here is on acclimatising pilot candidates to the aircraft and their new environment, significantly boosting their self–confidence. Beyond the cockpit, they are immersed in the discipline of aviation, learning about flight preparation and the paramount importance of flight training. This five month phase includes intensive landing and take–off drills, along with in–depth instruction on the SF–260D's unique characteristics. During this crucial period, pilots accumulate approximately 25 hours and 30 sorties, culminating in their first solo flights aboard the SF–260D.

122. Filo (122nd Squadron) Akrep: Mastering the skies

Upon successfully navigating initial training, candidates advance to the 122nd Squadron for their basic

training, transitioning to the more advanced KT–1T aircraft. This phase is a multifaceted programme designed to hone their skills across various critical areas:

Mission Phase: Emphasising advanced control techniques and aerobatics.

Instrument Phase: Training pilots to navigate solely by instruments in challenging weather conditions.

Formation Phase: Instilling the techniques of close formation flying, a skill vital for future combat operations.

Navigation Phase: Perfecting the art of precise point–to–point navigation using pre–planned altitude, time and direction data.

Night Flight Phase: Covering night vision, lighting systems and fundamental night flight principles.

Complementing the rigorous flight training, simulator exercises provide invaluable support, comprising twenty four weeks and sixty nine sorties. Upon successful completion of basic training, Lieutenants are then assigned to jet, helicopter, or transport squadrons, based on their preferences and the squadron's evaluations.

125. Filo (125th Squadron) Panter: Specialising in transport and rescue

For those chosen for helicopter and transport roles, advanced pilotage training continues at the 125th Training Squadron Command, utilising AS–532 Cougar helicopters and CASA–CN–235 transport aircraft. This squadron holds a unique distinction as the Turkish Air Force's sole unit providing comprehensive search and rescue, transport and pilotage training.

Candidates undergo an initial two week ground training, followed by approximately 90 hours and 59 sorties in Casa CN–235 aircraft. Successful candidates then go on to serve as pilots in the Air Force's transport and logistics squadrons. This versatile squadron is also instrumental in all–weather, day–and–night search and rescue operations across land and sea.

Upon completing advanced training, transport pilots specialise further into C–130, C–160 and CASA–CN–235 aircraft. C–130 and C–160 pilots proceed to combat readiness training at the 221st and 222nd Squadrons in Kayseri, while CN–235 pilots continue their training at the 212th Squadron in Ankara. Advanced Transport Training spans twenty four weeks and fifty nine sorties. Helicopter pilots, meanwhile, continue their combat readiness training within the 125th Squadron, with their advanced training consisting of twenty four weeks and fifty one sorties.

121. Filo (121st Squadron) Ari(Bee): The path to jet combat

For those destined to become fighter or fighter–bomber pilots, the 121st Jet Training Squadron Command provides all the essential skills and knowledge required for jet combat. This demanding eight month programme dedicates two months to academic study and six months to intensive flight training.

Advanced Jet Flight training involves approximately 70 sorties including 12 crucial solo flights. The T–38M aircraft used in this squadron are central to this phase. The primary focus for candidates is to master aerial control of the aircraft and execute safe landings. They also receive extensive training in formation flying, learning to control aircraft just a meter apart in the air. Instructor–led flights cover instrument flying, low altitude, and night operations, while solo flights encompass fundamental formation, contact flying, advanced formation, and solo night flying. Full–featured dual cockpit T–38 simulators provide vital support. Notably, the T–38M is the first aircraft on which pilot candidates experience their solo supersonic flights.

Upon completing their training at the 121st Squadron, pilots officially earn their Pilot Wings and are then assigned to fly F–4E 2020 or F–16C aircraft. F–4E pilots continue their combat readiness training at the 111th Squadron in Eskisehir. F–16C pilots, however, continue their combat readiness training, focusing on advanced techniques and tactics, with T–38M aircraft at the 121st Squadron.

Transition to combat readiness

This advanced stage of training combines 69 hours of academic simulator training with approximately 32 hours of flight training. Flight training is divided into two crucial

areas: Air–to–Air and Air–to–Ground. In Air–to–Air scenarios, the focus is on engaging with air–to–air missile threats, while Air–to–Ground training centers on air–to–ground munitions and missiles. The modernised T–38M aircraft feature a Removable Memory Module system, allowing flight data and conversations to be recorded and reviewed in 3D after each sortie, providing immediate feedback on errors and areas for improvement.

The power of simulation: Replicating reality

The Turkish Air Force's commitment to cutting edge technology is exemplified by its state–of–the–art simulator facilities, developed and operated by the Turkish company Havelsan since 2013. The Simulator Squadron Command boasts an impressive array: 4 KT–1T Full Mission Simulators, 2 KT–1T Instrument Flight Simulators, and 4 T–38M Full Mission Simulators. These advanced simulators, some featuring rare dual cockpit designs for joint instructor–student operations, run for twelve hours daily, with each flight considered an actual flight.

Simulators enable training across various flight profiles, including familiarisation, visual, instrument, navigation and night flights for KT–1T aircraft, with additional formation flight training for T–38M aircraft. They can also simulate all weather conditions and emergency scenarios. This invaluable resource has led to significant reductions

in live flight sorties: 15–12% in Basic Flight Training and 20–17% in Advanced Training. All conversations and flight phases are meticulously recorded.

Before and after each simulator flight, a 3D system allows students and instructors to conduct detailed briefings and debriefings, enabling a 3D review of all events and immediate error identification. Impressively, networking between simulator rooms allows pilots to conduct synchronised flights, even meeting each other in the virtual skies. With a remarkable 90–95% resemblance to real aircraft systems, continuous feedback from instructors and students ensures the simulators remain

highly accurate, with Havelsan teams making immediate corrections as needed. Future developments aim to provide instant audible or visual error warnings to students.

124. Standardise Filo Komutanlıgi (124th Standardisation Squadron Command)

Maintaining consistent quality and standards across all fixed and rotary–wing aircraft training for newly graduated Lieutenants is paramount. This requires instructor pilots to possess the same exceptional knowledge and training discipline. Experienced pilots joining the squadrons undergo rigorous selection and examination processes, with successful candidates assigned as instructors at the 124th Squadron Instructor Training, Standardisation, and Instrument Squadron.

A key responsibility of the Standardisation Squadron is conducting periodic check flights for all instructor pilots in the Çigli training squadrons, ensuring a uniform high standard of training. Furthermore, students identified with low performance by squadron instructors undergo final check flights with standardisation pilots. The outcomes of these flights can lead to significant decisions, even the termination of a student's piloting career, underscoring the critical role of this squadron.

The future of Turkish Air Force training: Innovation in the skies

The Turkish Air Force is continuously investing in the future of its training fleet, with several exciting projects on the horizon.

MFI 395 Super Mushshak aircraft for the 123rd Squadron

In 2016, Pakistan Aeronautical Complex won a tender to supply a more modern and highly acrobatic two seater training aircraft to the Turkish Air Force. A contract for 52 MFI Super Mushshak aircraft was signed in May 2017. The first aircraft, tail number 21–001, was delivered in 2022 for testing and evaluation, and deliveries are ongoing.

These Super Mushshaks will initially replace the venerable Cessna T–41D aircraft, which have faithfully served the TurAF since the early 1970s and are nearing the end of their operational life. T–41s are currently used for Air Force Academy student selection flights. In the future, the Super Mushshaks are expected to also replace the SF–260D aircraft used in initial training. This standardisation across student selection and initial training will not only reduce costs but also enhance training quality and standards through the use of a more advanced aircraft.

Hurkus project: A homegrown training revolution

Turkish Aerospace Industries (TUSAS) has developed the Hurkus, an advanced training and light attack aircraft tailored to the TurAF's needs, capable of fulfilling roles from initial training to challenging operational conditions. Designed as a single engine, turboprop training aircraft

with tandem seating, the Hurkus project has since expanded to include light attack and reconnaissance variants.

Building on this success, TUSAS has initiated the Hurkus II project, aiming to further enhance the aircraft's capabilities. The Hurkus II boasts a weight reduction of 400–500 kg compared to the original model, leading to improved performance and extended endurance with less fuel. The Turkish Air Force has placed an order for 55 Hurkus II models, with 15 scheduled for delivery by the end of 2025 and the remainder expected in 2026 and 2027.

Hurjet project: The next generation of jet training

The Hurjet Project is TUSAS's answer to the Turkish Air Force's need for new jet trainers and the modernisation of its existing fleet. This manned jet training and light attack aircraft project, a testament to Turkey's growing domestic defence industry capabilities, began in 2017. After extensive engineering and R&D, the first prototype began production in 2019, undergoing various avionics and flight control system tests, as well as ground tests. Following successful ground tests in 2022, Hurjet's flight test preparations commenced.

The highly anticipated maiden flight of the first prototype took place on April 25, 2023. Since then, Hurjet has achieved an impressive 179 sorties and over 118 hours of flight time, successfully completing flight control systems, air data systems, and other aircraft system tests. In October 2024, Hurjet further demonstrated its capabilities by achieving supersonic flight, exceeding Mach 1.01.

The Turkish Air Force has ordered 16 Hurjet Jet Training and Light Attack Aircraft, which feature a single engine, tandem seating, and modern avionics. TUSAS aims to deliver the first Hurjet's to the Air Force Command in 2026, with a production target of two per month starting from 2025. These aircraft are planned to replace the TurAF's current T–38M jet trainers and be used for various operational missions. Furthermore, there are plans to replace the NF–5A and B aircraft, currently used by the Turkish Stars Aerobatic Team and nearing the end of their service life, with Hurjet in the future.

International collaboration: Spain joins the Hurjet family

In a significant international development, a Memorandum of Understanding was signed between Turkey and Spain on 20 December 2024, for the procurement of 30 Hurjet aircraft. This agreement marks a crucial step for Hurjet's potential entry into the Spanish Air Force inventory.

Article and photos: Onur Kurc and Tayfun Yasar

NATO summit 2025 Netherlands

The Netherlands, city of The Hague, hosted the NATO Summit 2025. In addition to heads of state, ministers of defence and foreign affairs also attended the annual gathering. Due to the brief visit by the President of the United States (POTUS), Donald J. Trump, leaders from global partner nations–Australia, Japan, and South Korea–chose not to make the journey.

Support for the POTUS visit was provided by seven AMC C–17A Globemaster III flights. Two C–17s from the 437th Airlift Wing transported two VH–3D Sea King helicopters. The remaining aircraft delivered "The Beast" (the presidential limousine) along with other equipment, material and vehicles. During their stay at Schiphol International Airport, the Sea Kings conducted one test and reconnaissance flight.

Most visiting delegations arrived on 24 June and departed the following day.

Article and photos: Manolito Jaarsma
Instagram: Phantomaviation
Twitter: @Phantomaviation

Perhaps the last visit by a Spanish Air and Space Force A310 to The Netherlands as they will be replaced by the A330(MRTT).

Three A319s are operated by the Italian Air Force of which one visited Schiphol on 24 June.

The Polish Air Force VIP fleet, including three B–737–800s, is based at Warsaw and assigned to 1.BLTr.

26 June saw the arrival of three USAF C–17A's bringing the "beast" and other material for the visit of POTUS.

After a flight of about seven hours Air Force One is about to touchdown on runway 24.

The Portuguese Air Force recently acquired a Falcon 900B but flew to Schiphol with their Falcon 50 of which three are in service.

Hellenic Air Force 352 352 MMYP (352nd VIP Transport Squadron) operates a ERJ135LR, Falcon 7X and pictured Gulfstream G–V.

Another Italian Air Force visitor was the C–550 (G550) assigned to 71° Gruppo, 14° Stormo stationed at Pratica di Mare near Rome.

On 19 June the second VH–3D Sea King arrived at Schiphol and is seen being unloaded from a 437th AW C–17A

A VH–3D captured before turning towards runway 22 after concluding its test / reconnaissance flight.

The Unsung Hero of Walong

The Life and Times of Lieutenant Bikram Singh


SOURCE: FAMILY OF LT BIKRAM

"I have already killed many to avenge my comrades. I will kill more till the bastards finish up". These were the words of Lt. Bikram Singh in his last letter home. Bikram was born on 30 November 1938 in a village called Jaroda Jatt to Vidhyawati and Ranbir Singh who was an employee of Punjab Agriculture Department and son of a retired Sub Inspector Badam Singh who lived in Sialba in Ropar.

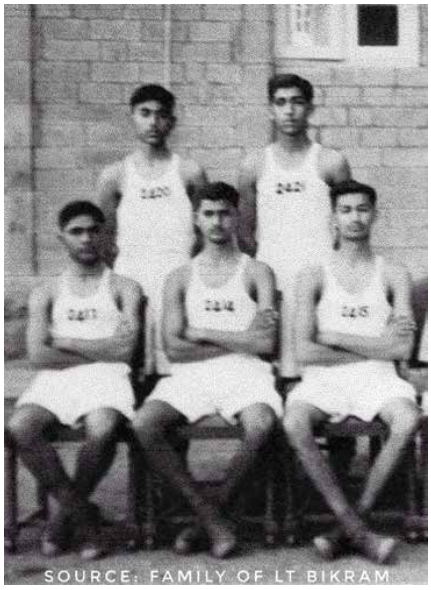
Bikram Singh belonged to the Rathore Rajput community and his ancestors were from Bijaynagar in Rajasthan. Bikram had eight siblings, four brothers and four sisters. He received his primary education at Hoshiarpur where his father was posted. He passed his Matriculation examination in 1954 from Government High School, Karnal and later he joined Government College, Hisar as a student of F.Sc (First year Science). Bikram was a bright and sincere student; he was also a talented sportsman. He was a good hockey player in his school and college days. During his F.Sc his father once went to an astrologer with Bikram and the astrologer prophesied; this boy will join the Army and also said "Yeh Ucch Koti ka Sainik Banega Parantu iski umra ka Choubisva varsha bhaari hoga". Subsequently, Bikram applied for admission in the National Defence Academy, Khadakwasla, Pune (NDA) and after about an year in college, he was selected for training in the NDA.

He joined NDA in January 1956 where he did extremely well in sports and academics. In NDA Bikram became a good polo player. With his team in NDA he won a prize in tent pegging at Poona Horse Show. In December 1958 Bikram passed out from NDA and joined IMA. He was a very dedicated and determined cadet by whom all the instructors were impressed. In December 1959 Bikram met Lt Gen K Bahadur Singh of The Kumaon Regiment. The General impressed by Bikram's personality asked him about his preference, Bikram said I want to join the Rajput Regiment but the General wanted him to join The Kumaon Regiment. Bikram passed out from IMA and was commissioned into the 6th Battalion of The Kumaon Regiment in December 1959.

He joined his paltan in Ramgarh and in the paltan boys fondly used to call him as Dara Saab. Later in 1961 he moved to Ukhrul in Nagaland from where Bikram came home last time and was recalled from leave in January 1962 as his paltan was moving to Walong in March 1962 to relieve 2nd batallion of The Rajput Regiment.


SOURCE: FAMILY OF LT BIKRAM


SOURCE: FAMILY OF LT BIKRAM


SOURCE: FAMILY OF LT BIKRAM

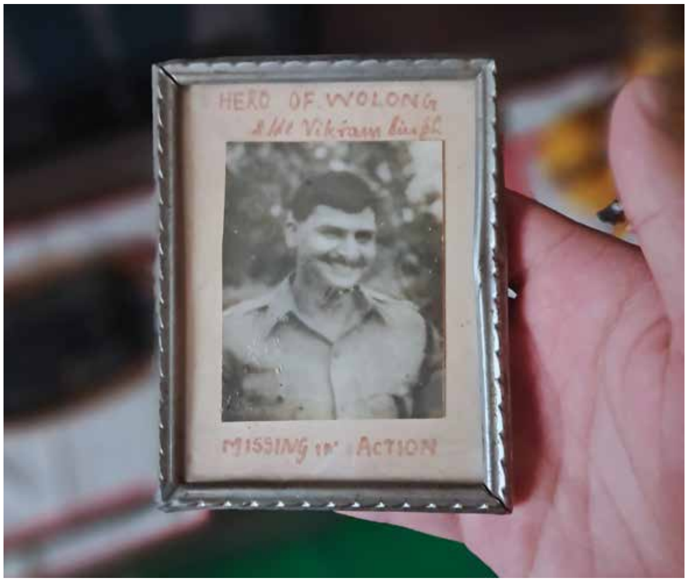
The Unit was in dense forests and mountains of NEFA; there was no clue of the upcoming conflict. All four companies of 6 Kumaon took positions near the Indo–China border (McMohan line) and Bikram used to go on long patrols to survey the Chinese positions and build up. The Chinese movement in the Walong sector intensified in the month of September. The Indo–China war started on 20 October 1962 when in the Walong sector, the first Chinese attack came with a sudden surprise. The Kumaonis fought well but they had to withdraw to Kibithoo and later on, on 23 October to Walong defence position. Bikram was commanding the D company and was asked to lay a screening position on Ashi Hill which was on outskirts of Namti (about 5 kms from Walong). The company prepared defenses but the same day his Company was ordered to move back to the south bank of Nam Ti (which is one of the tributaries of the Lohit river) and then destroy the foot bridge over Nam Ti so as to slow down the Chinese advances towards Walong. Here, Bikram planned an ambush on the enemy and removed some planks of the footbridge on Nam Ti. In the darkness of the night, the Chinese reached Nam Ti and, unaware of the removed planks, came forward, the leading soldier fell into the nullah. With this, the Chinese soldiers lit up their lights to see what had happened, this gave a chance to Bikram's company to destroy the enemy. He fired a very light and ordered his mortars and LMGs to fire upon the enemy. This caused heavy damage of about 200 casualties on the enemy. Bikram's company suffered 9 casualties in this operation. After this successful operation, Bikram and Delta Company were ordered to return to Walong. Bikram used to write letters to his family members from Walong. His letters showed that he cared for his brothers and was concerned about their education. In one of his letters to his brother–in–law, he wrote "you must be aware of the present situation. Well, let us see what happens next – Win or Die." Similarly, in his last letter to his father he wrote "Received your letter today. I am OK, Happy and fine. Don't worry at all. Traditions of our race can never be forgotten. I have already killed many to avenge my comrades. I will kill more till the bastards finish up. Look after Kaku, Narender and Surinder.

Love to Anita, Sunita, Jassu and little one. How is Birji, Crops must be good. I will keep writing to you regularly. Do not bother much. Have faith. Nothing will happen."

On 11 November, 6 Kumaon was ordered to capture Yellow Pimple and Tri Junction which were taken over by the Chinese. The unit launched an attack with two companies on 14 November, the fight went for 6 hours and in this attack the Indian side suffered heavy casualties and the attack failed. During this attack, Bikram was holding an important post Point 2847 a.k.a. "The West Ridge" which is a stone–throw from Yellow Pimple but importantly was overlooking the Walong landing ground (ALG). Loss of his position would mean that the Chinese could take control of the Walong ALG and essentially cut supplies to Walong. On 16 November 1962, approximately 300 Chinese surrounded him on three sides. The fourth side was almost a cliff. He was in direct contact with the Brigade Commander Brigadier NC Rawlley, MC. He was asked to hold the position as long as possible to which he replied I could hold it for half an hour but none of us would return. He held the post for one and a half hours and under his courageous and gallant leadership the men fought until they were outnumbered and overrun. Bikram's last message to his Brigade Commander over the wireless was that he would hold on and would not withdraw. He has fulfilled these words to the limit.

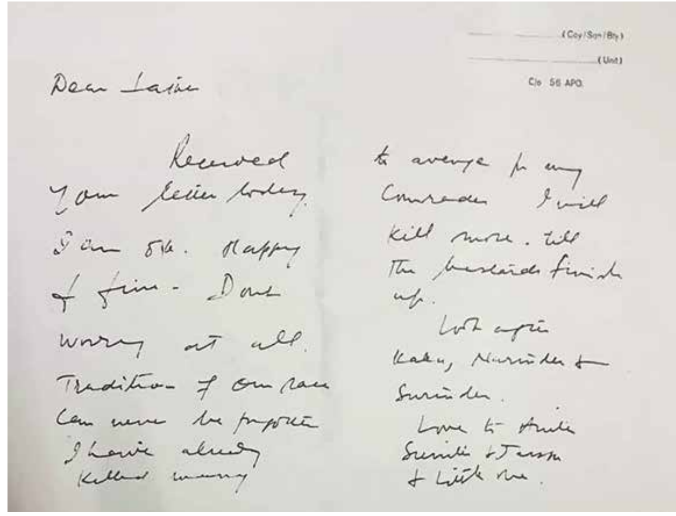
He fought till last man last round. In this battle 107 men of Delta company died fighting gallantly including Lieutenant Bikram Singh and only 17 soldiers including 1 Junior Commissioned Officer managed to break the enemy onslaught and escape. As per the eyewitnesses, Lt. Bikram Singh was amongst the last men standing on The West Ridge and decided to stay back and fight to the end. Chinese historians have also recorded the battle fought on West Ridge on 16 November 1962 in detail and admit that they suffered heavy casualties in this battle.

The author standing next to Ashi Hill.



Overall, 6 Kumaon suffered heavy casualties in the Battle of Walong. Many were killed, many were wounded and some were taken PoW including the Commanding Officer and the 2nd in Command. Later Bikram's family received a telegram stating Lt Bikram Singh missing/ believed to be Killed in Action. In December 1962, the family received letters from the Brigade Commander and Colonel of The Kumaon Regiment, Lt Gen K Bahadur Singh both letters stated that jawans who escaped saw Bikram being hit by a burst of fire and falling forward. Bikram's death was confirmed but there was no evidence of his mortal remains. His family waited a long time with no update on Bikram's body. Later in March of 1963 his father was handed over the ashes of his brave son. Lieutenant Bikram Singh was recommended for a gallantry award but his valor was shrouded in the thick fog of War.

It is said that Bikram's actual mortal remains were found in December 1986 on The West Ridge by a patrol of 6 Assam Regiment who found 67 bodies along with their belongings such as helmets, mess tins, rifle magazines and used casings etc. The Assam Regiment cremated the bodies and made a memorial of unknown soldiers using the helmets they found on the site. This memorial is known as Helmet Top and is a short drive from Walong Town. Bikram's two brothers Raj Singh and Narender Singh


(Coy/Sqn/Bty)
(Unit)
C/o 56 APO

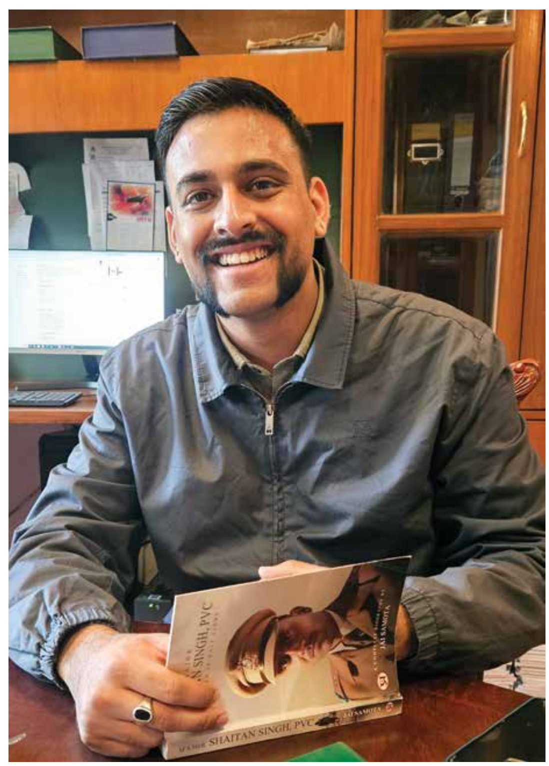
Dear [illegible]

Received your letter today. I am OK. Happy & fine. Don't worry at all. Tradition of our race can never be forgotten. I have already killed many to avenge for my Comrades. I will kill more, till the bastards finish up.

Lots of love Kaku, Narinder & Surinder. Love to Auntie Sunita & [illegible] & little one.

joined the Army in December 1963. Narender Singh was proudly commissioned into his brother's paltan 6 Kumaon and participated in the 1965 War. He was later transferred to The Border Security Force and retired as an Inspector General.

Bikram's brave deeds and sacrifice till date remains unsung. He fought like a true Hero. In Gen K Bahadur Singh's words "Bikram died but like a gallant Rajput on a battlefield".



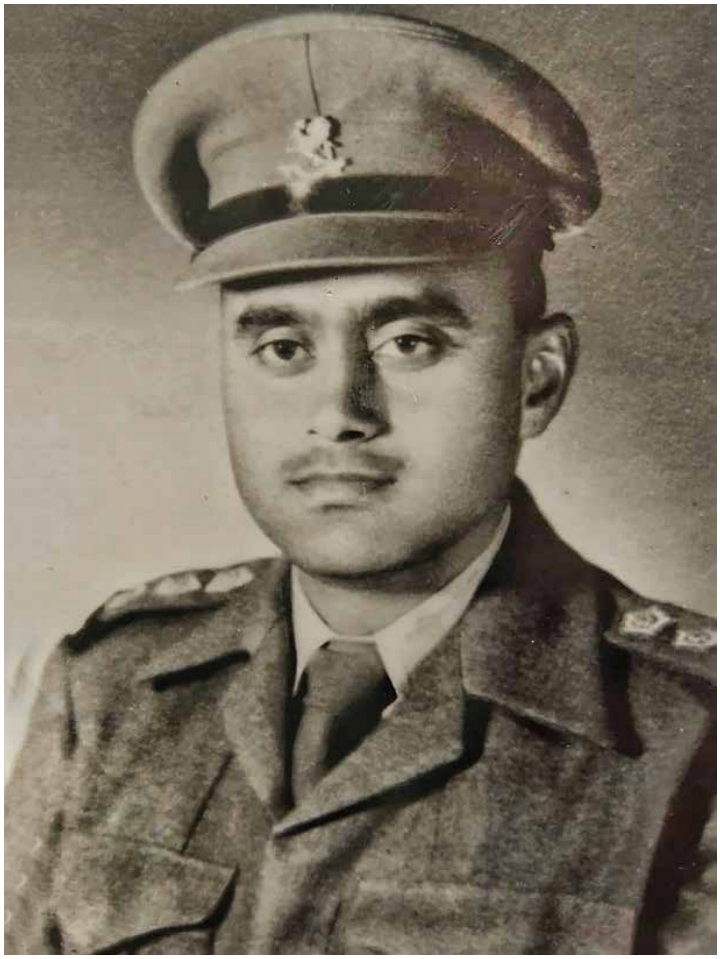
Article by Jai Samota

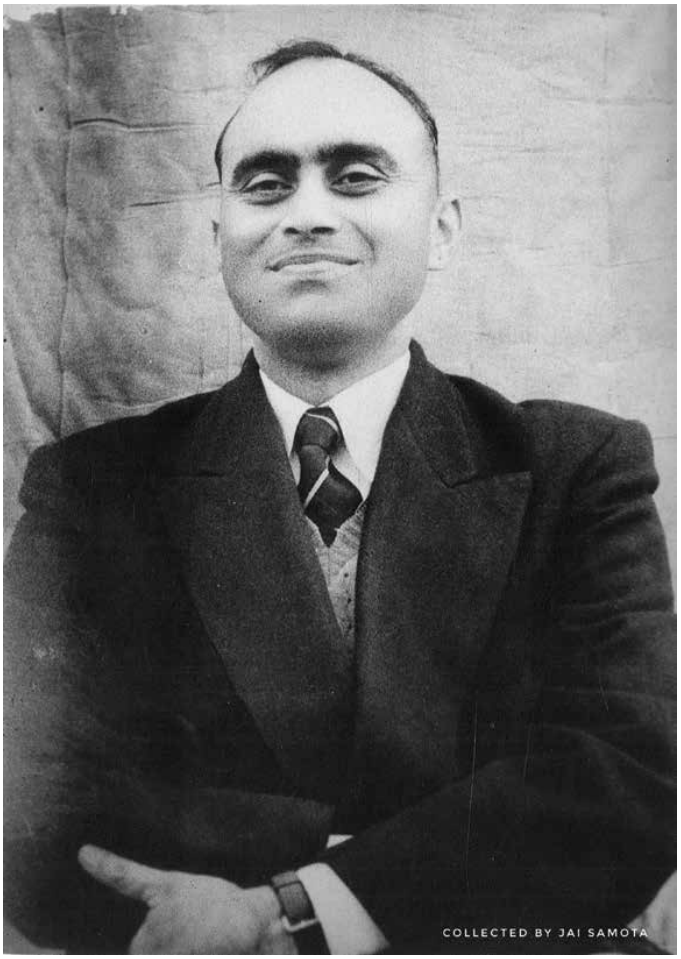
X: @jai_samota

A biographer specialising in the life of Major Shaitan Singh, PVC (P), has conducted in–depth research into the Ladakh Theatre of the 1962 War. This research will soon be published in a dedicated book, providing a comprehensive history of this critical period in military history.

Beyond The Param Vir Chakra

The Life and Legacy of Major Shaitan Singh





Early life and family background

Major Shaitan Singh was born on 1 December 1924 in the village of Banasar in Phalodi tehsil of Jodhpur district to Lieutenant Colonel Hem Singh Bhati and Mrs. Jawahar Kanwar. Shaitan Singh was the eldest of 4 brothers and 2 sisters. Shaitan Singh's father, Lt Colonel Hem Singh was an officer in the Jodhpur State Forces. He was a brave and courageous soldier. Lt. Colonel Bhati was born into a common Rajput family, in 1906 he started his services as a soldier in the Jodhpur State Forces. Due to his merit and hard work, he was soon promoted to higher positions. He was an excellent marksman and an equestrian. He also served in the First World War as a part of the British Army. His contribution in the war as a soldier and a leader was invaluable. He was awarded the Order of the British India (OBI) by the British government. The title of Haathi Saropao was conferred on him by the Maharaja of Jodhpur for his valour during the wartime.

The Maharaja also offered to give him two villages in the Pali district, but being a humble and simple man, he refused. He retired from the Army in 1935 and took a leap into civilian life.

Shaitan Singh was said to be the most polite and disciplined child in his family. He was not only a top performer in academics but was proficient in sports too. Shaitan Singh and all his brothers received higher education. Shaitan Singh's second brother Surajbhan Singh studied law and in 1952 he was elected as the sarpanch of the village. Third Brother Lal Singh did B.Sc. from Agra and at the same time he became a renowned athlete of national level and was also selected as the best marksman of NCC. Youngest Brother Prithvi Singh was educated up to BA and was considered as a good player in football and basketball, later he joined BSF and retired as a Commandant. All four brothers valued education as well as took sports very seriously.

Education

Shaitan Singh completed his primary schooling from Sumer School, Jodhpur and later he got enrolled in Rajput

High School Chopasni. The Chopasni Senior Secondary School was established by Lieutenant General Sir Pratap Singh Idar, of Jodhpur in 1875 to impart good education to Rajput students. He studied in Chopasni School up to his matriculation. Chopasni School is the only civil school in India whose students got highest gallantry awards of their times, Daffadar Govind Singh, a student of Chopasni, was awarded the Victoria Cross in World War I and Major Shaitan Singh was awarded the Param Vir Chakra in 1962. Shaitan Singh used to pay a lot of attention to studies. His classmates say that he was a reticent person with no sense of anger. Most say that he never expressed anger or rage towards anyone, perhaps only once in his life, the result of which is known to the whole world.

Once, a teacher noticed him in a class said that this child speaks very little and asked his name, Shaitan Singh told his name which the teacher was surprised to hear and said this boy's demeanour is the exact opposite of his name and the whole class burst out into laughter. The teacher then went on and prophesied that at some point in his life, this boy will prove the mettle that his name carries. The teacher's words became true and Shaitan Singh did something that nobody ever imagined.

Of all the sports, he loved football the most. He used to play football for hours and it is said that there was no other footballer like him in the entire school. He would hit the ball far enough in one kick. Impressed with his performance, the selectors made him the captain of the team, indicating that there was no lack of leadership in him. Shaitan Singh became a national level football player. In 1942, he represented his school team at the national level Labhshankar Football Challenge and finished second. As football became an integral part of his life, he continued to play football even after school and participated in national level tournaments.

After completing school education in 1943 many of his friends joined the army but he didn't. He wanted to become a lawyer, so he enrolled himself in Bachelor of Arts in Jaswant College in Jodhpur which was established by Maharaja Jaswant Singh in 1893. He completed his Graduation in 1947. In 1943 Shaitan Singh got married to Sugan Kanwar, the couple had one son named Narpat Singh on 26 October 1946.

Military career

After completing graduation, he wanted to pursue a degree in Law and probably would have done so but he coincidentally met Colonel Mohan Singh Bhati (Last Commandant of Durga Horse) during a football match. Col Mohan asked Shaitan Singh what do you want to become in future to which Shaitan replied I want to become a lawyer, Col Mohan replied you should become a soldier like your brave Father and Shaitan after giving it a thought agreed to join forces. Later Col Mohan took Shaitan as a State Officer Cadet into Durga Horse on 2 November 1947. Durga Horse, which was a Royal Bodyguards unit, a Squad of nearly 90 men raised in mid–forties to continue the Horse Cavalry after Jodhpur Lancers became a mechanised force. Shaitan Singh served in Durga Horse for nearly one and a half year. In 1949, when State Forces were being incorporated with the Indian Army, Shaitan Singh went to Col Mohan Singh and asked him what should I do now, should I leave the Army and go back to village or continue to serve? Col Mohan Singh exhorted Shaitan and told him not to leave Army. Later Shaitan Singh joined Officers' Training School, Poona's Officers' Supplementary Course no. 3 on 23 July 1949, where he did his induction training till 3 September 1949. After this training he was commissioned as a Second Lieutenant into Kotah Umed Infantry which too was a state force unit of Kotah State and was later merged with three other units to form 9 Grenadiers, Mewar. Shaitan Singh served in Kotah Umed Infantry till 31 March 1951.

Association with Jodhpur Sardar Infantry/20 Rajput/ 24 Mechanised Infantry

Soon afterwards, when State Forces were officially amalgamated with the Indian Army on 1 April 1951. 2/Lt Shaitan Singh joined Jodhpur Sardar Infantry (now 24 Mech Inf) which was located in Jasai, Barmer under the command of Lt Col Dhonkal Singh. Shaitan Singh had some good friends there in the unit as Sardar Infantry had a good lot of officers from Jodhpur itself with the likes of Lt Hari Singh who became a Brigadier and was awarded AVSM, Lt Bijai Singh who commanded 13 Grenadiers in 1971 War and Lt Mal Singh, who later became Lt Col and was awarded the Ashoka Chakra Class III for his gallant deeds in Diu Liberation Movement of 1961. Shaitan Singh served in Jodhpur Sardar Infantry till August 1951 and later he was sent to 6 Kumaon on permanent transfer.

He did a tenure with 6 Kumaon in Shillong which was an extraordinary tenure of 6 Kumaon. In October 1953 he was sent to Kumaon Regimental Centre, Ranikhet. On 25 May 1954 he received his permanent regular commission in the Indian Army. In 1955 he rose to the rank of Captain. He was always benevolent towards his fellow officers and everybody liked to have his company. He served in KRC as training company commander and later as Quartermaster.

In October 1957 he was sent to GOC Assam HQs (now 23 Inf Div) as a Staff Officer. The division was looking after the operations going on against the Naga insurgency and there Captain Shaitan Singh also served as staff captain of Maj Gen Bikram Singh.

Lt Gen Saklani once told Brig RV Jatar; a few months before the Rezang la Battle a palmist saw Maj Shaitan's palm and told him in (then Capt.) Saklani's presence that something extraordinary, out of the world, would happen soon to make him famous. The palmist's words came true with Maj Shaitan's glorious death in battle.

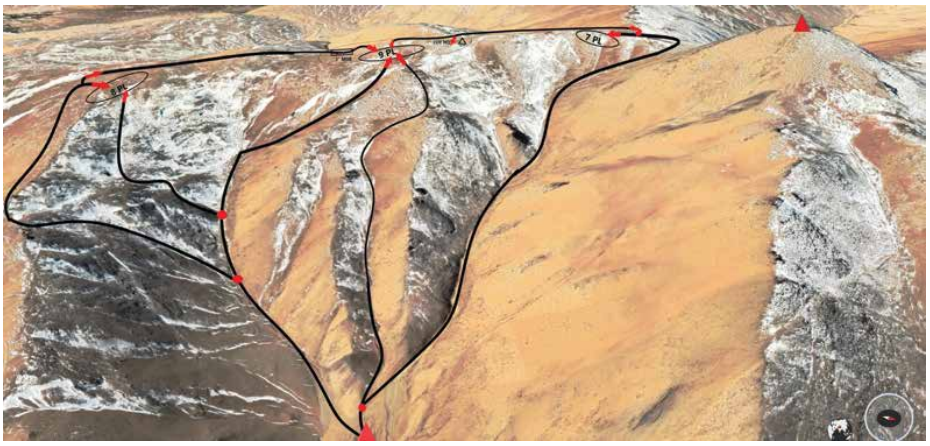
A few days before the Rezang la Battle, the then Commanding Officer called the Company commanders including Maj Shaitan at which Maj Shaitan for once raised his voice over lack of defence material like artillery support, mines, MMGs and defence stores for constructing bunkers. The Commanding Officer also raised his voice and promptly quietened him. After the meeting, Maj Shaitan met each of us personally and apologised "for spoiling the atmosphere in the meeting"! His demand was perfectly legitimate but then that was his mind set as a perfect gentleman.

Battle of Rezang La

Before the War started 13 Kumaon was stationed at Baramulla along with 3 Para (Kumaon) and 1 Jat LI, so when the unit received orders to move towards Chushul, two companies were sent and on reaching there Charlie Company was ordered to occupy Rezang La and to prepare defences there. Maj Shaitan Singh was the Quartermaster of the Unit so when he came to Chushul after discharging his duties in Baramulla, he was sent to Rezang La to command the Charlie Company.

Rezang La is a massive feature, approximately 5,180 metres high. It was defended by Charlie Company of l3th Battalion the Kumaon Regiment. Deployed over a frontage/ stretch of about 2 kms, it had a strength of 118 all ranks. The company was commanded by Major Shaitan Singh. The Company consisted of No. 7, 8 and 9 platoons. The ground required to be covered at La Rezang La was much larger than what could be covered by the troops available.

The company administrative base, with its cook house, reserve rations and clothing was located at the Nallah below. The company position had been prepared well within the time limits and resources available.



On night of 17–18 November around 2200 hrs, a heavy snowstorm was leashed in the battle zone for nearly two hours. After the storm, visibility improved to 600 meters. At 0200 hrs, LP ahead of 8 Platoon observed a large body of Chinese soldiers swarming through the gullies at about

Lt Col Hem Singh, OBI father of Major Shaitan Singh, PVC.

700–800 meters moving from the pass. Lance Naik Brij Lal the LP commander ran back to Platoon Headquarters to in inform this unusual development. He, with his Section Commander Hukam Chand and one LMG were rushed as reinforcement to the post. By then the Chinese had advanced with in firing range of small arms from the post. The LP fired a pre–determined red Very Light signal along with long bursts of LMG fire, warning the C Company to 'stand to' in their dug–out positions. Similarly, 7 Platoon's LP on the forward slopes also saw Chinese forming up and the entire C Company was alerted. Maj Shaitan Singh immediately contacted his sub–unit commanders on the radio communication who confirmed that all ranks were ready in their battle positions. Since the paucity of troops had caused wide gaps in 7 and 9 Platoon localities, he also ordered 9 Platoon to send a patrol to ascertain the situation. The patrol confirmed massive Chinese build up had taken place through the gullies.

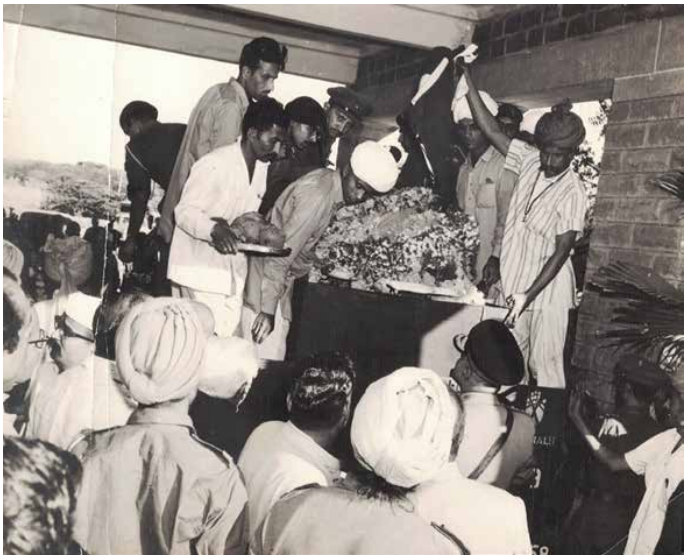
All ranks of the Charlie Company with their fingers on

Football team of Durga Horse.

triggers, waited patiently for the impending major frontal attack on their positions around first light with improving visibility. Around 0500 hrs, the first wave of the Chinese were spotted through their personal weapon sights by every Ahir manning the defences and hail of LMGs, MMGs and mortar fire greeted the enemy. Scores of the enemy died, many were wounded but rest duly reinforced continued to advance. Soon all the gullies leading to Rezang La were full of Chinese corpses. Wave after wave of the Chinese launched four more attacks that were beaten back that dwindled defender's strength and ammunition as many Ahirs fell fighting. As the fifth attack was launched, Naik Singh Ram, a wrestler of repute led his comrades with bayonet charge killing 6–7 Chinese single handidly till he fell to martyrdom. By about 0545 hrs, the Chinese frontal attack was beaten back and failed.

By now, the Chinese realised Rezang La was not a cake walk and changed their plan. Rezang La was resorted to heavy artillery shelling and to destroy field fortifications they used concentrated fire of 75 mm recoilless (RCL) guns brought on wheelbarrows from the flanks and 132 mm rockets. The Chinese shelling was a spectacular display of fire power against defenders who had no artillery support and no bunker on the Rezang La feature. In between, Maj Shaitan Singh was hit by enemy bullets in his arm but without caring of his own safety he continued to fight.

The Chinese started regrouping for an attack on 7 Platoon positions that had no survivors. A little distance away Naik Sahi Ram the only survivor detached from his platoon waited for the enemy to assemble and let them have it with accurate LMG fire. The Chinese dispersed and Sahi Ram waited for the next wave that came with RCL guns and blasted his lone firing position. Major Shaitan Singh regrouped his dwindling assets to charge the advancing Chinese. Since all the platoon positions had been overrun with no survivors, the enemy was re–grouping to assault the C Company Headquarters after heavy pounding. While moving from one–gun position to other, motivating his men, a burst of fire also hit Maj Shaitan in the abdomen. The remaining two men Jai Narain and Phool Singh picked him up and continued to rush downhill towards the company base, now and then taking cover behind boulders, to escape the Chinese fire. Major Shaitan Singh had become unconscious with the loss of blood. Life was fast ebbing out of him. For a moment he regained consciousness. Turning to the loyal jawans who were risking their lives in trying to carry him, he said that they should leave him alone and save their lives. Reluctantly the men obeyed. 'Tell the battalion, how well the company fought' were the last words heard from this brave soldier. With this he breathed his last. Three months later his body was found exactly in the same place where he was left. The snowy pinnacles of Rezang La had stood helplessly by watching this unequal match of 'so few against so many'. It was all over by about 8 a.m.



Harphool Singh led 3 survivors to fight and stop enemy's onslaught till martyred. Ram Kumar's 3 inch Mortar Section having coughed all its ammunition was ordered to be disabled and fire plans and maps destroyed less they fell in the Chinese hands. As Ram Kumar was disabling his mortars, he was hit by rifle fire from the Chinese 20 yards away. Though wounded, he took position in his command post and as the Chinese peeped in, he pumped bullets with his bolt action .303 rifle and killed many of them. The remaining Chinese hurled hand grenades to silence him and left. After many hours profusely bleeding, he regained consciousness and painfully trekked back to Battalion Headquarters to narrate the chilling, gallant untold story of the Rezang La Battle for the posterity. Silence of war engulfed Rezang La as the last round had been fired and the last soldier bled to martyrdom. Neither any help or reinforcements were asked for nor could any be provided to C Company.

Charlie Company's soldiers kept their promise of fighting till the last bullet and last breath. Out of a total of ll8 all ranks, one officer, 2 JCOs and 105 other ranks laid down their lives. One JCO and 4 ORs were taken prisoner. Of the five prisoners, one later succumbed to his wounds. Only four managed to return alive from the ghastly hell at Rezang La, on 18 November.

Maj Shaitan Singh was awarded the Param Vir Chakra, the three platoon commanders, Hari Ram, Ram Chander and Surja and five other ranks were awarded Vir Chakra.

Deceased body of Major Shaitan Singh at Rezang La.

Four received the Sena Medal. Except for four awards all were posthumous.

Aftermath

In January 1963, a local Ladakhi shepherd wandered over the Rezang La feature. He was amazed by the awesome war specticle of soldiers frozen to death but still holding their damaged weapons. Their weapons were mostly with empty magazines and bulged barrels due to excessive firing.

A month later in February 1963, the first Indian party of International Red Cross and Indian Army visited Rezang La found 97 bodies with multiple splinters and gunshot wounds frozen to death with weapons in their hands in the shattered trenches. Nursing Assistant Dharampal Dhaiya had a morphine syringe and a bandage in his hands.

Major Shaitan Singh's body was recovered from the same spot where he was last left by the two jawans. While the other ranks were cremated with full military honours in Chushul, the body of Major Shaitan Singh wrapped in national flag was flown to Jodhpur from Leh. Maj Shaitan Singh's Body was taken to Col Mohan Singh's residence in Jodhpur.

It was probably the first time in history of Independent India that mortal remains of a soldier were brought back to his home town, In presence of his family, relatives and thousands of people from all over Jodhpur he was cremated with full military honours in Caga Cremation Ground.

Later a monument was erected in the Chushul valley in 1963 in the memory of those who laid their lives defending Rezang La. The following words by Macaulay are inscribed on it:

"How can man die better
Then facing fearful odds
For the ashes of his fathers
And the temples of his gods"

Article by Jai Samota
X: @jai_samota

A biographer specialising in the life of Major Shaitan Singh, PVC (P), has conducted in–depth research into the Ladakh Theatre of the 1962 War. This research will soon be published in a dedicated book, providing a comprehensive history of this critical period in military history.

The Forgotten Unsung Heroes of the Battle of Madhumati (1971 Bangladesh, 45 Cavalry, 62 Mountain Brigade)

By Dinesh K Kapila, Chief General Manager (Retd), NABARD
(As discussed with Major General (then Major) Pramod Kumar Batra, Retd and Other Veterans)

Left: Dinesh K Kapila, author of this article. Centre: Dinesh K Kapila and Maj Gen Rajendra Nath (son and father). Right: Major General (then Major) Pramod Kumar Batra, Retd.

Just a glimpse – Cdr 62 Mountain Brigade – "Pramod, I believe it is hard to maneuver PT 76 tanks in this terrain and waters". Pat is the answer, "it is hard and I may struggle, but you will never see me to give up or fail". They stood together, on the edge of the swift flowing Madhumati, the staff and soldiers waiting. It was dark. Very dark. After waiting for some time the Bde Cdr had said, "lets go". Major PK Batra vividly recollects even now watching the Cdr's face as he looked at the map with a torch. He was calm and very quiet, showing no fear or afraid and maintaining a dignified silence. He remembered the old saying, "Uneasy lies the head that wears the crown". It was a moment in not only the life of the Brigade

Commander but also the Sqn Cdr, any failure and the years of dedicated service, especially of the Cdr, would be washed away. This thought raced through his mind, with all of a eleven years service as they walked to mount the tanks. Before mounting up, the Cdr explained to the young soldiers that the brave soldier is he who conquers fear. Finally, the Cdr said let's go. "Veer Bhogya Vasundhra", the war cry filled the air as Major Batra started his tank. Driving it himself, the Bde Cdr sitting resolutely on the hull, and plunged into the choppy river, he gasped at the water coming over the anti–surge vane onto his face and trickling down. It was December. He was wet down till my waist in winter. After driving for some time, he felt a warm hand on his shoulder, It was none other than the Cdr sitting just outside by his side saying "shaabash, well done", across the years he says, "I was moved and inspired by this gesture" .

Why am I writing this? In fact I have to. This battle has many who fought in it still having regrets about it being rather underplayed. The Battle had units of the 62 Mountain Brigade, Commanded by my father, Brigadier (later Major General) Rajendra Nath crossing the broad Madhumati River at night on light tanks of the A Squadron of the 45 Cavalry. A Squadron was commanded by Major (later Major General) PK Batra. This was certainly an unparalleled decisive brave action undertaken during the war and deserves much more recognition. Major General Pramod Kumar Batra has been advocating that this battle ought to have been more recognised by way of gallantry awards. My father, for one, always had this regret somewhere in his heart, hidden well, but I knew it. This only came out when he ran into fellow warriors from the battle. Through the years he carried that hurt inside. . I have my own emotions as regards this battle, firstly, many an evening walk over the years with my father was on leadership and decision making but also that life could be unfair too. This battle was what often underlay these aspects at times and of course due recognition not coming his way for the reconnaissance of Aksai Chin in 1952, when he reported the Chinese interest in the area. Consequently, a dutiful son has decided to bring out this piece. My father's pride was the recognition from his fellow veterans. This, his own write up, discussions with General Batra and other veterans has brought about this article. I have stayed true to the facts as conveyed to me.

A couple of points, as stressed by many veterans. Vehemently and emotionally. Point one, the crossing of the River Madhumati was a bold and courageous decision by the Brigade Commander, for all the attendant risks, it was taken in a calm, resolute and objective manner, which motivated the 62 Mountain Brigade and 45 Cavalry. Secondly, the crossing, undertaken at night, actually upset the carefully drawn up defences of the Pakistan Army in that sector, and thirdly, the rapidity of the follow up action resulted in the surrendur of the GOC 9 Pak Inf Div. Somewhere in the ceasefire being declared and the attention on Dacca, this battle faded away. This brave and bold action, by the 62 Mountain Brigade and 45 Cavalry, and the leadership and bravery of the Brigade Commander must be recognised.

As Gen Batra remembers vividly, the day was spent in planning and the crucial night, if you look at the map, then only will a person realise that the decision to cross the rather choppy Madhumati River which was 500 to 700 yards wide, with a water current of over 4 knots, was a brave action, especially as the other bank of river was held by the enemy. Some may even think of it as a bit foolhardy. As he says for all the action, towards the end we held a rather small discussion. The crossing was to take place at midnight. It was a very hard decision. Failure would have put them back by 48 hours or more. The brave Commander (that is, Then Brigadier Rajendra Nath) decided to bite the bullet. The onus now fell on the shoulders of young Maj Batra, Sqn Cdr. Undaunted Maj Batra sat on the drivers seat of the leading tank and the Brigade Commander said, "well done Batra, I call this pride in command" and with the Brigade Commander himself on the deck of the tank and he said, "let's go". It requires guts and strong character to take a decision like this and implement it and the Gods of war as Gen Batra says favoured the brave and the Pak 9 Inf Div surrendered to 62 Mountain Brigade. When decades later, both my father and Gen Batra visited Bangladesh, the Commander (to Maj Gen Batra my father is Cdr always) while addressing the officers did say that, "Maj Batra deserved a gallantry award, maybe even the PVC". This is also a tribute from me to all those who were there and selflessly gave the series of battles their best.

This action of crossing the Madhumati River at night stealthily under the nose of the enemy is the only one of its kind in the 1971 Operations in the Eastern Sector and actually including the Western sector. General Batra is clear about this. The GOC of the Pakistani 9 Infantry Division when informed of the tanks having crossed the Madhumati River refused to believe and called it rubbish and actually stated that the troops who reported it were scared and making up stories. He sent an officer to Kamarkhali where the action was to confirm the same. The officer returned and informed the GOC that tanks had crossed and were supporting the attacks on the Pakistani troops. Thus started the beginning of the process of the surrender by the Pakistani 9 Inf Div. This high risk and by no means an ordinary action/operation deserves to be studied as to the thought which went into conceptualising it and the planning for it. And the tough question, what really goes through a soldier's mind when literally striding towards death, this very few can understand.

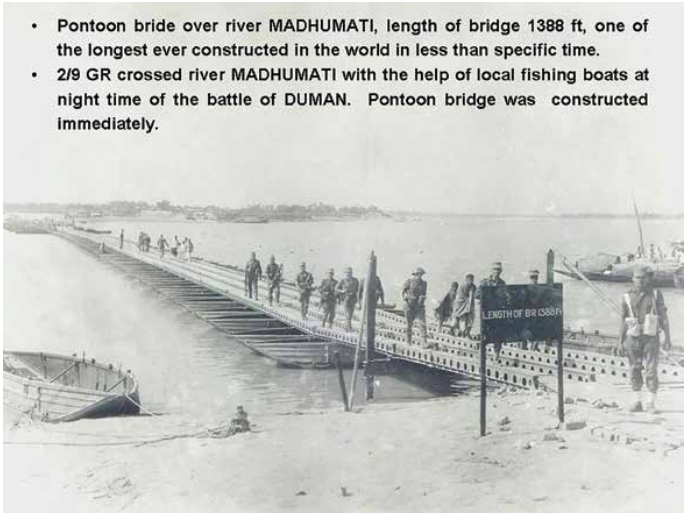
And then the crucial question posed by Gen Batra to me, "What about the Commander who led and planned the Operation?" Well, all wars have their disturbing or maybe such overlooked operations, across a vast theatre, some action could go less recognised. By the time the really higher echelons realised this, months later, they just let it be. As I understand after interacting with the veterans from the battle, somewhere in the Corps HQs, grappling with losing out in the chase for Dacca, this got little priority.

Well, around 12 December, A Squadron led by Major PK Batra less two troops were placed under the command of 62 Mountain Brigade, say a day before the battle and ordered to move back to Madhumati, where the 5 Maratha Light Infantry was holding the western bank of Madhumati. They covered approximately 100 kms in about 8 hours or so. In the meantime to make up the tank losses suffered at Kushtia, the 45 Cavlary sent two troops from B Squadron under Maj Chakraverty (Chuks) a brave and a very fine officer. B Squadron had already taken part in a few battles and acquitted themselves with honour. These two troops were placed under command 7 Mountain Brigade. The Eastern bank of Madhumati was held by two battalions of the Pak Army, with elements of a recce and support battalion and artillery. On arrival, they were welcomed by heavy shelling. The boys had got so used to shelling that by listening to the piercing whistle of the sound of an incoming shell through the air, they could guess likely location where the shell was likely to land. If the shell was coming close to their location, their reaction was the equivalent of "Oh Shit" and they would hit the ground. Major Batra had just got back from a recce of Madhumati looking for likely crossing places and got to watch this fun.

Before the battle and the crossing, Maj Batra was very tired and sat on the ground leaning on to the sprocket of his tank and dozed off. After a little while, his tank driver woke him up with a hot cup of tea. This tea is very distinct from the normal tea. It has a bit of kerosene oil, diesel

Own tank (Amphibious PT-76) advancing for the battle of DUMAN after crossing the river MADHUMATI

- **Pontoon bride over river MADHUMATI, length of bridge 1388 ft, one of the longest ever constructed in the world in less than specific time.**
- **2/9 GR crossed river MADHUMATI with the help of local fishing boats at night time of the battle of DUMAN. Pontoon bridge was constructed immediately.**



"flavour" with plenty of sugar and it is served hot. One is tempted to ask for another round. It is at this time that a man carrying dead body of a young woman around 20 years or so came and laid it near the tank. He went away and returned after ten minutes carrying the dead body of a newly born baby. He was crying and trying to convey something which they could not understand. His boys gave him some water and he became calm. This Mukti Bahini fighter narrated his sad story. The previous night three Pak soldiers had come to his cottage, tied him and his wife and raped this young lady who had just delivered this baby. Next morning, villagers came and untied both of them but by then, both mother and child were dead. A week back, his son and son–in–law had been taken away by Pak soldiers for labour work and not returned. It is believed some were shot dead. This harrowing and sad incident upset them. They could do nothing. But the anger was building up. And the resolute action.

Background from D Dasgupta – Troops of the 101 Communication zone were the closest to Dacca and for the 4th Division to close in towards the Padma river to the west of Dacca, the towns of Kamarkhali, Modhukhali and Faridpur, needed to be captured. And to capture the next town– Kamarkhali, came the Madhumati river as an obstruction! The Brigade didn't have any bridging equipment or the ability to get a Bailey bridge up or anything solid to rely upon to cross the river, but the boys marked out the shallowest part of the river. The shallowest areas were some 15–20 feet deep and some 500 yards across to cross, with the river water current being some 4 knots. So, Brigadier sahib came up with a really risky idea. He decided that the PT–76 tanks led ably by Maj PK Batra and with him on the tank would ford the river!! Now, PT–76 tanks are light Russian tanks that were suitable for small amphibious operations but for a larger river like Madhumati, it was still horribly risky. Still, the battle was depended on this crossing. On the other side of the river were the 50 Punjab and 38 Frontier Force of the Pakistani army, though not on full strength.

Well, to go back, Major Batra was summoned to headquarter 62 Mountain Brigade where the plans for crossing of Madhumati and capture of Kamarkhali were discussed. He got back after the discussion and ordered his boys to carry out all the 18 pre–floatation checks. The Madhumati was a formidable choppy river which was minimum 500 yards wide, with a depth of 15–20 feet, water current of 4 to 5 knots and steep banks. The Engineer Regiment had done a good job in providing this data. The plan was that the 7 Mountain Brigade was to hold Western Bank of Madhumati with one battalion, establish a firm base on the far bank of the river by morning 15 December and assist 62 Mountain Brigade in the capture of Kamarkhali. The 62 Mountain Brigade was to affect the crossing in the North during the night of 14/15 December and clear the enemy opposition upto the road Magura–Faridpur and resume the advance on the axis Kamarkhali–Goalundo Ghat sooner but not later than first light 17 December. It was a pincer move, with 62 Mountain Brigade in the North and 7 Mountain Brigade in the South. Two troops of B Squadron tanks were allotted to 7 Mountain Brigade and A Squadron 45 Cavalry less two troops were placed under command 62 Mountain Brigade for battle of Madhumati/Kamarkhali.

Let me emphasise here that I am more inclined to bring out here the human element of the battle and the crossing, this would bring out the bravery of all the soldiers, the young cavalry boys. The infantry youngsters on top of the tanks and the Brigade Commander. As the preparations were underway, as recollected by some of the soldiers, my father (then Brigadier Rajendra Nath) spoke to the young soldiers, informally at the home bank of the River Madhumati, "Darr to nahin lag raha"? So said the Sowar, "jab aap Cdr saab hamare saath hain to darna kya". And the Cdr asked, "Yeh Darya 500 se 700 gaz hai, par Kar loge"? Sir Saab Samundar bhi par Kar le ge. then this, by the Cdr, "Leading tank mein main aap ke saath hoonga".

And the NCO said, "Saab hamare Sqn cdr bhi leading tank mein honge jaise Arjun ka rath Krishan ne Chalaya tha" (and the boys clapped).

The exchange was as follows, are you afraid, and the soldier responds, when you are with us, where is the fear. And to the question, this river is 500 yards to 700 yards in width, can you cross it, and the youngsters said, with you, we will cross the sea even. When the Bde Cdr said he would be on the leading tank with them, the NCO said, our Sqn Cdr will be driving the lead tank, as Krishanji drove the chariot of Arjun. (At this stage there was a call from another battalion, as the Commander went to one side to take it, the A Sqn boys in unison called out their Regiments motto, "Veer Bhogya Vasundhra"). And they went in. with the water drenching Maj Batra.

They had some small talk as they went in. Major Batra as he was then remembers being asked by the Brigade Commander, "So Batra why are you driving the tank" and he responded, "Pride in Command, Sir". My Regimental tradition. The Commander responded, "Leading by example, a damn good tradition of 45 Cav. Do you know the importance of this operation?" The young Major recollects saying, "Yes Sir. I do. We will do our best and won't let you down". Then after some time as they went further in, "How will you know from where to get out" and the Sqn Cdr stating, "Sir, my boys are already across the river with digging tools, radio set, torches etc to work on the crossing place". And the response was a simple, "Ok, good, let us complete this". And there is another heartwarming exchange, to lighten the mood, Gen (then Brig) Rajendra Nath asked loudly so that all could hear, "Batra Saab ke pass driving license hai ya nahin"?

(Every one burst out laughing.) NCO: Saab CO Saab ne aap ko Paar le Jane ke waste Regt ka best driver bheja hai. (Again loud laughter). (Does Major Batra have a driving license, and the NCO said the Regiment has deputed its best driver to take you across).

7 Mountain Brigade with one Battalion and a troop of tanks crossed Madhumati river from the south and established behind Kamarkhali. Remaining tanks of B Squadron gave fire support from the west bank. The Commander 62 Mountain Brigade responsible for the northern pincer rightly appreciated that any delay in crossing of Madhumati will give the enemy a chance to consolidate their defences further on this very formidable water obstacle. The plan to cross over had been discussed by them earlier. The plan envisaged by the Brigade HQs was to capture Arpara/Kamarkhali with 2/9 GR with tanks giving fire support. At mid night, on 14/15 December he decided to cross over the Madhumati river, but the element of surprise and momentum was with them, if it was effected as planned. According to the Brigade Commander, the mother of all battles was the crossing of Madhumati and capture of Kamarkhali. Two battalions of the Pakistan 9 Division had taken up positions on the far bank at Kamarkhali/Arpara. It was a difficult decision to take as any delay could bring international pressure on India for a ceasefire, this news had filtered down. There were indications of American 7th fleet heading for Indian Ocean.

Here I will quote from the "History of the 9th Gorkha Rifles, Indo–Pak War: 1971 page 201". Brig (Dr) SK Sinha, the author, writes "the description of how the tanks crossed River Madhumati deserves to be told. In the words of Brig Rajendra Nath (Later Maj Gen), the Squadron had already carried out pre floatation checks and boys were in high spirits. The brave squadron commander (Maj PK Batra) sat in the driver's seat leading by example with me on the deck of leading tank. With prayers on our lips, the leading tank plunged into the river. With great skill and dexterity, the squadron commander moved through the choppy river guided by recce troop. The gradient on the far bank was steep but luck favours the brave. The tanks were across the river with the brave Gorkhas (2/9 Gorkha Rifles) following up in country boats. It was a harrowing experience. "This was the first instance of amphibious tanks swimming across a river obstacle under battle conditions and water current of 5 knots. It was a major achievement in the employment of PT–76 tanks to cross a formidable water obstacle under battle conditions. The presence of tanks on the far bank had a tremendous effect on the morale of the troops", according to historian Brig (Dr) SK Sinha (retd). It was a major psychological boost. The momentum was decidedly theirs. They went into battle almost immediately and inflicted heavy casualties.

Discussing in December 2024, says General Batra, "Personally for me, it was a great challenge as there was to be no failure, the success of the whole operation depended on the tanks getting across and supporting the attacks by the infantry". The tanks and infantry battalions in both pincers were across Madhumati river. 22 Rajputs with two troops of tanks established a road block behind the enemy by 1100 hours 15 December. The brave Gorkhas of 2/9 Gorkha Rifles supported by Maj Chakraverty (Chucks) tanks attacked Arpara on the morning of 15 December. The enemy offered stiff resistance but could not hold on against the Gurkhas and with some accurate shooting by tanks. Chucks supported the attacks ably and handled his tanks like a maestro as a series of attacks were launched in succession with support of tanks and all were successful. However, destiny had something different for this brave soldier. One of his tanks got bogged down during a lull in the battle. With total disregard to his personal safety, he got off his tank to supervise the recovery and to tell the 2/9 Gorkha Rifles boys to move away from tanks as the tanks would draw enemy's fire. Suddenly a mortar bomb landed behind him and he was grievously wounded. His loss was another big blow to Major Batra, as he had not yet recovered from what he calls the "Kushtia shock" (more on this separately). Chucks was a brave compassionate and gentleman officer loved and respected by all in the Regiment. To the warriors of Madhumati, he is and will always remain in their annals the "Hero" of Kamarkhali. He was evacuated and finally boarded out as he had fractured his spinal cord. A brave gallant officer. Arpara was captured by 1400 hrs on 15 December, with the A Sqn supporting a hard fought battle.

Brig Rajender Nath flanked by Lt Col PN Kacker, SC, VSM, OC 2/9 GR and Sub Maj Lal Bahadur Sahi just after the capture of Jiban Nagar, Bde first objective

D Dasgupta writes – The 4th Sikh Light infantry crossed first on the tanks while local Bengalis voluntarily gave their boats for the others to cross. The boys of the 2/9 Gorkhas hopped on these boats and crossed the river. And not a single tank or infantry, was lost in the crossing! The Pakistani army and even young officers of the Brigade, were not sure whether they would be able to cross the river, but these brave boys had achieved more than what they expected! The 4 Sikh Light infantry crossed and rallied up behind the enemy positions, while the 2/9 GR and the tanks lined up for the attack. As the dawn of 16 December cracked up with the first sunrise of a liberated Bangladesh, the valiant Gorkhas screamed and charged at the enemy, with the PT–76 tanks forming up the backbone of the attack. The bewildered Pakistanis, being scared shitless and surprised, were no match for this Blitzkrieged style attack and were smashed in their defences. Meanwhile, from the rear, the Sikh Light infantry kept cutting through their defenses, distracting and reducing the enemy's counter fire on the tanks and the Gorkhas.

Then they received reports that the enemy was escaping by using a track north of the 22 Rajput road block. The Commander 62 Mountain Brigade ordered Major PK Batra to move with a Company of the 5 Maratha Light Infantry to establish another road block to trap the enemy. Major Batra took one tank from one of his tank troops and they established the road block by 1600 hrs. They saw approximately 50 Pak soldiers approaching their road block. Across the years, Major General Batra says resolutely, "I could feel strong sense of revenge amongst our boys for the massacre at Kushtia. The tanks (Maj Batra sat himself on the gunners seat as he says to kill these Ba xxxxxs) and 5 Maratha Light Infantry boys opened fire and more than 30 Pak soldiers lay dead. For them it was a "Savage Revenge". After last light, the Pakistanis again launched yet another attack and it was repulsed with heavy casualties to them. They made yet another attempt on 16 December morning to dislodge them but failed miserably. The Cdr was with them, close by, wherever the action was, egging them on, meeting the wounded and doing real time coordinating and planning, his energy levels and can do attitude were a great motivator. Finally, the Pakistanis gave up and surrendered to 62 Mountain Brigade". So observe Major General Batra and other veterans who spoke to me, it was a great experience to withstand four counter attacks at night, launched with fury and fire. The battles were fought bitterly and no quarter asked or given. The PT–76 had a limited night capability, yet the 45 Cavalry acquitted itself with honour. The surrender was the icing on the cake so to say. At this surrender event, Gen Ansari, GOC Pakistan 9 Infantry Division admitted to the Commander 62 Mountain Brigade that they could not believe that tanks will get across the formidable Madhumati river and that too at night. One of the Pakistan officers complimented the A Squadron by calling them the, "Tank Commandos" this my father told me, as I coaxed him to write it down. The credit goes to B Squadron boys too. Gen Batra says he will always remember his Cdr for the swagger, the heart full throated laugh, the ability to relate immediately one to one with the troops, coupled with a modesty about his own role, post action, he could be even self–effacing. And he could be ruthless too, highly driven yet watching out for his team.

After this there was no respite, as they resumed their advance on road Kamarkhali–Faridpur. The Squadron including one troop of B Squadron was advancing with two troops up, one troop each astride the axis. The leading troop leader came on radio to inform Major Batra that a Pakistani jeep with a white flag was approaching towards our location. The Squadron halted the advance and deployed tactically with instructions to carry out speculative fire if need arises. Maj Batra came on to the road to meet the occupants of this jeep which halted a few yards from his tank, he met the GSO 1, Lt. Col. Mansoor–Ul–Haq of Pakistan 9 Infantry Division, who had come to work out surrender formalities with the Indian Army. He was a very smart, soft spoken gentleman. They searched him and the soldiers accompanying him. His boys searched the jeep and handed over a book wrapped in green silken cloth to him. As a soldier he felt for the Lt Col, as the worst form of humiliation for a soldier is to surrender. The colonel requested if he could keep the book as it was the holy Quran. As he recollects, Gen Batra touched the book to his forehead as a sign of reverence and handed over the holy Quran without hesitation. This little gesture was much appreciated by him and he said, "We really appreciate the Indian Armed Forces for their respect for all religions and being so secular". Gen Batra says as a young Major he felt very proud of our culture, our country and our armed forces. They chatted for quite some time about the futility of wars between the two nations with same habits, culture, that we were one country, blamed the politicians for this mess etc. The Pakistanis were offered them a cup of tea which was politely declined. In the meantime, a message had been passed to higher headquarters about the surrender and staff from division and brigade headquarters had landed up.

It was a great moment for 45 Cavalry, squadron and him but sadly and it seems it still rankles somewhat, some from the Indian side turned it into a "Tamasha", maybe it was excitement but the sanctity of the moment should have been appreciated. By this time, some other Pakistani officers had also come over. As he (Maj Batra) stood alone watching, an elderly Pakistani officer walked upto me, introduced himself and said, "Maj Batra, your armoured corps officers on both sides have strong spirit–do–corps and affinity, I've a son who is in 4 Cavalry of Pakistan and I've had no news about him for over a month. We have no news about war in the Western front and I am worried, he is my only child".

Well, they did contact a friend at Command Headquarters at Calcutta (now Kolkata) and requested him to find out whereabouts of 4 Cavalry. He was very kind and appreciated the concern of a father. Next day early morning, Maj Batra was transmitted a message that the 4 Cavalry of Pakistan had not come to battle. He immediately conveyed this to the Pakistani Officer, who was so overwhelmed, that he hugged him and kissed his hands with tears of joy rolling down both his cheeks and kept blessing me. This was a moment difficult to describe by both of us.

Ein PT-76B der sowjetischen Marineinfanterie nähert sich dem Flussufer. Man beachte den angebrachten Schnorchel und die spitzen "Flachen"

Well, the GOC of the Pak 9 Inf Div surrendered to the Cdr 62 Mtn Bde. Maj Batra got to drive around the jeep of the jeep of the GOC. It was a time of heady excitement. Every Officer up the hierarchy was ready to claim some role in the victory, while they regrouped and waited for the next orders. Then came the summons from the Div HQs that in view of the developments on the Western Front, the A Squadron had to move immediately to Suratgarh. Gen Batra recalls, "I looked up to the skies and wondered on the irony——from marshy graves of Bangladesh to scorpion/snake infested sand dunes of Rajasthan". Since he had gone to the Div HQs, he paid respects to the GOC as courtesy demanded. The GOC complimented Maj Batra wholeheartedly and the parting words were "I'll be recommending you and your boys for gallantry/awards". Ceasefire too had been announced.

In the chaos of war and victory and what not, the A Sqn suddenly found itself alone. But the Commander certainly found time and addressed a few of the men from "A" Sqn of the 45 Cav. Other men also joined in. Nobody from division or any other brigade (they were associated with another brigade too) came. This does happen. He complimented 45 Cav for being a gallant, competent and motivated force and with a spirited leadership like the Sqn Cdr. He emphasised that A Sqn had led by example and stayed steadfast and true to its motto "Veer Bhogya Vasundhra". He and I wished the 45 Cavalry a bright future and all the best. Emotional he certainly was and it was clearly evident though he struggled to contain his emotions. He promised to visit the Regt at the earliest opportunity. As he finished, it was a truly inspiring and spoken from the heart address by a Military Leader, the men, who were certainly very moved, let out a full throated "CDR SAAB KI JAI", It resonated across the fields. Then Gen (then Brig) Nath thanked Maj Batra and wished him all the best and left.

Over the years, Maj Gen PK Batra does feel as to why the tank' men are treated like step children. I would agree as to this battle particularly. After a dozen of actions/ battles at Div/Brigade level including two road blocks, facing five counter attacks to dislodge them, crossing the Madhumati river under the enemy's nose on a pitch dark night and covering 700 kms without a single breakdown in 20 days of war and the only memory you actually carry sadly is false promises. A sad fact as the glory went to Regiments and Battalions from the Eastern Bangladesh and Northern Bangladesh side as they made the dash to Dacca. The Corps of which 45 Cavalry was a part, well, history records they went off on another tangent mid–way through. To all who were there, my regards, to the units, from the Sepoy to the CO, to one and all. You gave it your best, you were there and that is what is important. History will acknowledge you. Thank you for your service.

Tailpiece – Later, after deployment at Suratgarh, Maj Batra sent his boys on spot of leave. Finally, in February 1972, he went on short leave to Ramgarh where his family was staying at the Cantonment. A prisoner–of–war camp had also been established there. One evening as he went for a walk, he stopped at the camp and met the Pakistani Subedar Major and enquired about their welfare. He said," Hazoor Sab theek hai, koi gila yah shikait nahin, ek chhoti urz hai", I said "farmaiye", "Hazoor har subah hamain is gane ke saath uthaya jata hai "maar dia jaye ya chhor diya jai bol tere saath kya salook Kia jaye" (translated, the Pakistani Subedar Major requested that the song was repeatedly playing, should we leave you or kill you. Tell us what kind of treatment you want.) He was assured him that we follow Geneva conventions unlike their army and they will go back to their country eventually and requested the adjutant of the camp to not to play this number.

(Note – Dad passed away on 18 January 2024. I asked him over the years as to why he did not write about the battle in his own well appreciated book, Military Leadership in India. He simply stated, because it hurts when I try to write, I don't I don't know what more I could have done to get the due recognition for the boys. This has stayed with me, the human angle, as in my piece, Down Madhumati Road. Dad did write his memory of the battle and gave it to the 45 Cavalry, I have a copy of the same. Gen Batra wants me to emphasise that my father as the Brigade Commander had the maximum at stake yet calmly and resolutely not only took the decision to ford the river but to demonstrate his commitment sat on the hull of the lead tank. He says My Cdr is up there now, where the warriors find a place of honour, as and when his time comes, he would be happy to be with his Cdr again. They succeeded).

(Veer Bhogya Vasundhara" – The brave shall inherit the earth. Or The Earth is meant to be ruled by the Brave)

(Additional inputs from Col Nitin Chandra)

45 Cavalry's glorious 61st Raising Day Honouring the Legacy of the Phoenix

The valiant 45 Cavalry, affectionately known as "Paintalis Risala", celebrated its 61st Raising Day with grandeur and reverence from 14 to 17 May 2025. This proud Armoured Regiment, with its glorious history, illustrious Battle and Theatre Honours, took the opportunity to pay tribute to its fallen heroes, reunite with veterans, and reaffirm its dedication to duty, camaraderie and valour.

The Regiment traces its origins back to 1965, when it was raised in the present reincarnation under the command of Lt Col SK Candade. Since then, 45 Cavalry has stood as a formidable symbol of courage and resilience. The Regiment has earned its nickname, 'The Phoenix', for being raised thrice under the same name – first in 1918 at Cairo, then again in 1941 at Meerut, and finally in 1965 at Kandahar Lines, Delhi Cantt, when it was reconstituted in its present form.

A Celebration of Heritage and Unity

The 61st Raising Day celebrations began on 14 May and spanned three memorable days, blending tradition with heartfelt reunions. Veterans and serving personnel gathered to mark this significant milestone, sharing stories of courage and sacrifice. During the Special Sainik

Sammelan, Col Vinay Prakash Singh, Commandant, conveyed his best wishes on the occasion and complimented the men for splendidly performing their operational, training and administrative duties. A mandir parade was conducted, where all serving personnel and veterans prayed to Almighty for the well–being of the Regiment. Homage was paid to the 'Brave–Hearts' who made the supreme sacrifice in service to the Nation. The sight of veterans and young soldiers praying together was a testament to the Regiment's enduring spirit and camaraderie.

A History Forged in Fire

45 Cavalry's journey is one of resilience and triumph. Since its inception, the Regiment has stood resolute in the face of adversity. 45 Cavalry was originally raised on 3 August 1918 by Maj Edward Moore Taylor of 22nd

Sam Brown's Cavalry at Kantara near Cairo, Egypt, more than a century ago during WW I, drawing its personnel from 20th Deccan Horse, 34th Prince Albert Victoria's Own Poona Horse, 36th Jacobs Horse, 38th King Georges Own Central India Horse. The class composition was Sikh, Punjabi Muslim, Jat, Rajput, Hindustani Muslim and Kaimkhani.

Consequent to its raising, 45 Cavalry was shipped to India and put under command 13 Indian Cavalry Brigade which was part of 4 (Quetta) Division. Regiment was employed in detachments to guard and bolster the East Persian Corridor (Siestan Force). The task was to protect lines of communication of British Expeditionary Force in Transcapia and prevent infiltration across Afghanistan into Western Balochistan and Northern India.

The Regiment was demobilised in 1919 after the end of World War–I. Though no documentation is available to substantiate the claim, open–source information states that 45 Cavalry was awarded Battle Honour Balochistan in 1918 and Battle Honour Afghanistan in 1919.

At the Bugle's call, 45 Cavalry in its second incarnation, was re–raised with class composition of Sikhs, Dogras and Pathans, on 1 April 1941 at Meerut by Maj CPJ Prioleau of the "Guides Cavalry". The raising was under 255 Indian Tank Brigade, to counter the threat posed by the Axis Powers.

After conversion to Stuart tanks the Regiment was placed under command 254 Indian Tank Brigade and thereafter under 50 Indian Tank Brigade which was earmarked for XIV Army. However, in early 1944 the Regiment was placed under command 21 Infantry Division (XXXIII Corps) and staged forward to Nichuguard on road Dimapur–Kohima from where they were tasked to patrol the highway, carry reinforcement stores, escort convoys

and road opening duties. The Regiment also reinforced and provided protection to the 'Zubza Box' (admin box) on the Dimapur–Kohima Road (approx 15 km North–West of Kohima).

'B' Squadron of the Regiment was actively involved in the Battle of Kohima and one Stuart tank was taken up to the DC bungalow/Tennis Court complex where it was used for bunker bursting. However, due to its thin armour it drew concentrated enemy fire and after being hit by a 3.7mm anti–tank shell had to be pulled back. It was later replaced by a Lee tank of 149 RAC which was later shot and rolled down the hill.

After the Japanese withdrew from Kohima, the Regiment was sidestepped to operate under 268 Indian Infantry Brigade (Lorried) in the Ukhrul sector. It was later returned to 50th Tank Brigade at Kohima.

As part of the Second Arakan Campaign, 45 Cavalry was stage forwarded to join 50th Tank Brigade at Wabyin Camp under 15 Indian Corps in Arakan (Burma) in December 1944. The Regiment supported operations of 25th Indian Infantry Division and 82 West African Division in the Arakan Peninsula. Notable engagements of the Regiment were at Goppe Bazar, Taungbro, Taungmaw, Maungdaw–Buthidaung road axis, operations across the Kalapazin river and the Htingdaw Bowl. Two tank troops also took part in Akyab landing.

The Regiment on return to India converted to Sherman tanks and trained for amphibious operations against Japanese in Malaya and Indo–China. On 6 and 7 August 1945 the tanks were loaded onto ships at Bombay but were ordered to be off–loaded as Hiroshima and Nagasaki had been bombed and the end of WW–2 seemed imminent. The

Regiment was ordered to move to Risalpur in NWFP to join the 254 Indian Tank Brigade, where it was demobilised on 31 May 1946. Numerous gallantry awards, including two Military Crosses were awarded for the action at Taungmaw (Burma), these being its first honours in battles overseas. As per open–source information Battle Honour Kohima was awarded to 45 Cavalry, on termination of WW–2.

The call to arms came once again in 1965 and in keeping with its well–earned sobriquet – Phoenix; 45 Cavalry was raised for the third time on 16 May 1965 at Kandahar Lines, Delhi Cantt by Lt Col SK Candade. The Regiment,

equipped with Centurion, Sherman and AMX–13 tanks, performed the role of an 'Armoured Delivery Regiment' in the Punjab sector, with great distinction, during the 1965 war with Pakistan.

45 Cavalry achieved glory yet again and etched its name in the annals of history during "Op Cactus Lily" in 1971, for the liberation of Bangladesh. In early November 1971, the Regiment moved from Kanchrapara, near Barrackpore, West Bengal, to its designated Concentration Area at Krishna Nagar, closer to the border with erstwhile East Pakistan. 9 Infantry Division and 4 Mountain Division had by then been placed under command the newly raised 2 Corps which despite having two Infantry Divisions, had on its ORBAT only one Armoured Regiment i.e. 45 Cavalry. The Regiment, less 'A' Squadron was placed under command of 9 Infantry Division. 'A' Squadron was placed under command 4 Mountain Division.

45 Cavalry was the first Armoured Regiment to be bloodied in battle in the1971 war on 21 November 1971. In a squadron versus squadron battle on 21 Nov 1971 at Garibpur, East Pakistan, 'C' Squadron of 45 Cavalry, under the bold leadership of Late Maj DS Narag, MVC (Posth), destroyed 11 tanks of Pakistan's 3 (Indep) Armoured Squadron while losing merely two of its own, an extremely rare and unprecedented feat in armoured warfare. Battle of Garibpur set the stage for the famous air battle over Boyra, on 22 November 1971. This was the first air battle of the 1971 Indo–Pak War. 22 Squadron (Sabre Slayers)

created history in this air battle. Future PAF Chief of Air Staff, Flt Lt Parvaiz Mehdi Qureshi, was taken PoW after he ejected consequent to his F 86 Sabre Jet being hit and destroyed.

Over the next twenty six days, the Regiment had the unique distinction of fighting twenty–nine actions with seventeen battalions of the two Divisions and two battalions of 50 (Indep) Para Brigade. Prominent battles being Darsana, Suadih, Madhumati River, Kamarkhali, Garibpur, Burinda, Durgabarkati, Khajura, Jessore and Siramani.

45 Cavalry was awarded Battle Honour Darsana and Theatre Honour East Pakistan. The Regiment had the proud privilge to be the first Indian Army troops to enter Jessore and Khulna.

It won nine awards for gallantry and distinguished service, including a Maha Vir Chakra. The Regiment paid a heavy price too, with thirty seven casualties – sixteen killed including two officers and twenty one wounded which included four officers.

The last 60 years have seen the Regiment operate with cavalier panache and professional elan in diverse terrain in various parts of the country, incl 'Op Vijay' in the desert sector, 'Op Parakram' in J&K, CI Ops during 'Op

Rakshak' in Punjab and J&K. The Regiment was deployed in Amritsar for 'Op Trident' and later participated in 'Ex Brasstacks'. In early nineteen eighties, the Regiment trained extensively with the Indian Navy for amphibious operations at the Andaman Islands, incl beach assaults and establishment of Beach Heads, as part of Amphibious Joint Exercises (AMPHEX).

In December 1992, in the aftermath of the Babri Masjid demolition, the Regiment was extensively deployed in "Op

Vyavastha" in Kanpur, Unnao and adjoining villages to control communal riots.

Active and significant disaster relief efforts and rescue operations undertaken by the Regiment, during 2023 floods in Patiala, won accolades from not only the military hierarchy but also from the local administration and the affected civil population.

The Regiment's distinguished service since its inception after independence has been recognised with numerous awards, including a Maha Vir Chakra, a Vir Chakra, a Shaurya Chakra, a Sena Medal, and numerous Mentions–in–Dispatches and commendations. This remarkable record reflects the unit's unwavering commitment to excellence 45 Cavalry is the first regiment in the Armoured Corps to be presented with both the 'Guidon' as well as the 'Standard'.

From PT–76 to T–90 Bhishma: Evolution of Power

45 Cavalry's journey is marked by significant technological evolutions. At its raising in 1965, the Regiment was equipped with the PT–76, a nimble yet formidable light amphibious tank. In 1986, the PT–76 was replaced by the powerful T–55, which served the unit with distinction for over three decades. In 2018, the regiment transitioned to the formidable T–90 Bhishma, the Indian Army's cutting–edge Main Battle Tank. This powerful platform ensures that 45 Cavalry remains a formidable force on the modern battlefield. 45 Cavalry is probably the only Armoured Regiment to have participated in three Republic Day parades ie. 1971 (PT–76 tanks), 1988 (T–55 tanks) and 2019 (T–90 tanks).

The Spirit of the Phoenix

The Paintalis Risala is unique in its composition, with three proud squadrons – two comprising South Indian Class soldiers and one with Other Indian Class soldiers. This blend of cultural diversity has fostered a spirit of unity, resilience, and mutual respect that defines the Regiment's strength.

As 45 Cavalry celebrates its 61st Raising Day, the spirit of the Phoenix – rising stronger with each new beginning–continues to inspire its soldiers. From the sands of time to the modern battlefield, the Regiment's unwavering dedication to duty, valour, and brotherhood stands as a shining example of the Indian Army's finest traditions.

With its proud heritage, formidable firepower, and indomitable spirit, 45 Cavalry remains ever ready to uphold its motto of "Veer Bhogya Vasundhara", ensuring that the legacy of the Paintalis Risala lives on for generations to come.

By Col Nitin Chandra

Colonel Nitin Chandra is a Geo–Spatial Imagery Analyst and a Geographical Information System (GIS) professional. Consequent to his superannuation from the Indian Army, he is pursuing his passion in Military History. He has authored a book on the history of 45 Cavalry and regularly contributes articles for both the print and electronic media.

World famous pilots in the Faroe Islands

"On Friday evening around 7 o'clock, a distant hum was suddenly heard from the southeast, like that of a large blowfly – and at the same moment, a large crane fly appeared south of Nolsoy. 'The aeroplane!' people shouted, staring in awe at the foreign looking vessel, which now roared as loudly as a motorboat as it flew over the fjord, turned eastwards in an arc right above the watch house hill – and continued over the rooftops out towards the bay, where it skidded across the water at full speed, turned back towards land, and anchored calmly off Tinganes..."

This was how the newspaper Tingakrossur described the event on 15 August 1924, when the Italian air captain Antonio Locatelli and his crew landed their Dornier Wal seaplane in the bay of Torshavn. The town's other newspaper, Dimmalaeting, reported that "Cows tethered over by Skansavegin were so frightened that they broke loose and galloped around as if they were mad, while seagulls fled swiftly from the church roof, apparently terrified of this new gigantic competitor on the routes where they and other winged colleagues had previously reigned supreme..."

Antonio Locatelli

Antonio Locatelli was born in Bergamo, Italy, in 1895. During the First World War, he served in an aviation unit of the Italian army and obtained his pilot's licence in 1915. He flew 523 missions during the war, distinguishing himself with daring operations, including a solo reconnaissance flight over Vienna in 1918. After the war, Locatelli spent some time in South America, where in 1919 he set a record as the first pilot to fly over the Andes from Argentina to Chile, reaching an altitude of 6,500 meters on that occasion. During the interwar period, Locatelli was active in the Fascist Party and briefly served as a parliamentary substitute. Locatelli's expedition in 1924 was aimed at exploring possibilities for air routes between Europe and America.

Locatelli's mishap

The day after arriving in the Faroe Islands, Locatelli continued his journey. A large crowd had gathered at the harbour on Saturday morning, and at 9 a.m. on 16 August 1924, the Dornier Wal aircraft took off again, circled over Kirkjuboreyn, and headed for Iceland, where it arrived in Hornafjordur on the southeast coast at noon. In Iceland, Antonio Locatelli met American pilots who had crossed the Atlantic a few days earlier. The Americans knew he was on his way to the USA, and this would later prove to save his life. On 21 August, Antonio Locatelli and his crew left Iceland. But when they did not reach their destination in Greenland, the American pilots raised the alarm – and their escort ship, the cruiser Richmond, began a search for the Italians. Late in the evening of 24 August, Richmond found Locatelli's seaplane floating about 100 nautical miles off the east coast of Greenland. They had been forced to land on the sea due to thick fog, and the aircraft was so damaged that it could not take off again. By that time, they had drifted at sea for three days. Locatelli and his crew escaped with their lives, but the mission ended with the crash off Greenland. When Italy invaded Ethiopia in 1936, Antonio Locatelli participated as the captain of a bomber. He was shot down during a bombing raid and died, aged only 41.

Transatlantic seaplane route

After Locatelli's visit in 1924, the Faroe Islands were occasionally visited by aviation pioneers who, due to the

lack of airstrips on land, always used seaplanes. Most visits were expeditions to explore the possibilities of establishing a transatlantic air route between Europe and the American continent.

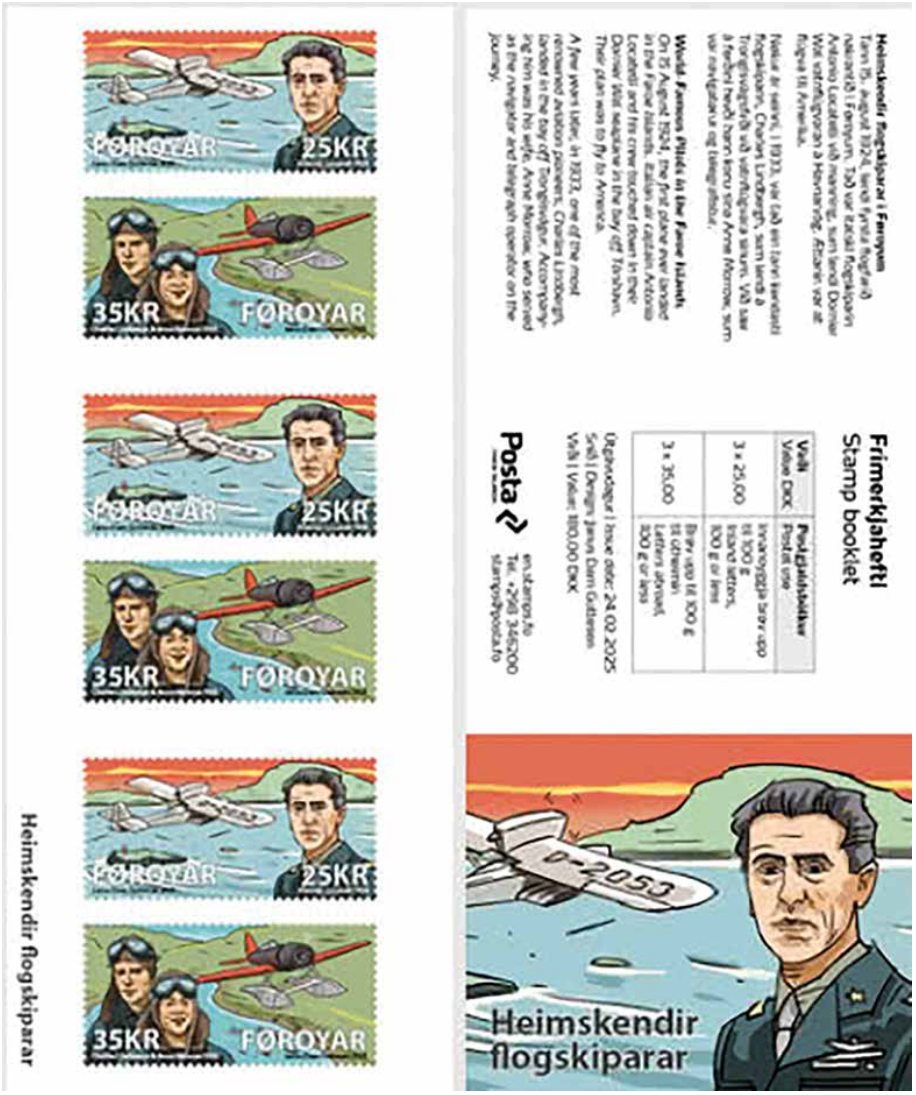
Charles Lindbergh in the Faroe Islands

It caused quite a stir when news arrived in 1933 that the best known of the aviation pioneers, Charles Lindbergh, might make a stopover here. He was conducting an expedition for Pan American Airways to assess the conditions for an air route between New York and Copenhagen. A few years earlier, in 1927, Charles Lindbergh had completed the legendary solo flight from New York to Paris in the Spirit of St. Louis, securing him a place in aviation history as the most famous pilot ever.

The taciturn pilot

People in Tvoroyri were eager to see if the famous pilot would actually show up. Eventually, word came that he would arrive on 22 August. But the day came and went without any sign of a plane – so it was assumed that Lindbergh had passed the Faroe Islands and flown directly to the Shetlands. The next day, on 23 August, a telegram arrived stating that Lindbergh had left Reykjavík and would land in Trongisvagsfjordur. Soon after, the plane appeared over the fjord and touched down on the water right off the town.

It caused quite a bit of surprise when Lindbergh came ashore with his wife, Anne Morrow, who turned out to be the navigator and telegraph operator on the journey. The town council had prepared a big celebration, but the couple excused themselves. The year before, they had experienced the tragedy of their two year old son being kidnapped and later found dead – so they were not in the mood for a party so soon after the terrible loss.



Their host, shipowner Gudmund Morten–sen, instead arranged a small dinner with a few guests. Charles Lindbergh was friendly and courteous but very reticent about the purpose of the mission. The later well–known Faroese author, Jorgen Franz Jacobsen, who was then a journalist for the Danish newspaper Politiken, tried to ask about the planned air route to Copenhagen, but Lindbergh politely deflected all questions regarding the expedition. By noon the next day, Lindbergh and his wife sailed out to their plane, followed by several boats. They patiently posed for photographs before boarding the aircraft and flying out of the fjord again, heading towards the Shetland Islands.

Famous Pilots in the Faroe Islands, the 25 DKK stamp depicts Antonio Locatelli and 35 DKK depicts Charles Lindbergh and Anne Morrow designed by Janus Dam Guttesen and issued on 24 February 2025.

By Vijay Seth
Aerospace Heritage Trust

The Tank Museum, Bovington, UK

A13 Cruiser Mk.III.

The Tank Museum is the regimental museum of the Royal Tank Regiment and the corps museum of the Royal Armoured Corps. The purpose is to tell the story of tanks and the crews who served in them.

The Tank Museum is an army museum in Bovington, Wareham, Southwest England, located at Bovington Camp, Linsay Road. It is accessible by Wool railway station. It features armoured fighting vehicles with interactive activities. It also features various events, exhibitions, a shop and a restaurant. The museum was established in 1947 and the collection follows the history of the tank. The Tank Museum has the largest collection of tanks in the world and has the world's biggest collection of armoured vehicles as well. The Tank Museum's collection includes Tiger 131 which is a German Tiger–1 tank and is known as the only operational Tiger–1 in the world. The museum

Carden Loyd Mk.6 carrier.

Lanchester Mk.2 armoured car.

Vickers Armstrongs Mark E tank

Churchill Mk.7 Crocodile

Light Mark VI B

Sherman Firefly

The Panther

Char B1

Renault FT 17

Medium Tank Mk.II

Panzer II

Crossley Chevrolet armoured car

has also preserved the world's oldest surviving combat tank.

The Tank Museum brings history to life, with the world's best collection of tanks and explosive live displays. The exhibitions tell the story of armoured warfare spanning over 100 years of history. Exploring ten powerful exhibitions, one can come face to face with almost 300 armoured vehicles. This unique collection includes the world's first ever tank, the feared German Tiger and the modern Challenger 2. There are special events going on throughout the year at The Tank Museum including TANKFEST, Tiger Day and the Vintage Christmas Festival and Craft Fayre, as well as special activity programmes during the school holidays.

A definite must visit if one is on holiday in the UK!

25 Years Back

From Vayu Aerospace Review
Issue IV/2000

IAF to buy 40 Mi–17–1Vs

The Indian Government has signed a $170 million deal to purchase 40 Mil Mi–17–1V transport and assault helicopters. The prime contractor is Aviaexport while Promexport is to equip the helicopters with guns and air to surface weapons. These 40 helicopters will supplement the considerable number of Mi–8/17s already in service with the IAF.

Army to acquire Israeli UAVs

Indian Army is to procure two types of Israeli UAV systems. Malat, a division of Israel Aircraft Industry (IAI), will supply an unspecified number of the short range Searcher 2 UAV and the medium altitude long–endurance Heron 2 UAV's. Industry sources speculate that many more could be ordered to fulfil the requirements in the Defence Ministry's future projections.

IAF Mi–35s to Sierra Leone

With the situation in Sierra Leone continuing to get murkier, the Government of India has reinforced its military presence with the United Nations in this West African country, with an additional Infantry Battalion (18th Grenadiers) being airlifted to join the 5/8th Gorkha Rifles, an element from the Mechanised Infantry Regiment and Assam Rifles.

The "Sukhoi Deal": CAG pulls up MoD

The Comptroller and Auditor General (CAG) of India has criticised the Defence Ministry for the continued delay in induction of the Sukhoi Su–30MK, pointing out that only eight fighters had been received till 1999 against an expected 20 and that these too were "only air defence versions".

Air India scraps GSA system

Air India will shortly appoint a group of consolidators to handle its business in the UK and other areas, superseding the practice of retaining exclusive general sales agents. The airline, however, has reserved the right to appoint its present GSA in the UK as one of the contenders to ensure "continuity of business."

Implications of BARC/AERB

Separating the Bhabha Atomic Research Centre (BARC) from the Atomic Energy Regulatory Board (AERB) is indicative that nuclear warheads for the Indian armed forces are now in the process of production, according to a senior official of the Department of Atomic Energy (DAE).

Plans for the INSAT series

India is planning to shortly launch four new satellites in the INSAT–3 series and two more in the IRS series within the year 2002. INSAT–3B, the first of five in this set of third generation satellites, was launched by Ariane from Kourou in French Guyana on March 22.

Air India to sell 7 aircraft, lease 10

Even as its small fleet has been the cause of great concern, Air India has put seven more aircraft on sale. "On the block" are three Airbus A.300 B4 and four Boeing 747–200s which the national carrier wants to get rid of.

Long wait for "Admiral Gorshkov"

The Indian Navy has been awaiting a decision on acquiring the Admiral Gorshkov (the Russian aircraft carrier) for over five years. Negotiations between India and Russia have again been extended and it appears that the Navy will have to wait longer, probably at least till Mr Putin visits India in October 2000.

India's N–arsenal is a "Fraction of Pak's"

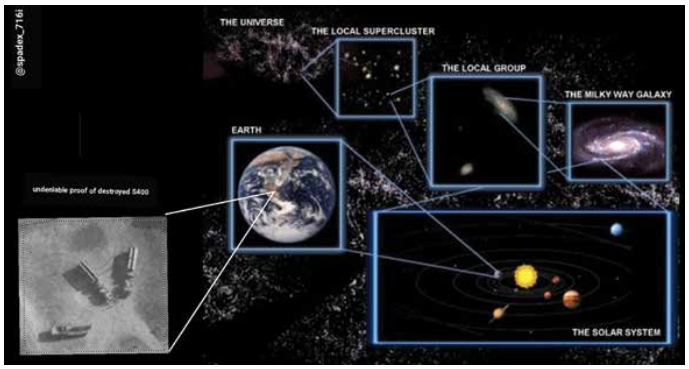
"Pakistan's nuclear arsenal is vastly superior to that of India with perhaps five times the number of nuclear warheads. It also has greater means and preparedness of delivering them", reported NBC News of Washington DC on 7 June in what could be a stunning reversal of balance of power in the region.

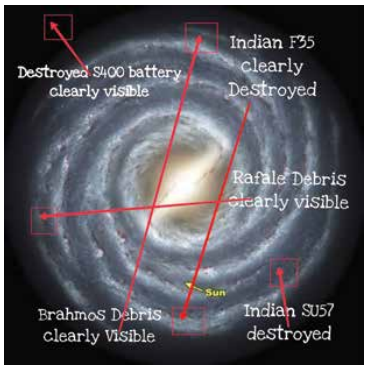
Indian Navy/Coast Guard exercise off Sri Lanka

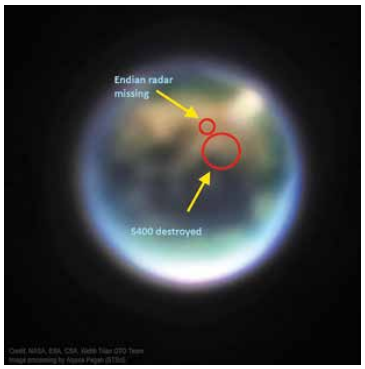
In a calibrated show of strength, units of the Indian Navy and Coast Guard have carried out exercise along the country's south–eastern seaboard, not far from northern Sri Lanka. Five naval ships including a Kashin class destroyer, Khanjar class corvettes and offshore patrol vessels (of the Coast Guard) took part in the exercises from Vishakapatnam and Chennai.

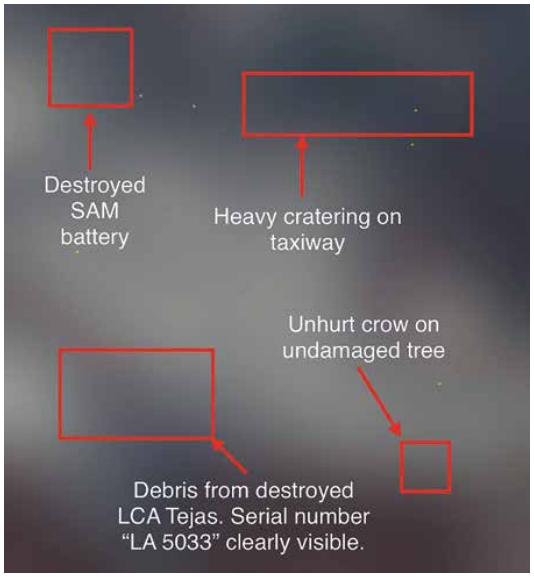
Operation Sindoor from the world of social media and memes

Social media spoof and jokes on the evidence that Pakistan supplied to prove they decimated Indian targets since "their satellites and intel had worked overtime locating the destruction". In other words, not a single actual image of any Indian asset getting obliterated was provided by Pakistan.









India provided 100's of images via various sources of the damage inflicted on Pakistan air bases and assets (which were not denied by Pakistan).

The term "Centre of Gravity" made famous by the Pakistan side at their press briefings during Operation Sindoor… and glee from our side regarding "testing" of our missiles systems on the opponent which was unchallenged throughout the operation.

Left: What Pakistan told the world and their domestic audience vs the reality. Right: While the systems on display were absolute stellar performers during the clash, Indian news channels and social media enthusiasts attributed any and every kill of any kind to the S–400 missile system and hailed it an 'absolute hero'! Funny.

Left: When the Pakistan side was asked to provide evidence that they had downed IAF fighter jets, the best they could come up with was that "it was all over social media", prompting ridicule and laughter from the international media and community. Right: Meanwhile, Indian Prime Minister N. Modi introduced us to a new blood group, Sindoor. So now here in the country, besides the usual blood groups of A/B/O/AB we now have Sindoor S +ve and S –ve.

Left: A tribute to the decades old Pechora SAM used by India effectively during the operation prompting amazement and a new found respect for the missile which has constantly been mocked for not being phased out. Right: Meme fest on the "feared" Chinese HQ–9 SAM operated by Pakistan which proved "ineffective" and was always "caught sleeping".

To celebrate their "great victory", Pakistan's COAS General Asim Munir promoted himself to the rank of "Field Marshal", immediately prompting mockery and being referred to as a "Failed Marshal".

Author
Tom Cooper

Frankly (as always): can't care less about PR-efforts by CNN & Co KG GesembH AG, and even less so about Western 'military Experten'.

When one side is bombing nuclear weapons storage facilities of the other, and the other has no ability to retaliate left, then that's a clear cut victory in my books.

No surprise Islamabad 'sounded' for a 'cease-fire'.

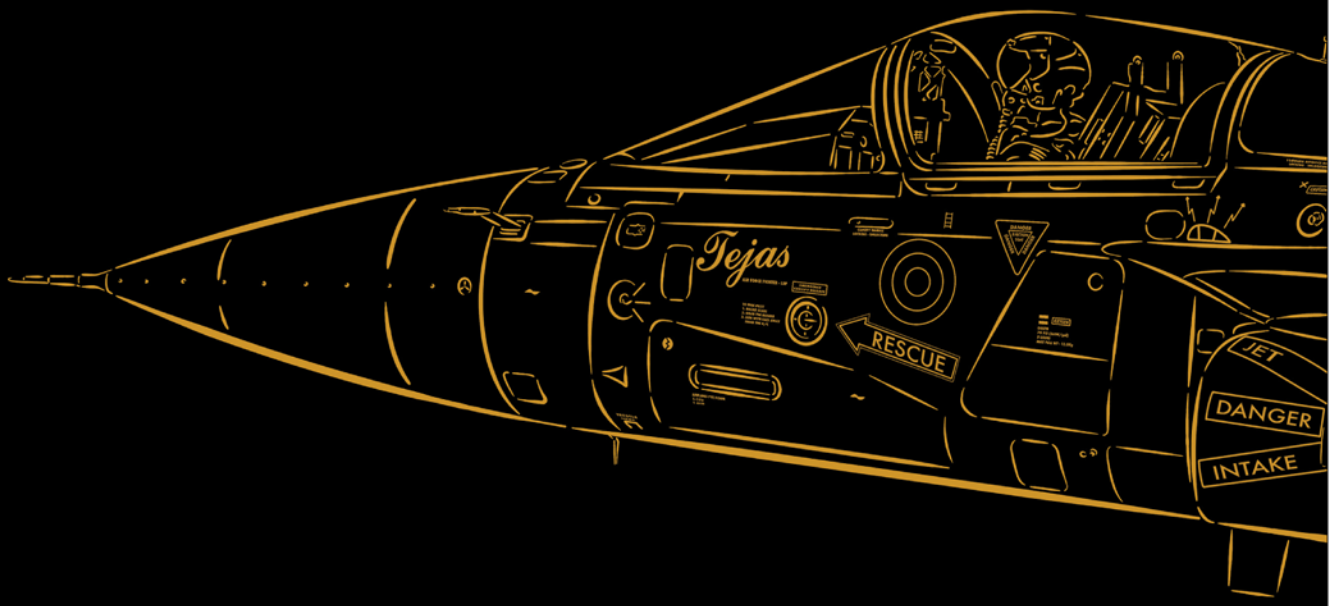
At the beginning of Operation Sindoor, in the information warfare/perception domain, Pakistan's fake narrative and lies peddled took centre stage while the Indian narrative was generally sidelined or ignored for various reasons. It took Austrian analyst and prolific author Tom Cooper (one of the most respected combat aviation historians in the world) to put the record and facts straight. Slowly, international media took cognizance of this.

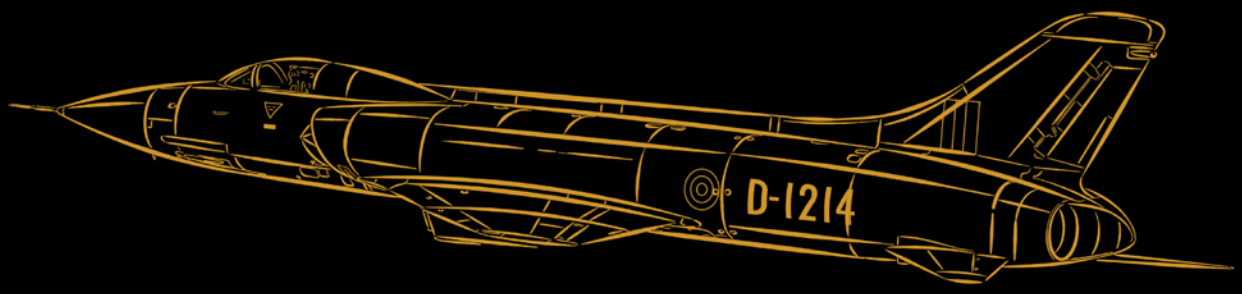
Meme from Pakistan on the daily briefings by MoD from both sides. Our side "retaliated" by posting similar counter–memes which further led the other side to post counter–counter memes using the same theme! And this went on for days. Humour in times of war/aggression?

Afterburner

VAYU

Aerospace & Defence Review





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