

# SECOND to NONE

QUARTERLY

## PAF's SUPERMEN *Producing* SUPER MUSHSHAK

A Tale of F-104

### Fast & Furious

New Beginings

### Markhors

Finally... Mystery Solved

### 8 Pass Charlie

Pakistan Defence Budget

### Myths & Realities

The Next Arms Race?

### Hypersonic Weapons



**EXCLUSIVE**  
SUPER MUSHSHAK

**SPECIAL REPORT**



### TAKING STOCK

"We would never be intimidated by stockpiling of weapons by the enemy. PAF, in synergy with sister services, is ever ready to counter any threat to the sovereignty of our sacred motherland." **CAS, PAF**





# NATIONAL DEFENCE THROUGH SELF RELIANCE

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A SYMBOL OF EXCELLENCE IN AVIATION

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# from the Editor in Chief

**A**s the nation celebrated the Defence Day last month with usual fervor and resilience, we thought it would be appropriate to dedicate the current edition to its armed forces. The day reminds us of the uncanny ability of a young nation's defence capability, which established itself as a formidable force against the enemy during the 1965 war. It was no easy feat. Other than the brave sons of soil who defended the country with their lives, the leadership of PAF of that time also rose to the occasion. Fortunately, the current PAF leader, Air Chief Marshal Mujahid Anwar Khan is the proud torch bearer of that incredible leadership. In the opening article, we delve into his commendable methodology of taking a hands-on approach and scrutinizing each aspect of his under command formations, personally. The effects of such leadership are apparent. Super Mushshak is a great example, manufactured proudly by the passionate men of the Aircraft Manufacturing Factory (AMF) at Kamra. Built indigenously, the trainer aircraft has evolved to become the preferred trainer for several air forces and civilian setups around the world, giving Pakistan substantial foreign exchange from its sales. Taking aerial excitement to new levels, another story is about the remarkable CN-235 and its crew that has been given its due recognition after years of service to the nation. PAF recently gave these men their own squadron, aptly named

'Markhors', the No 52 Sqn. Another aircraft that has been paid tribute is the unparalleled F-104 Star Fighter. Deemed 'the pilot's dream' of all times, the Star Fighter reigned supreme in terms of design and performance for decades. PAF was fortunate to have this remarkable jet in its fleet during the 1965 war. The aircraft and its crew proved equal to the task during those testing times and made the nation proud against an enemy five times larger in size.

Although the importance of equipment and military preparedness can never be downplayed, the world has entered into an era of warfare seen before. The nation must now fight on multiple fronts as the battle shifts from the borders to the hearts and minds of the populace. Pakistan is deep in the clutches of a covert war, which is as elusive as it is damaging. Termed the 5<sup>th</sup> generation warfare, we shall dissect the role of social media and information warfare in this new yet highly dangerous phenomenon. One of the most damaging notions that have seeped into the populist sentiment is the false claim that Pakistan has an unjustified, bloated military budget. We have addressed this claim by presenting facts and figures which unquestionably prove otherwise. Even as the nature of war changes, Pakistan still faces its old foe, India. However, now the world is being disillusioned to its true saffron colors, as it tries to bully its neighbors, China and Nepal.

A heavy player in any military's arsenal is its missile capability. The latest game-changer is the recently-developed Hypersonic missile technology, which has triggered another phase of the ever-present arms race with its deadly proficiency and the absence of any counter-measures.

For decades, the sensational tale of the legendary '8-Pass Charlie' has enthralled the national and international audience alike. For the first time ever, we reveal the identity of the pilot whose prowess impressed and scared the enemy during the 1965 war. Penned by the ace himself, the account thrills and awes in equal measure. Another tribute that is long overdue has been given to the 'Birdshooters' of PAF, the marksmen who can't afford to miss. We move on to explore the future of air power, covering the latest advancements in artificial intelligence in aviation and how it is rapidly evolving to change air warfare forever.

For PAF, last month was full of activities, all related to Defence Day. The event which received most attention and remained in the lime light especially in the national media was PAF's annual show 'Mujahideen-e-Aflak ko Salam'. We have aptly covered the event which was aired almost on all major TV channels across Pakistan.

We end with a tribute to the ultimate sacrifice rendered by the PAF's brave heart, Sqn Ldr Sarfaraz Ahmed Rafiqi, HJ (Shaheed). His selfless and unbelievable sacrifice during the 1965 war, washes over you and continues to inspire the generations of PAF fighter pilots along their journey into the present times. The 'International Aviation News' segment which we introduced in last edition continues as well. We hope our worthy readers would appreciate our humble endeavor and keep us posted with their valuable input.

Happy Reading!



*Muhammad Ali*

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“A trait that makes a leader great is the ability to be involved and aware on the micro level of his domain. A hands-on approach of the lives and working of his men not only gives him a real-time grasp of realities but also boosts morale of his followers. Air Chief Marshal Mujahid Anwar Khan is the epitome of this assiduous practice. His pragmatic modus operandi has an excessively positive effect on the force under his command. This special report explores the recent visits made by the Air Chief to various bases and the pleasant yet intricate methodology he employs for ‘Taking Stock’.”

by Air Cdre (R) Muhammad Ali, SI (M)

Cover Page: ACM Mujahid Anwar Khan, Chief of the Air Staff, PAF evaluating the newly inducted JF-17 Thunder Bravo during an operational training mission. (Photo: PAF Archives)

For the last couple of months, Air Chief Marshal Mujahid Anwar Khan was on the move. From visiting bases in breathtaking North to scrutinizing formations in the enchanting South, he had a hectic schedule. His purpose was obvious, his intentions clear to all. He had arrived to acquire first-hand knowledge of the men, equipment and bases that he had the privilege to command. To meet, greet and motivate the men in blue who are tirelessly defending aerial frontiers of the motherland without a blink of an eye. He knows, every single one of these men is a hero in his own right and that is what he communicated to them during these visits.

Another purpose of these visits was discreet yet equally compelling. To satiate his undying desire of flying....his everlasting wish to be in the cockpit....fly with the boys... measure the pulse....and above all ‘Take Stock’...

Sizzling July saw the Air Chief witnessing an operational exercise at the far flung PAF Base at Skardu. The base had officially been named as ‘PAF Base Qadri’ after Air Commodore Abdul Hameed Qadri (Ex Base Commander Minhas) who attained shahadat in operational training mission. The base is a well-organized haven, surrounded by towering peaks which are generally shrouded in crawling clouds. The Air Chief saw the ‘Pride of Pakistan’ JF-17 Thunder take-off and land from the highest altitude runway of Pakistan. He also observed various operational activities at the base including rapid deployment of fighter aircraft and combat support elements. He was also briefed on the ongoing infrastructure development works at the base. The Air Chief appreciated operational preparedness of the base personnel and expressed his satisfaction over the pace of developmental works. During the visit, he had the



opportunity to meet the combat crew and talked to them about the current situation in the region. Addressing the base personnel, the Air Chief stated that PAF was fully cognizant of the geo-strategic developments in the region. He said that the aggressive military procurements by the enemy were not going unnoticed and necessary measures were in place to ensure the balance of military power in conventional domain as well. The Air Chief assured the nation that PAF alongside its sister services was ever ready to give a befitting response to any misadventure by the adversary. Expressing concern over the Indian state terrorism and atrocities of its armed forces in Indian occupied Jammu & Kashmir (IOJ&K), the Air Chief stated that Pakistani nation unequivocally supports the freedom struggle of Kashmiris and reiterated the need for expeditious resolution of Kashmir issue in accordance with the United Nations’ resolutions.

Above: It is really the mental fortitude that someone brings to the table - ACM Mujahid Anwar Khan gets ready to evaluate the newly inducted JF-17 ‘Bravo’ at an operational air base. (Photo: AWO Iftikhar)

# TAKING STOCK

Fast forward a month, Air Chief's next stop was PAF Base Minhas. On arrival, he was received by Air Officer Commanding (AOC) Northern Air Command and Base Commander, PAF Base Minhas. The day holds importance in PAF's history. Carrying forward the proud legacy of leading from the front, Air Chief Marshal Mujahid Anwar Khan would personally take the newly inducted dual seat JF-17 Thunder for a ride. The purpose was to gain the firsthand experience of this state-of-the-art aircraft, truly known as the 'Pride of the Nation'. Being an adroit F-16 pilot himself, the Air Chief felt right at home in the new aircraft, assessing its operational capabilities while thoroughly gratifying his perpetual desire of flying.



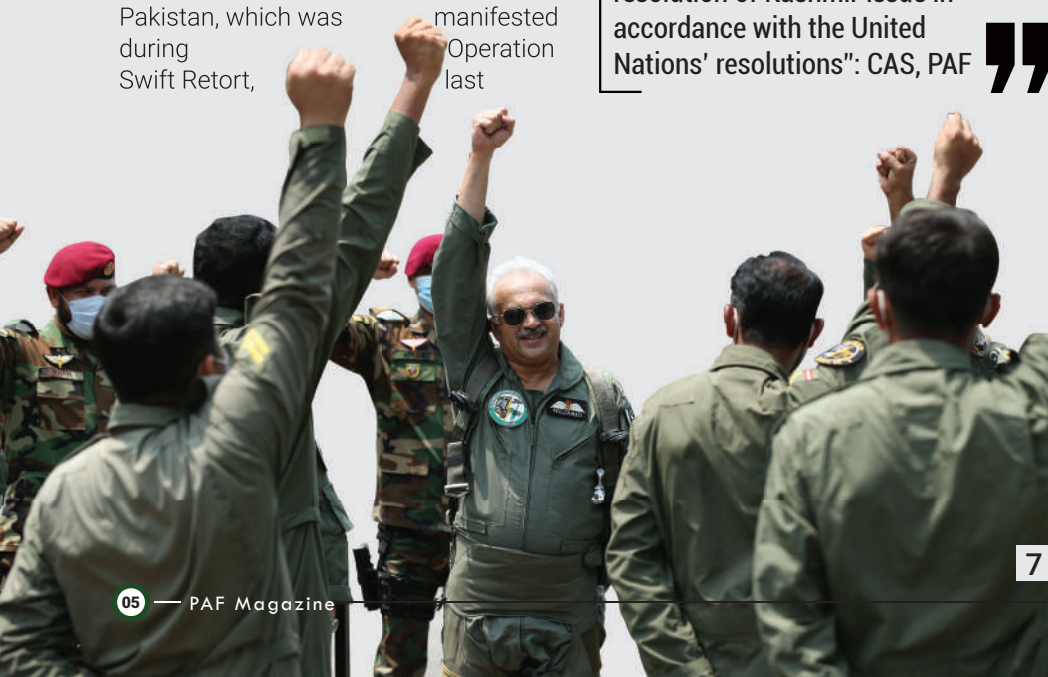
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Once on ground, Air Chief Marshal Mujahid Anwar Khan met the air and ground crew. He lauded the level of drive and professionalism of the personnel involved in the venture. While talking to the combat crew the Air Chief said that the induction of dual seat version and Block-3 variant of JF-17 Thunder would help in maintaining the cutting edge of the PAF. He also stated that PAF personnel are the proud custodians of the legacy of valiant air warriors of Pakistan, which was manifested during Operation Swift Retort, last

year. He further said that PAF would never be intimidated by stockpiling of weapons by the enemy. He added that PAF, in synergy with sister services, was ever ready to counter any threat to the sovereignty of our sacred motherland.

Next on his schedule was a visit to Home of PAF's Special Services Wing-Kalarkahar. Set in the rugged terrain of Kalarkahar, the base is not for the

“Pakistani nation unequivocally supports the freedom struggle of Kashmiris and we reiterate the need for expeditious resolution of Kashmir issue in accordance with the United Nations' resolutions”: CAS, PAF



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1. A Picture of Grandeur - ACM Mujahid Anwar Khan lands after completing an operational training mission on JF-17 dual seater.

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7. You cannot help but respect their cause and wish to make it your own - ACM Mujahid Anwar Khan raises slogans along with combat crew during a visit to PAF Minhas.

(All pictures AWO Iftikhar)



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weak of spirit. Only the best of the best are able to make the cut. Air Chief Marshal Mujahid Anwar Khan, being a man of action himself, fully understands and appreciates the value of these professional men. During the visit, the Air Chief witnessed the mock drills of counter-terrorism and close-combat operations. Inverted men grappled down burning buildings and conducted air-tight hostage rescue operations while the Air Chief observed approvingly. At Minhas, the Air Chief had been excited for soaring in the cockpit of a JF-17. In Kalarkahar, he was eager to test the lethal arsenal of weapons in the likes of FN P90s and FN F2000s that the SSW has in its inventory. After he had observed commandoes at the firing range, he could no longer hold himself being left out of the action. It was a sight to watch, as the Air Chief fired and handled one weapon after the other. The commandoes learned a thing or two from their leader as well.

The Air Chief's next destination was Airpower Centre of Excellence (ACE) in PAF Base Mushaf, Sargodha. Rightly named as ACE, the institution is one of its kind facility and has acclaimed high reputation in the

region in a short span. The core purpose of the facility is to link operations, research and doctrine to orchestrate air campaigns with air combat tactics. This institute is imparting quality training to future PAF commanders to undertake complex and demanding upcoming challenges and counter-

“ Combat training in PAF can be maintained at the highest pedestal of realism and responsiveness, only if we are cognizant of the contemporary challenges and ready with evolved tactics and strategies”: CAS, PAF ”



Right page above: From Dream to Take-off: Air Chief jumps off the deck in the new dual seat JF-17.

Right page centre: Moment of Honor-Sqn Cdr of JF-17 Thunder Sqn patches up ACM Mujahid Anwar Khan before an operational training mission.

Bottom: Experience must come from training in conditions as real as possible - A JF-17 Thunder takes off from PAF Base Qadri.

(All pictures AWO Iftikhar)



terrorism operations. The purpose of Air Chief's visit was to attend the graduation ceremony of No 53 Combat Commanders' Course, being the Chief Guest on the occasion. While addressing at the occasion, the Air Chief said, "Combat training in PAF can be maintained at the highest pedestal of realism and responsiveness, only if we are cognizant of the contemporary challenges and ready with evolved tactics and strategies." He further said, "Along with tactics and professional skills, selfless dedication combined with high sense of discipline and comradeship are the key to effective and safe accomplishment of PAF's mission."

In the following awards ceremony, the graduates were privileged to receive certificates and trophies from the Air Chief. Sqn Ldr Muhammad Shafaat received the prestigious Chief of Air Staff Trophy for overall performance amongst combat pilots. Air Defence Trophy for overall best performance amongst combat controllers was awarded to Sqn Ldr Julius Joseph.

Air Chief Marshal Mujahid Anwar Khan's work, however, was not done. The next venture that required his presence was the inauguration of PAF's 'Centre of Artificial Intelligence & Computing' (CENTAIC) at Islamabad. Being the Chief Guest on the occasion, he unveiled the plaque, formally inaugurating the newly-formed facility. Addressing at the occasion, he said that that establishment of CENTAIC was indeed a landmark initiative in the evolutionary journey of PAF. The Centre will lead Artificial Intelligence Research & Development in both civil and military spheres. He said that technology had altered the characteristics of warfare in the 21<sup>st</sup> century and the vision of establishing the centre was to harness the potential of artificial intelligence and its integration in PAF's operational domain. The Air Chief then spent some time catching up with former Air Chiefs' principal staff officers and other PAF officers, who were attending the ceremony.

This was the busy yet spirited itinerary of Air Chief Marshal Mujahid Anwar Khan for the last couple of months. A hands-on approach of the lives and working of his men not only gives him a real-time grasp of realities but his visits also boosted morale of his followers. His earnest desire of testing aircraft, equipment and meeting the men, very conveniently ensures that he is perpetually aware of the workings of the force under his command. And that is what the legacy of PAF leadership demands, always leading from the front...





“ A lot of people at the LA (Light Aircraft) department in Aircraft Manufacturing Factory (AMF) have immense passion for what they do and mass-producing Super Mushshak is what they do best. This piston-engine trainer plane is a product of experience, constant changes and improvements, innovation, and is dedicated to meeting all service conditions. Built from ground up, the Super Mushshak is an easy to maintain and simple to fly training / utility aircraft. With origins dating back to early 1970s, it has stood the test of time and has become the dominant primary flight trainer in the world.”

by Air Cdre (R) Muhammad Ali, SI (M)  
& S. Khalil

**T**oday if you Google to find the countries indigenously producing aircraft, you will come across few. If you refine the search further to learn how many air forces of the world are manufacturing aircraft at their own, you will be surprised. It's only Pakistan Air Force....By all standards it is no mean feat. The achievement is outstanding and, indeed, a matter of pride for the nation. However, laurels are not attained over night. Behind the scenes, as always, there is a saga of commitment, perseverance, hard work and, above all, faith; and the men and women of Pakistan Aeronautical Complex (PAC) have demonstrated it for decades.

Over time, the PAC folks are repeating their successes year after year. Here a dream team have been manufacturing the Super Mushshak (Urdu word for 'The Proficient') for more than four decades. It is one of the longest running training aircraft manufacturing programmes in the world. The requirements are daunting - to produce an aeroplane that has high performance, enhanced manoeuvrability, durability, maintainability, and most importantly is safe for flight training.



# PAF'S SUPER MEN SUPER PRODUCING MUSHSHAK

Title Pic: 'Made in Pakistan' Super Mushshak continues to inspire air forces and civilian organizations alike for a variety of roles. Seen in picture are two newly rolled out Super Mushshak standing 'Head to Head' in front of AMF Hangar at Kamra. (Photo: Alan Warnes)



The Super Mushshak is one of the most dependable trainer aircraft flying today, embedded with state-of-the-art systems needed for imparting quality training. A modern training aircraft must possess an engine a pilot does not have to worry about and advanced avionics suite that optimizes pilot performance in the cockpit. 'Made in Pakistan' Super Mushshak has it all.

"Kamra did not become the hub of aircraft rebuild and manufacturing overnight. Thousands of skilled workers employed, trained and full of commitment and passion; hundreds of thousands square yards of hangar space housing cutting edge production and testing machines / equipment, miles of cables to operate those heavy machines, and tarmacs, runways and taxi strips provided, all on more than ten square miles of stretch is what makes Kamra an epitome of Aviation Manufacturing. We are proud of our products, Pakistan is proud of it", elaborates Air Marshal Syed Noman Ali as he discusses the products, services, and

projects of the four factories and other constituent setups of Pakistan Aeronautical Complex.

Back at the Aircraft Manufacturing Factory (AMF) where these Super Mushshaks are manufactured, a dedicated team of aeronautical engineers, technicians and researchers, under the supervision of AVM Shamsul Haq MD AMF, are clocking long working hours to meet time-compressed production targets. Explaining the value proposition of Super Mushshak, AVM Shams believes that this trainer plane is ideal for the mission of training ab-initio pilots of air forces world over. This little bird has growth



potential engineered into it. It can even operate out of small unpaved airstrips. It has just been a year after AVM Shams took charge as the MD, AMF made a breakthrough by winning a contract to supply Turkey with 52 Super Mushshak, beating America's Cirrus and Germany's Grob, two of the biggest names in the industry.

"It is a great achievement, and we are proud of it" the AVM said.

This is not all. The contracts signing ceremonies for the sale and support of Super Mushshak aircraft have now become a routine at PAC Kamra. Most recently, the aircraft added a new customer, Zimbabwe, that wants a dozen new Super Mushshak for its air force and it wants none other than AMF to build them.

You look at everything and realize just how much goes into the production of the plane and the hours it takes for the

**Above: All planes must be flight tested which emphasizes the role test pilots play in development and acceptance of air craft.**

**Right Page Above: The Story That can now be Told in Full - A Super Mushshak at a static display during Dubai Air Show.**

**Right Page Inlets: Super Mushshak wearing liveries of various countries.**

**Bottom: Latest touch screen technologies incorporated into the Super Mushshak.**

**(All Pics PAF Archives)**



finished product to roll out the doors. Powered by the American Lycoming engine, the Super Mushshak is built like a model plane. It all starts by machining, bending, and forming over 2,000 aluminium piece parts - sheets, beams, cylinders and every form of this light weight metal. This is the first step of manufacturing. Aluminium sheets are cut to proper sizes for handling in the machining centres, presses, and forming machines. Since these planes are to be flown by air forces over different terrains, over salt water, in the desert heat, and cooler environments, around half of the world, individual parts have to be treated to protect them from

**“ Recently PAC won a contract to supply Turkey with 52 Super Mushshak, beating America's Cirrus aircraft manufacturers and Germany's Grob, two of the biggest names in the industry. ”**

the harsh environmental effects. Through its ingenious efforts to keep Super Mushshak relevant in evolving aerospace manufacturing landscape; AMF has replaced a large number of aircraft's aluminium structural parts with composite materials. The facility to manufacture, mould and assemble these composite material parts is one of the finest in Pakistan.

These parts are put together through high-precision structures, called assembly jigs to manufacture different structural assemblies of the aircraft. You can witness the aircraft taking shape when fuselage is joined with wings and



other structural surfaces. The 6 cylinder engine is mounted through an intricate but clearly defined process by hugely experienced technicians. IPAD looking fuss-free glass cockpit, radio and other delicate equipment are installed and propeller is added in station to station assembly process. The canopy, which gives pilots a 360 degrees view, comes on next. All of it is formed and assembled by hand due to complexity of involved processes and the need to exercise engineering intervention at different stages of work. It is a perfect example

“ Until the PAF introduced the JF-17 Thunder, the Super Mushshak was the largest foreign exchange earner for the country. Everybody at AMF envisages a golden age of collaboration. ”

of 'Made in Pakistan' product where knowledge and skill of trained manpower is of paramount importance. The aircraft then rolls over for a customized paint job. With all done, the team which produced it, pushes the brand new Super Mushshak out of the hangar to mark its rollout.

Back in the early 1970s, the prospect of setting-up facility for manufacturing of Mushshak aircraft was viewed with some scepticism. But the planners at PAC Kamra had the vision to take-on this challenge. "PAC was fortunate to have pioneers like AM Shaikh Saeed who played an instrumental role in laying the foundations of this complex that has today transformed into a true aviation city. It was on the wings of their dreams that most of the aircraft in the PAF fleet continue to take flight", reminisces Air Marshal Syed Noman Ali



Super Mushshak Performance	
Description	Limits (ISA)
Max S.L. speed (kts)	140
Cruise speed (kts)	130
Stall speed clean (kts)	57
S.L. ROC (FPM)	1700
Take off distance ( 50 ft)	900
Landing distance ( 50 ft)	970
Range low power (NM)	440
Endurance	5 hrs
Service Ceiling (ft)	19,000
Glide ratio 1.2 NM	1.2 NM

Above: 2, 000 piece parts taking shape at the Aircraft Manufacturing Factory, Kamra.

Two Page Spread: Super Mushshak, getting ready for aerobatic display at Dubai International Air Show.

while paying tributes to his predecessors. The Chairman also underscored the pivotal role played by PAC for factory-level maintenance of PAF fleet, and its aircraft and avionics production capability.

The Mushshak catapulted into PAF history in 1974, when the AMF rolled out the first 15 of these trainer planes built from semi knocked down kits, acquired from SAAB SCANIA of Sweden. After successfully producing 92 Mushshak aircraft, AMF acquired the status of Original Equipment Manufacturer (OEM) in 1982 and started manufacturing Mushshak indigenously, which were inducted by both PAF and Pak Army in sizeable numbers. By 1995, a new vision started to materialize- transformation of Mushshak into Super Mushshak aircraft.

The more agile Super Mushshak flew its first flight in August, 1996. With its six cylinder Textron Lycoming 260 HP engine, the aircraft could now operate with cruising speed of 135 knots, around 30 knots faster than the original version. Another improvement was the cockpit's air conditioning system which came as a blessing for the countries where the temperatures regularly reached 50° C in summers. Approximately, 70 Super Mushshaks were needed by PAF after the new variant became available. However, rather than acquiring brand new aircraft, the upgrades were simply retrofitted in the original airframe. The first upgraded aircraft was handed over to PAF Academy Risalpur on 16 May 2001 and within a short span of five years, all the PAF Mushshaks were upgraded to the more agile and advanced Super Mushshak configuration.



Above: AMF is invested in the creation of a better trainer aircraft.



Insets: Various phases of easy-to-assemble Super Mushshak production.



(All Pics PAF Archives)





Then came the stage where PAF senior leadership decided to showcase the indigenously manufactured Super Mushshak to air forces and civilian entities

chosen Super Mushshak to train their ab-initio pilots in this modern trainer.

overcome these problems. The Super Mushshak is now training our air force cadets at Academy and its induction has significantly reduced the period of training for the pilots", said the Director Public Relations of NAF while talking to media back in 2019.

around the world. Initially, the task appeared impossible; however, with intensive marketing of the aircraft, the results started to appear. In the first phase, the strategy was to market the aircraft in Middle East only. The efforts bore fruit and PAC won the first ever overseas military sale contract from RAFO (Royal Air Force of Oman) in late 2003. There on, there was no looking back. The marketing strategy opened up to other continents as well and led to sale of Super Mushshak to a large number of countries across the world. Saudi Arabia, Turkey, Qatar, Nigeria, Iran, Azerbaijan, Iraq, Syria, South Africa, Oman, and Zimbabwe are some of the countries that have

And the list of satisfied customers is growing. "Before the acquisition of Super Mushshak we had a Diamond Trainer which had limitation of not performing aerobatics and it could only be used for training civilian pilots. However, with the induction of these (Super Mushshak) aircraft from Pakistan we have

Post 2016, the conventional analogue dials were replaced by a sophisticated glass cockpit. This was done to bring Super Mushshak at par with premier



**Above: A civilian version Super Mushshak from South Africa.** (Photo: Airliners.net)

**Left: AVM Shams ul Haq, MD AMF explaining the technical aspects of 'Glass Cockpit' in Super Mushshak.** (Photo: S. Khalil)

**Bottom: REPS of International Customers Technical Coordination Group (TCG) Meeting - 2019.** (PAC Archives)

**Right Page Bottom: PAF display pilots pose for picture before commencing aerial display at Dubai Air Show-2019.** (Photo: AWO Iftikhar)



trainer aircraft worldwide. The glass cockpit comes with two distinct configurations to select from; Garmin 950 and Dynon Aviation suites. Borrowing heavily from renowned G1000 glass flight deck system, the G950 is a seamlessly integrated package that makes flight information easier to scan and process. It has been acquired by majority of metro liners and commercial aircraft companies and has been integrated into Super Mushshak by PAC technicians. The other variant Dynon aviation suite has also been incorporated. This gives variety of choices to potential customers to choose from. AMF has now integrated the Genesys avionics suite on Super Mushshak aircraft which has exponentially enhanced the ease of operations for the operators with additional options.

"Today, AMF can easily roll

out 20 Super Mushshak aircraft a year. The goal is minimum fuel consumption, maximum range, product of precision workmanship and expertise" said Air Cdre Javed Haider Khan, Deputy Managing Director at AMF.

**Above Left: Wearing Pakistani Green livery, Super Mushshak attracted scores of aviation enthusiasts and potential buyers alike at Dubai Air Show, 2019.** (Photo: AWO Iftikhar)

**Above Right: Super Mushshak in Iranian Air Force color theme.** (Photo: Shahram Sharifi)



### Super Mushshak Participation in Air Shows

S No	Air Show	Country	Year
1	Dubai Air Show	UAE	2005
2	Dubai Air Show	UAE	2007
3	Dubai Air Show	UAE	2009
4	Dubai Air Show	UAE	2011
5	Dubai Air Show	UAE	2013
6	Dubai Air Show	UAE	2015
7	Dubai Air Show	UAE	2017
8	Dubai Air Show	UAE	2019
9	KISH Air Show	Iran	2002
10	AAD Air Show	South Africa	2006

### Super Mushshak External Load

- Two Gun Pods with 7.62 mm LMG
- Two external fuel tanks
- Surveillance Camera under fuselage with live video link



Max weight of external under stores each wing:  
150 Kg / 330 lbs



After the Super Mushshak is built, AMF's job is not yet done. The plane has to be tested by both ground and flight crews. The extensive flight testing of aircraft by the AMF, has and will be of vital importance. It also highlights the role flight test pilots play in the acceptance of aircraft by the air forces. The judgement of top ranking test pilots often become the basis for important decisions and modifications, which helps in making constant upgrades to the aircraft. Often, in the twin seater, someone who can help the pilot find out answers, will fly along – some one like a flight test engineer.

The Mushshak has logged one million plus flying hours around the world. While its primary customer remains the PAF, Pakistan Army also operates a substantial number. Other than the basic roles, Pak

Army utilises these birds in wide range of army co-operation missions which includes Forward Air Control, Forward Area Support with droppable supply, Reconnaissance, Artillery Fire Observation, Camouflage Inspection, Border Patrol, Liaison, Target Flying and target towing for training of ground units etc.

"The Super Mushshak excels in training potential pilots at the primary flying training levels", said Super Mushshak test pilot Wg Cdr Majid Ali. The factory continues to refine the design, easing pilots' natural transition to advanced weapons systems. "There are no problems with the roll rate. Barrel rolls, loops, the Super Mushshak



performs them all including stall and spin manoeuvres that are basic requirement for most pilots learning" he added.

While complimenting this ageless bird, equipped with super composite parts and advanced digital flight control system that let a pilot do what he / she wants, Gp Capt Usama Salar Sufi (Super Mushshak test pilot) eagerly describes its inverted flight feature and its ability to perform at +6 to -3 Gs, a rarity in this class of aircraft. And while he admires its forward swept

Top: Pak Army's Super Mushshak Fly over Makran Coast. (Photo: Hamza Tariq)



## Super Mushshak-Operators

	PAF
	PAK ARMY
	SAUDI ARABIA
	IRAN
	SYRIA
	SOUTH AFRICA
	OMAN
	IRAQ
	TURKEY
	QATAR
	NIGERIA
	AZERBAIJAN

More than One Million hours flown by a total fleet of 325 aircraft produced by AMF



## LIVERY OVER THE YEARS

Since its maiden appearance in the 70s, the Mushshak has worn numerous interesting liveries. It started off with a typical two colour scheme; olive dark green and orange. This theme continued for decades in PAF, as the large number of pilots got used to seeing it. However, to attract potential buyers, it needed a much more colourful and commercialised livery. That's why came the white bird painted with coloured lines in blues, greens and reds. This livery comes in customised themes as per the desire of the operator. Complete olive green livery with aircraft numbers painted in yellow remains the standard official theme of the Mushshaks belonging to Pakistan Army. When the PAF decided to market and display Super Mushshak in Air Shows across the world, a more commercial looking livery was introduced. Initially, a white bird with lines painted in blues and reds was introduced. However, couple of years back, a more attractive livery portraying the green and white of Pakistani flag was adopted to fully give it a look of 'Made in Pakistan'.

By 1995, a new vision started to materialize- transformation of Mushshak into Super Mushshak aircraft. The more agile Super Mushshak flew its first flight on 15<sup>th</sup> August 1996.

wings that gives the aircraft enhanced efficiency, Chief Test Pilot Gp Capt Nusrat Abbas complemented the improved safety feature which allows the aircraft to auto-recover from a spin. And that's not all. Being the aerobatics pilot, Gp Capt Nusrat is in love with this highly manoeuvrable bird. "It is a little plane which is getting more fame due to its impressive manoeuvrability at international air shows. It gives us a feeling of pride when we fly this 'Made in Pakistan' aircraft". Beautifully painted in green and white theme, the aircraft prominently displays Pakistan's 'crescent and star on its fuselage. "It

gives you an extra dose of adrenaline when you fly in front of cheering crowds that too in foreign lands" adds Gp Capt Nusrat. "The usual aerobatics performance lasts for almost ten minutes during which we have to demonstrate the performance to the general public and potential buyers alike", he emphasises.

The Super Mushshak has a hard task. It has to continue to win fights against the likes of it. Which is why everything progressive at the AMF, is invested in

modernization. When the PAF first built the Super Mushshak, it was for the endurance and versatility of this little beauty that convinced the air force to put a production order for it. Fast forward few decades the scene has changed. Now the world is looking for state-of-the-art avionics, design and above all safety.

"It is the grace and safety of the design that captures the affection of those who fly it", concluded Gp Capt Nusrat Abbas...

Top: Super Mushshak in action at PAF Academy Asghar Khan.

Above: Shown in the photo are the instructor pilots, some of the most versatile to be found anywhere.

Bottom: A beautiful view of Primary Flying Training (PFT) flight line at PAF Academy Asghar Khan.

(All Pics Alan Warnes)



No 52 Sqn of PAF

# MARKHORS

## New Beginnings

“Once airborne, the CN-235 is a self-contained war unit of men and machine with a breadth of possible situations and actions known to a military transport plane. Everyday is its finest hour. Although the majority of war supplies were carried in bigger cargo planes, a small but vital portion was flown in smaller transport aircraft. This is where the CN-235 made its mark.”

by S.Khalil

It is the end of February, 2019. An active belligerent neighbour has brought the fight to the doorsteps of a peaceful nation. The CN-235 joins the fight.

This twin turboprop transport aircraft may be small but it is part of something big - the PAF's transport system - a fleet of giant planes, backed by people trained to the peak and state-of-the-art ground support equipment, necessary to carry out Pakistan's peace keeping and combat airlift jobs across the globe. CN-235, is a new platform with some of the finest operational capabilities, designed to tackle a variety of mission types. It's a plane conceived and engineered with modern technology in terms of avionics, cockpit, devices such as night vision (NVG) compatible green screens and provides troops and cargo transport. But unlike the other aircraft in the PAF fleet, its history was not written in blood. So the big question it faced was, could the CN-235 prove itself in the reality of warfare?

Dawn breaks first light at the Nur Khan Air Force Base at Chaklala and the day is soon filled with the growl of the charcoal grey CN-235. Flight Commander Training, Wg Cdr Suleman Ali and his flight crew have the opportunity to prove the CN-235 and its capabilities. They take her out again. It behaves like a text book machine. Many believe it to be a regular run, instead, there is a quick order over the intercom. This is it, boys. Then Suleman Ali lifts the CN-235's front gear after a few hundred meters run. Another hundred yards and the undercarriage slowly leaves the runway. Airborne. The crew has to meet an unprecedented schedule in a runway-hopping campaign, providing basic movement of personnel and equipment from one operating base to another. The mission requires flying from the wind whipped hills in the North to the sun soaked Arabian Sea in the South and all areas and climbs in between. Time is of the essence. Deadlines are established and meet them they must, under the cloak of secrecy.

Leading the Way: Wearing NVGs, the air crew of CN-235 gets ready for a low-level night training mission. (Photo: Wg Cdr Mudassir)



First stop, Peshawar. The 34 paratroopers seated along the side wall disembark, and ammunition for JF17 is loaded into CN-235's belly to be moved to Kamra. At Kamra, a team of technicians is urgently required to be deployed at PAF Base Rafiqui, home of the Mirages. Engines are running, the team comes on board. The bird is in the air again.

"CN-235 gives us the kind of flexible response that we require to meet today's PAF policy. Every war has been influenced by logistics. Success in the battle field depends on the supply time. CN-235s were configured for transporting high priority items - and the men, perhaps the most important cargo," Suleman Ali said. No sooner as the plane parks at the Rafiqui Air Force Base, and the technicians spill out of the ramp, Flight Commander Suleman Ali is ready for another mission. He is tasked to fly to Faisal air force base in Karachi to drop off a jet engine on an urgent basis. The Loadmaster balances the cargo properly.

In CN-235, Multan seems far, and Karachi farther. The twin engine plane is launched again on the roughly three hours journey and reaches cruise speed of 200 knots flying at 15,000 feet. Halfway across the country, and just when the crew is beginning to enjoy the freedom in three dimensions, and experience the magical feeling of seeing the world from above, fellow aviators soar past them like an eagle in their C-130, 5,000 feet above.

"We are the slowest plane on the block and our fellow aviators love rubbing it in that we'll miss some fun because we won't make it the same day. Even the guys in the Hercules feel like kings of speed



when they fly right past us."

"Markhor 21, this is Hercules 30. Looks like we are going to miss you at dinner at Dolmen Mall tonight, again," said the captain of the C-130 in a deep, calm and professional voice. Suleman Ali immediately recognized his buddy from the No 6 Sqn. "And you just know they are smiling," he quipped. But there have been times when, even half an hour late, CN-235 crew have managed to

land first while the Hercules pilots were managing their track and descent in line with the landing

sequences as demanded by the ATC. Those were also the moments when Suleman Ali would take over from the marshaller and get even by helping the C-130 pilots park at PAF Faisal. Even though the faster Hercules, with



**Top: Taking a Break - A duo of CN-235 rests on the tarmac of PAF Nur Khan after a long haul. (Photo: Alan Warnes).**

**Above: ACM Mujahid Anwar Khan, CAS PAF receiving Sqn Crest from the first Sqn Cdr of No 52 Sqn, Wg Cdr Arif Ali Khan. (Photo: AWO Iftikhar).**

**Right Page: Air Chief Marshal Mujahid Anwar Khan, CAS PAF along with officers of No 52 Sqn at the inauguration ceremony. (Photo: AWO Iftikhar).**

plenty of deck space to move oversized loads and able to land on unprepared grass and dirt landing strips hacked out of jungles, landed at Karachi way before, they forgot that the CN-235 has a 20 to 30 minutes turnaround time.

Exactly 25 minutes after landing the CN-235 crew are ready to take off once more for another hour long journey. Releasing brakes, Suleman Ali opens up the throttle and away she roars down the runway. Air speeds alive, gear up. They are headed to Gwadar to pick up priority cargo to be delivered to Jacobabad, home of the F-16s. The cargo is confidential, unknown even to the captain. Two hours later, at Jacobabad, Suleman Ali is ordered to maneuver to a hot bed (restricted area) to airlift munitions, to be transported two hours away to fighter town Sargodha, another hub of the F-16s. Engines run to full military power and the breaks are released. CN-235 begins to roll and the nose is lifted to take off altitude. Skies are clear, the air is mild and there is a slight breeze from the south, and CN-235 casts shadow on earth.

It has been a long day for the pilots. It is tough, non-stop flying for the crew. They return to Chaklala in the gathering dusk from their last mission. Despite the hardship of continuous flying, CN-235 is ready for combat. It can get troops where they need to go and it can do it in the toughest environments. PAF celebrates another proud day of operations.

Daily life at Nur Khan (Chaklala) is no day at the beach. But the No 52 Sqn has its moments - a day to remember with brothers



and in a career over a cup of tea and sandwiches. Soon they got their report card from their ultimate authority in person, the Chief of Air Staff, Pakistan Air Force, Air Chief Marshal Mujahid Anwar Khan. In January, 2020, a new unit was dedicated to the CN-235 under the No 35 Flying Wing, the

**“ Compared with other heavy transport planes in the PAF inventory, such as the IL78 air-to-air refueler that guzzles 22,000 lbs fuel every hour and the C-130, which burns 5,000 lbs per hour, the CN-235 consumes only 700 to 800 lbs gasoline every 60 minutes. ”**

largest flying wing of PAF. He came to see the operations of the No 52 Sqn first hand. The Air Chief liked what he saw, that the No 52 Sqn is making history, that the introduction of the aircraft into the battle field has been incremental. When war came, the CN-235 proved a stalwart defender. The Markhor insignia is

an appropriate symbol for the men of the No 52 Sqn.

Out of the four brand new CN-235 that entered service in 2004, one is dedicated for VIP movements including the Air Chief. Few planes can match the knockout punch of the CN-235. Its engines can sustain battle damage. It is also endowed with the Radar Warning Receiver (RWR), which issues an alert when it detects a radar signal from an enemy jet. This timely alert helps CN-235 pilots avoid detection. Operated by a crew of four, pilot, co-pilot, flight engineer and load master, all of which are necessary for tactical missions. Among its best features is its lower operating costs. The CN-235 can reach Karachi in 2,500 lbs of fuel. Compared with other heavy transport planes in the PAF inventory such as the IL-78 air-to-air refueler that guzzles 22,000 lbs fuel every hour and the C-130, which burns 5,000 lbs per hour, the CN-235 consumes only 700 to 800 lbs gasoline every 60 minutes. Like a first class race car the CN-235's horsepower is awesome. However, its greatest strength is its slow-speed maneuverability.

First Officer Commanding of the new No 52 Sqn Wg Cdr Arif Ali Khan's affection for the CN-235 surfaces in a variety of ways. "It is an aeroplane for





**Left: We Can See All the Time- A pilot wearing NVGs gets ready for a night training sortie. (Photo: AWO Iftikhar)**

**Bottom: Neon is the Color-Crew of CN-235 getting ready for a night tactical mission. (Photo: Wg Cdr Mudassir)**

all intents and purposes when it goes sour on us. The air force needed the ability to respond all out. In some ways we were short of military readiness for small and scattered actions anywhere. The PAF began asking the right questions such as what must we haul, how far, how fast, and at what cost, covering significant battle space. This called for a plane that would deliver men and their equipment into the combat area ready to fight and for effective steps ahead in the PAF's transport planning," Wg Cdr Arif Ali Khan said.

Moreover, back in early 2000s when the plan to induct a new cargo aircraft was deliberated upon, there was something else also in the minds of PAF planners. They had realised that the C-130 fleet had taken lot of beating over decades. Sometimes, the fleet was used for short hops and legs contrary to its basic role of moving heavy loads on long hauls. That's why, they decided to conserve this strategic asset as the war time reserve and use it more

judiciously. This thought led to the induction of CN-235 into PAF fleet. Wg Cdr Arif Ali believes that reliability is a very good friend to have. "We have to admit that this plane fills an important gap. Its missions are testimony to the unforgettable role CN-235 has played in the past," he said.

Besides its effective role in combat, the CN-235 has brought food to the hungry, relief to the victims of natural disaster and hope to almost



inaccessible corners of the country. In 2005, when a devastating earthquake shattered thousands of lives, the angel-of-mercy CN-235 embraced a new mission and it set the bar still higher. The transport plane flew 100 plus low altitude sorties through narrow gusty valleys, where the faster, heavier Hercules found it difficult to get into. "We flew from sunrise to sunset air dropping medicines, tents, and rations for the displaced families. CN-235 has played an integral role in strategic airlift and significant delivery of humanitarian aid. In 2005, it became the primary airlifter for relief operations across Balakot, Batagram and Neelum Valley to mention some difficult terrain," said Gp Capt Asim Hafeez (Retd), one of the pioneering CN-235 pilot. "Given the urgency of the relief missions, in this jack of all trades plane, we

could turn off the propellers without switching off engines for the safety of ground crew while loading cargo. This capability reduced the turnaround time and enabled us to fly five to six sorties a day to reach maximum victims of the catastrophe," said Asim Hafeez.

Back in early 2000s, the ferry flights of brand new CN-235 from Indonesia were also very eventful. "I was tasked to ferry the last CN-235 aircraft to PAF, the VIP version, in 2006. After carrying out number of test flights at IAE (Indonesian Aerospace) facility, the next task was to ferry this brand new bird to Pakistan. Owing to its slow speed, it took us three days to reach Pakistan, making night

**“ From paratrooping to aerial delivery and from passenger transportation to cargo movement, CN-235 can perform a variety of missions for PAF. ”**

**Right and Below: A Versatile Bird: Paratroopers getting ready for an high altitude drop from CN-235. (Photo: AWO Iftikhar)**

**Center: CN-235 banks right after take-off from PAF NurKhan (Photo: Rana Suhaib)**





stops at Male (Maldives) and Colombo (Sri Lanka). The complete itinerary of our route was Bandung (Indonesia) –Banda ache (Indonesia)-Male (Maldives)-Colombo (Sri Lanka)-PAF Faisal (Karachi)". Memories of avoiding dangerous weather while flying over beautiful beaches and landscapes are still fresh in our minds", reminisces Asim Hafeez.

CN-235 engineers and technicians wanted to be the tip of the spear, and the No 52 Sqn was the right place to be. They have proved vital all along. Its a treat to see how naturally they go about their routine jobs, jobs without which no combat mission can leave the ground. These young men are adepts at highly technical jobs. Every time one of these birds flies, it runs on their blood, sweat and tears. Sticking with CN-235 engineer, Sqn Ldr Abdul Samad, showed how it's really done.

For the technical staff, the planes under their care are breathing, living things. They have to be in sync with the mechanical heartbeat of these giant birds. CN-235 has been built with state-of-the-art aviation technology.

However, this does not mean that it does not require constant scrutiny and inspection from the technical staff. Fortunately, PAF's men of technical prowess more than rise to the occasion. It was no easy task, though. "The aircraft is young, just 16 years strong. We don't have a technical information database to consult when tackling problems with the

**“ Being the lynchpin of PAF transport operations, CN-235 played a key role during Ops Swift Retort last year. ”**

aircraft. However, its young age and competent build also ensures that it has relatively less problems to begin with." Illuminates CN-235 engineer, Sqn Ldr Abdul Samad.

Sometimes, the aircraft gives us technical problems that needs detailed scrutiny and takes lots of time to pin point the root cause. Nonetheless, this is more than just a good machine with a pretty good tour of service. It represents a distinct way of life," he said. In the practiced hands of the No 52 Sqn, the CN-235 now stands poised for duty.



**Above: A busy day at CN-235 flight line. (Photo: Alan Warnes).**

**Below: Air Crew of No 52 Sqn in a light mood after a long-haul mission. (Photo: S Khalil).**

**Right Page Above: A Semi Glass Cockpit of CN-235 makes a significant difference when it comes to night missions. (Photo: AWO Iftikhar).**

**Right Page Below: Chocks Off - A CN-235 departs for night operational training mission. (Photo: Wg Cdr Mudassir).**



"Owing to the tonnages we have to move and resupply, our operations are large. We have to move them to different places, get them there rapidly. When the CN-235 arrived in the inventory, it permitted the PAF to do its job far more efficiently and effectively, expanding operational range," said OC No 52 Sqn Wg Cdr Arif Khan, who described CN-235 as one of the most versatile and sophisticated military transport planes in its category.

And although the air battle on Feb 27, 2019, was won by jets, ultimate victory hung in the balance of all Pakistan Air Force operations. Many pilots owed their success to this versatile aircraft. Its crew knew who to thank - the reliable CN-235. This is where the No 52 Sqn earned their keep.





# Fast & Furious

## A Tale of Star Fighter - A Speedster of PAF

“ Superlatives have no place while presenting the technical appraisal of a fighter aircraft, however, F-104 Star Fighter has always been an exception in this regard. ‘Fastest’, ‘Highest’, ‘Best’, ‘Coolest’ are some of the commonly used superlatives when it comes to describing the charm of this most-photographed and most-fancied fighter jet of its time. Envisaged and produced more than five decades ago, it still looks ‘futuristic’. Elegance and speed together with remarkable performance made it the ultimate ‘pilots’ aircraft’. Even today for many fighter pilots and aviation enthusiasts it is the aeroplane of their dreams. Decades ago it was not only the first Mach 2 fighter able to fly at twice the speed of sound for a lengthy period, but also the first aircraft to hold the world records for both speed and altitude simultaneously. PAF had been fortunate to have this ‘Speedster’ in its fleet. This is the story of one of the fastest flying machines and the men who were always ahead while flying it....”

by Air Cdre (R) Muhammad Ali, SI (M)

Piercing the Skies - A handful of Star Fighter aircraft of PAF made the difference during the two wars with the enemy. A two-ship formation of Star Fighter aircraft shows-off its sleek design over Pakistani skies. (All Pics PAF Archives)

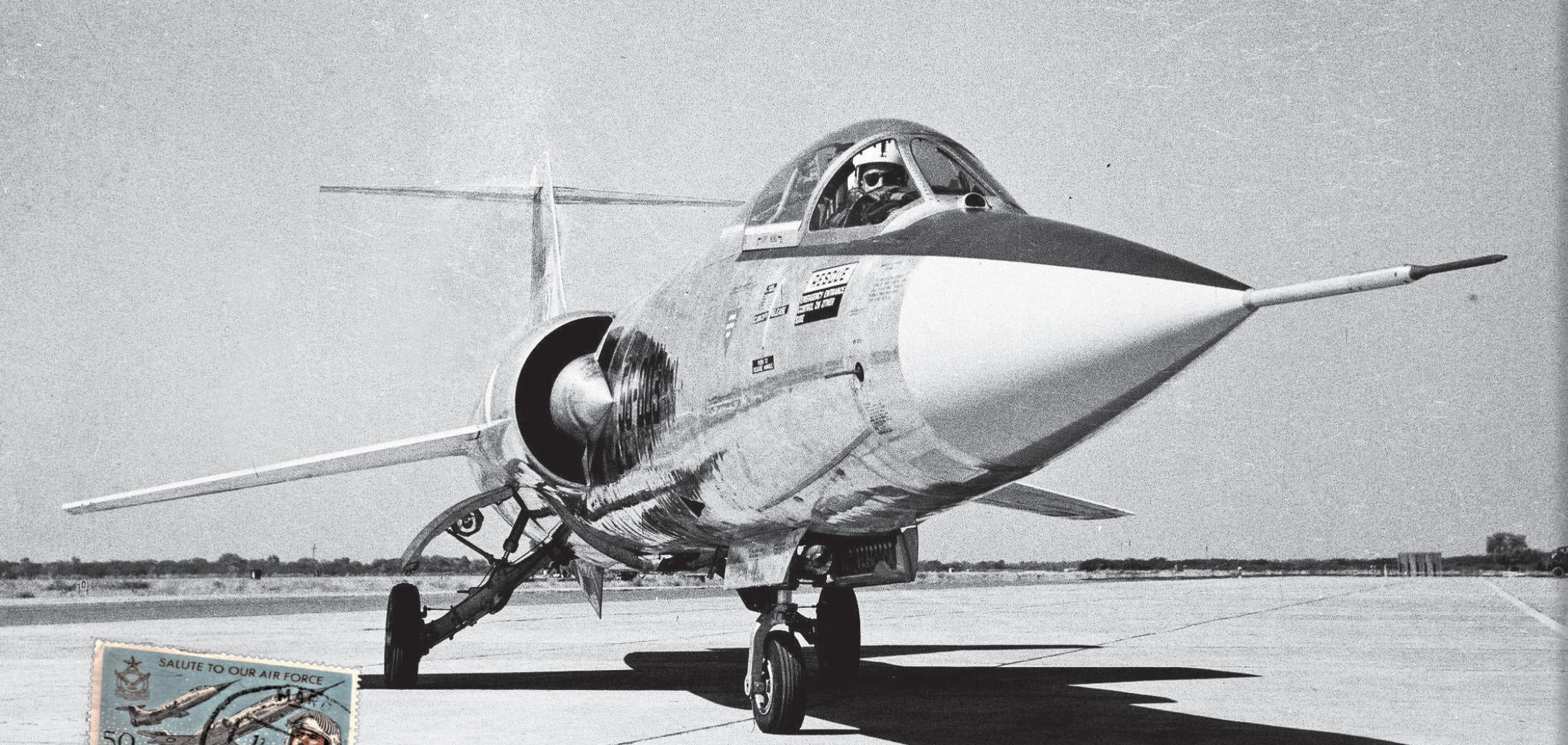


If you ask a teenager today, to draw or design a jet fighter, the ultimate result would surely resemble the likes of F-104 ‘Star Fighter’- every fighter pilot’s dream of 1960s era. Interestingly, it looked less like a plane and more like a rocket with some extra bits added as afterthought. That’s the reason it was famously nicknamed sometimes as ‘Missile with a man in it’, or ‘Flying Pencil’ or ‘Manned Missile’. It appeared to be a ‘Speed Machine’, breaking velocity and altitude records world over. Its long thin fuselage – with a tiny cockpit perched behind its pointy nose and short stubby wings – makes it look state-of-the-art even today. One can only imagine how revolutionary it seemed when it was first unveiled in the 1950s.

The world owes the design criteria for the F-104 Starfighter to the Korean War. USAF pilots operating during the Korean war were amazed with the high performance of Soviet Mig-15 fighters. The Migs could outrun and out-turn any Western jet operating in the region. Naturally, they wanted something potent, which could beat the Mig-15s. With this comes into play, the role of Clarence ‘Kelly’ Johnson, the famous aviation expert who was instrumental in designing the fastest fighter of the world, the SR-71 ‘Black Bird’.

Acknowledgment: The editorial team is thankful to Mr Usman Shabbir and Mr Yawar Mazhar for providing valuable data for writing this article.





Johnson, with his team of experts, went out and met front-line US Air Force pilots during Korean war and asked them what they wanted in a next-generation fighter. The answers were hardly surprising....

"They wanted a lot more speed, altitude, and manoeuvrability," says aviation historian Ray Panko, of the Pacific Aviation Museum. "The F-104 gave them the first two but sadly not the third."

Clarence 'Kelly' Johnson's Special Project team at Lockheed, refined a number of possible designs to find the best compromise between these conflicting requirements. The final design featured a long, thin body which housed a single turbojet, a thin un-swept wing of short (21ft 9in or 6.63m) span and a T-tail.

The F-104 first flew in March,

1954. It made an almost immediate impact. The needle-nosed jet quickly earned the nickname 'the missile with a man in it', however, its official name remained the 'Starfighter'.

### Arrival of Star (Fighter)

As the Soviet threat grew in the region in the 1950s, Pakistan aligned itself with the United States of America under the newly formed SEATO (South East Asian Treaty Organization) and the later British sponsored CENTO (Central Treaty Organization) security pacts. The treaties were signed to contain the former Soviet Union. This

**“The first three pilots selected to undergo type conversion on F-104 in the US included Sqn Ldr M Sadruddin, Flt Lt Mervyn Middlecoat, and Flt Lt Alauddin 'Butch' Ahmed.”**

was the same time when PAF was fortunate to have a visionary leader like AM Asghar Khan at the helm of affairs. Taking advantage of the newly signed pact, AM Asghar Khan embarked upon a plan to modernise Pakistan Air Force based on the model of United States Air Force. Over the late 1950s and till the middle of 1960s, under the Mutual Assistance Program (MAP), PAF was equipped with American aircraft like the F-86 Sabre, T-33, T-37s, C-130s and B-57s, most important being the F-104. The Star Fighter, had by now stormed the world with its futuristic design and supersonic performance.

A total of 14 F-104 Starfighter aircraft were transferred to Pakistan, including 12 F-104A and two dual seat F-104B for training purposes. All the aircraft were ex-USAF Air Defence Command and were equipped with the 20 mm M61 Vulcan Gatling gun. It could also carry

**Above: Flt Lt Farooq F Khan (later became CAS, PAF) in the cockpit of F-104A. Notice the white painted wings.**

**Right Page Above: They did not Have it in Them to Quit - Starfighter pilots of No. 9 Sqn pose in front of a F-104A. Flt Lt Mo Akbar (left), Flt Lt Farooq F Khan (sitting) and Sqn Ldr M Sadruddin (right) pose in front of F-104A of No 9 Sqn.**

AIM-9B Sidewinder air-to-air missiles on wingtips. All aircraft delivered were also equipped with the C2 upward firing ejection seat and higher thrust General Electric J-79-GE-11A engines.

Pakistan was the first country in Asia to fly a Mach 2 aircraft. While most countries in Europe were flying subsonic planes and no country in Asia was flying aircraft of this class and technology, many questioned the PAF's ability to maintain this advanced system. However, the PAF's flying skills and technological competence were soon proven. The pilots and ground crew of No 9 Squadron, who had been handpicked from F-86 squadrons, became the envy of the PAF by gaining mastery of the aircraft. The performance of these dare devils in following years proved all the western critics 'wrong'.

The first three pilots selected to undergo type conversion in the US included Sqn Ldr M Sadruddin,



Serial	Model	Tail number	Date Received
1	F-104A-20	56-802	August 05, 1961
2	F-104A-20	56-803	August 05, 1961
3	F-104A-20	56-804	August 05, 1961
4	F-104A-20	56-805	August 05, 1961
5	F-104A-20	56-807	August 05, 1961
6	F-104A-25	56-868	August 05, 1961
7	F-104A-25	56-874	August 05, 1961
8	F-104A-25	56-875	August 05, 1961
9	F-104A-25	56-877	August 05, 1961
10	F-104A-30	56-879	August 05, 1961
11	F-104A-15	56-773	June 08, 1964
12	F-104A-20	56-798	March 01, 1965
13	F-104B-10	57-1309	August 05, 1961
14	F-104B-15	57-1312	August 05, 1961



Flt Lt Mervyn Middlecoat, and Flt Lt Alauddin 'Butch' Ahmed. Sqn Ldr Sadruddin was sent to George AFB, California (east of Los Angeles) and spent time with 434 TFS, 479 TFW. This was part of "on the job" training as an executive officer for a squadron for 6-7 months. Towards the end of the stay he transitioned to F-104s and flew about 22 hrs on the aircraft during his training. Sqn Ldr Sadruddin also became the first Pakistani to push the Star Fighter to Mach 2. The other two pilots went to an Air National Guard unit in South Carolina for type conversion. The fully assembled aircraft were shipped to Pakistan, arriving at Karachi harbour in August

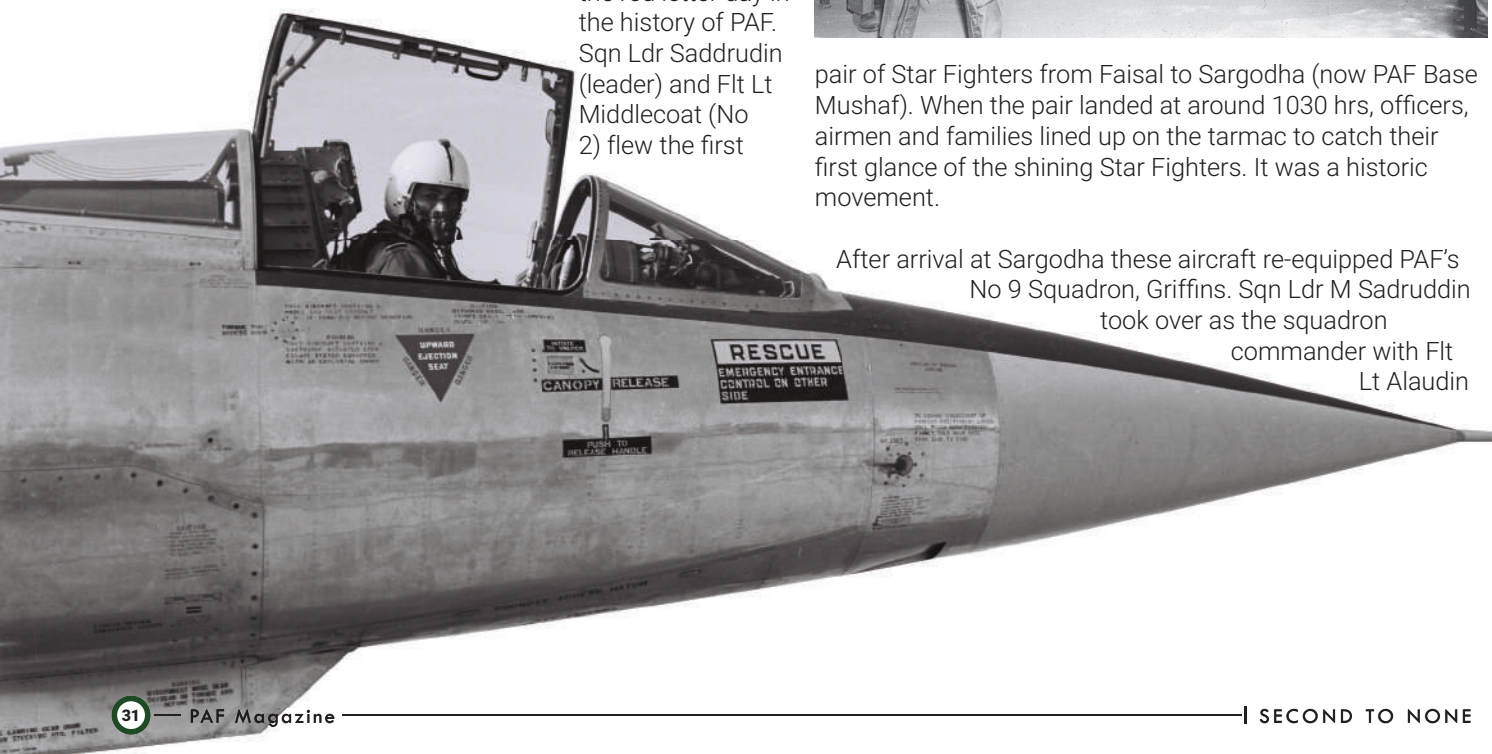
1961. The cargo reached Karachi harbour on board the USS Carrier CORE. Before these newly delivered Star Fighters could scream through Pakistani skies, they had to undergo a mundane journey. These supersonic jets were towed by tractors, from the sea port, through the streets of Karachi to PAF Station Drigh Road (now called PAF Base Faisal) at 3-5 mph during the night. Pilots sat in the cockpits to apply aircraft brakes if necessary. It was an exciting journey, especially for the general public to witness. Upon arrival at Faisal, the aircraft were assembled and were air tested.

15 September 1961 would always be remembered as the red letter day in the history of PAF. Sqn Ldr Saddrudin (leader) and Flt Lt Middlecoat (No 2) flew the first



pair of Star Fighters from Faisal to Sargodha (now PAF Base Mushaf). When the pair landed at around 1030 hrs, officers, airmen and families lined up on the tarmac to catch their first glance of the shining Star Fighters. It was a historic movement.

After arrival at Sargodha these aircraft re-equipped PAF's No 9 Squadron, Griffins. Sqn Ldr M Sadruddin took over as the squadron commander with Flt Lt Alaudin



Ahmed as his flight commander. Other early joiners included Flt Lt Jamal A Khan, Flg Off Farooq F Khan, Flt Lt Hakimullah, Flg Off M M Khalid, Flt Lt Arif Iqbal, Flt Lt Hashmi, Flg Off Amjad Hussain and Flg Off M Akbar.

That PAF senior commanders literally led from the front was demonstrated by the fact that then C-in-C Air Marshal Asghar Khan and some other senior officers attended the relevant ground school and undertook a number of familiarization flights on the aircraft. The conversion course included 2-3 weeks of academic classes followed by a few rides in F-104Bs and final check rides in a single seater. Once the pilot was qualified, an initial training period of 40-50 sorties commenced. This included navigation, formation flying, gunnery, air combat manoeuvring and interceptions.

### A Manned Missile

F-104's clean profile meant quick acceleration on take-off. Pilots had to be quick with retracting under-carriage as the maximum allowed speed of 240 knots for undercarriages down was reached quickly. That the gears retracted within 3 seconds of selection, was another small but impressive feature of the



aircraft. In case the pilot did exceed the maximum allowable velocity for gear down, he then had to enter a steep climb to bleed speed and reach the 240-knot figure.

"To say that the wing was 'thin' was an understatement. It had a maximum thickness of 4.2in (10.7cm) and its leading edge was so sharp that protective strips had to be fitted to avoid injury to ground crew. The wings offered no room for stowage, so the fuselage had to contain the retracted undercarriage and all the fuel tanks," recalls AVM

Amjad Hussain (Retd).

Starfighter's thin wing aerofoil and high wing loading left little room for mistakes at low speed. It had to be landed at a minimum 150 knots IAS (with engine RPM at 88-90%). Other impressive features included the powerful M61 Vulcan cannon. It fired 20mm shells at the rate of 66 per seconds, totally a monster.

### Going Super Sonic

The aircraft's sheer power and, if one could ascribe it a personality, was best illustrated

Left: A Star Fighter over picturesque Northern areas of Pakistan.

Left Page Inlets: Aiming for Triples- Flt Lt Hakimullah along with other legendary PAF pilots. Men of towering intellect and unsurpassed contributions to the art of war, focus on staying sharp to fly through the thunderstorms of the 1965 Indo-Pak conflict.

Left Page Above: F-104A with two wing tip side winders and two underwing fuel tanks rolls down on the runway with drag chute fully extended. PAF had indigenously modified their Starfighters enabling them to carry Sidewinders on underwing pylons as well.



AM Asghar Khan, C-in-C PAF along with officers of No 9 Sqn at PAF Base Peshawar.



by the mission profile for going to Mach 2. "The first requirement for such a mission was to find out where the tropopause was on a particular day. This was important as the aircraft acceleration is quickest at this altitude. Once the tropopause had been determined the sortie could begin," narrates AVM Amjad Hussain (Retd) while talking to the author. The configuration for going Mach 2 meant a clean aircraft, without external tanks or air to air missiles.

A standard subsonic climb at Mach 0.9 to the tropopause (generally around 37,000 to 40,000 feet in summer) was made. After levelling off and getting into the transonic regime at Mach 0.9 and level flight, full afterburner was selected and the acceleration to Mach 2 began. The acceleration was quite rapid and going supersonic took only a few seconds. It was hardly noticeable except for a quick flick of

the Machmeter from 0.98 to 2. Upon attaining Mach 2 the procedure for slowing down had to commence immediately or the airplane could accelerate well beyond Mach 2!!!.

### The First Test-1965 War

As tensions between the two regional rivals worsened into armed conflict over the Rann-of-Kutch dispute in April 1965, a detachment of two F-104s was immediately sent to PAF Station Mauripur (now PAF Base Masroor) to reinforce the existing F-86F and B-57 squadrons. This was the first time PAF's F-104s saw operational duties during a conflict situation. Full scale hostilities broke on 6<sup>th</sup> September, 1965, with F-104s tasked for air defence duties. The honour of achieving the first kill with the outbreak of declared war also belongs to a Star Fighter. It was on an early morning CAP on that day when Flt Lt Aftab Alam (later retired as Wg Cdr),

Sorties 1965 War	
Air Defence (Day)	246 sorties
Air Defence (Night)	10 sorties
Counter Air	04 sorties
Escort	04 sorties
<b>Total:</b>	<b>264 sorties</b>

Sorties 1971 War	
Air Defence (Day)	56 sorties <small>(incl 27 over battle area)</small>
Air Defence (Night)	18 sorties
Counter Air	24 sorties
Maritime Recce	06 sorties
<b>Total:</b>	<b>104 sorties</b>



encountered a formation of four IAF Mystere aircraft, which was attacking a passenger train near Rahwali. Vectored to the location by Flt Lt Farooq Haider from Sakesar radar, Aftab Alam dashed head-on through the centre of Mystere formation at supersonic speed, leaving the enemy in disarray. In the ensuing combat at treetop level, Aftab outmanoeuvred the opponents to claim an IAF Mystere with an AIM-9B Sidewinder and damaging the other with his lethal Vulcan Gatling gun. The remaining two managed to run away to safety, only to tell the tale of "dreaded F-104 and its deadly Sidewinder". Apart from being the first encounter to commence the war in earnest, the engagement was also significant in other respects. It marked a new era of dog-

fighting at almost treetop level. Not only was it the first combat kill by any Mach-2 aircraft in the world but was also the first missile kill for the PAF.

The result was obvious, IAF was devastated. It wanted revenge the next day. However, the dream of taking revenge turned out to be a nightmare for them. The first IAF air strikes on PAF bases took place on the morning of 7<sup>th</sup> September, 1965. It was at 0530 hrs that the first IAF strike on PAF's Sargodha air base was detected when the formation of 6 IAF Mysteres was already pulling-up to attack the airfield. Airborne Flt Lt Amjad Hussain Khan (later retired as AVM) in a F-104A was vectored by

1.F-104A shows off its lethal Gatling Gun with cannons during a static display at PAF Sargodha.

2. Men who Mattered the Most - A group of PAF engineers, technicians and ground crew pose with the PAF fleet of Star Fighters at PAF Sargodha. Some of the pioneering F-104 pilots are also seen in the group.

3. Stars of the show - A formation of No. 9 Starfighters over Lahore - 1965

4. Flt Lt Farooq Umar helping AM Nur Khan, C-in-C PAF, starting F-104A Starfighter- circa 1966.

5. Flt Lt Aftab Alam (PAF pilot with first F-104 supersonic kill) pose with Star Fighter.

6.'If you're thinking 'An astronaut', think again' - A PAF pilot, wearing a specially designed pressure suite, prepares for a high altitude sortie on F-104 Star Fighter.



ground control to intercept the raid. Flying at supersonic speeds, Amjad claimed one Mystere with his deadly AIM-9B and the other one with his cannons. In the melee, Amjad's aircraft went through the debris of exploding enemy aircraft. He ejected safely and made it back to Sargodha air base on a bicycle, a horse and was picked up in a helicopter!!!

### End of Night Intruders

Star Fighter's rate of climb was

exceptional. It was designed to catch up with enemy aircraft before they could release their weapons – a role known as 'interceptor' – which meant it needed to reach its targets quickly. A Starfighter pilot could reach 48,000ft (15 kilometres) in one minute, a feat still impressive. The Starfighter would fly fast and straight, firing its missiles from many miles away, and turning back to base before its target had time to respond. This capability was

put to good use by PAF during the 1965 war while intercepting the IAF Canberras. PAF's tactics during the war included single or pairs of Starfighters providing top-cover to CAPS of F-86s. In addition, F-104's radar based fire control system meant that it was the only fighter in PAF's inventory which could take up the role of a night interceptor against IAF Canberra.

The first positive contact between an F-104 and a Canberra took place on the night of 13<sup>th</sup> September, when Sqn Ldr Middlecoat (later attained Shahadat during 1971 war with award of SJ with bar) fired a Sidewinder on a Canberra in a blind intercept. An explosion was seen at a range of 4,000 ft but no confirmation was possible as the encounter took place over Indian territory. Later, reports revealed that the aircraft was destroyed. However, a confirmed kill was obtained on the night of 21<sup>st</sup> September, when Sqn Ldr Jamal A Khan (later became CAS PAF) made radar intercept of an egressing Canberra and shot it down with an AIM-9B Sidewinder. In this particular case the IAF Canberra climbed earlier than usual due to fuel considerations and failed to switch on its tail warning radar on ascent. Sqn Ldr Jamal saw an opportunity and shot the night intruder down with his lethal sidewinder missile. The pilot ejected and was captured by Pakistani forces.

**Above: A Perfect Example of 'Missile With a Man in it' - A lone PAF Star Fighter during a high altitude cruise.**

**Left Centre: 'Hunter with the Prey' - Smiling Flt Lt Hakimullah (later became CAS, PAF) pose in front of IAF surrendered Gnat at Pasrur airfield.**

**Bottom Page: All Stars in Front of a Star (Fighter) - Wg Cdr MM Alam (3<sup>rd</sup> from right) along with initial batch of PAF Star Fighter pilots at PAF Sargodha.**

**Right Page: AM Asghar Khan, C-in-C, PAF in the cockpit of F-104, getting ready to lead the PAF fly-past on Pakistan Day Parade.**



### Catch Me if You Can!

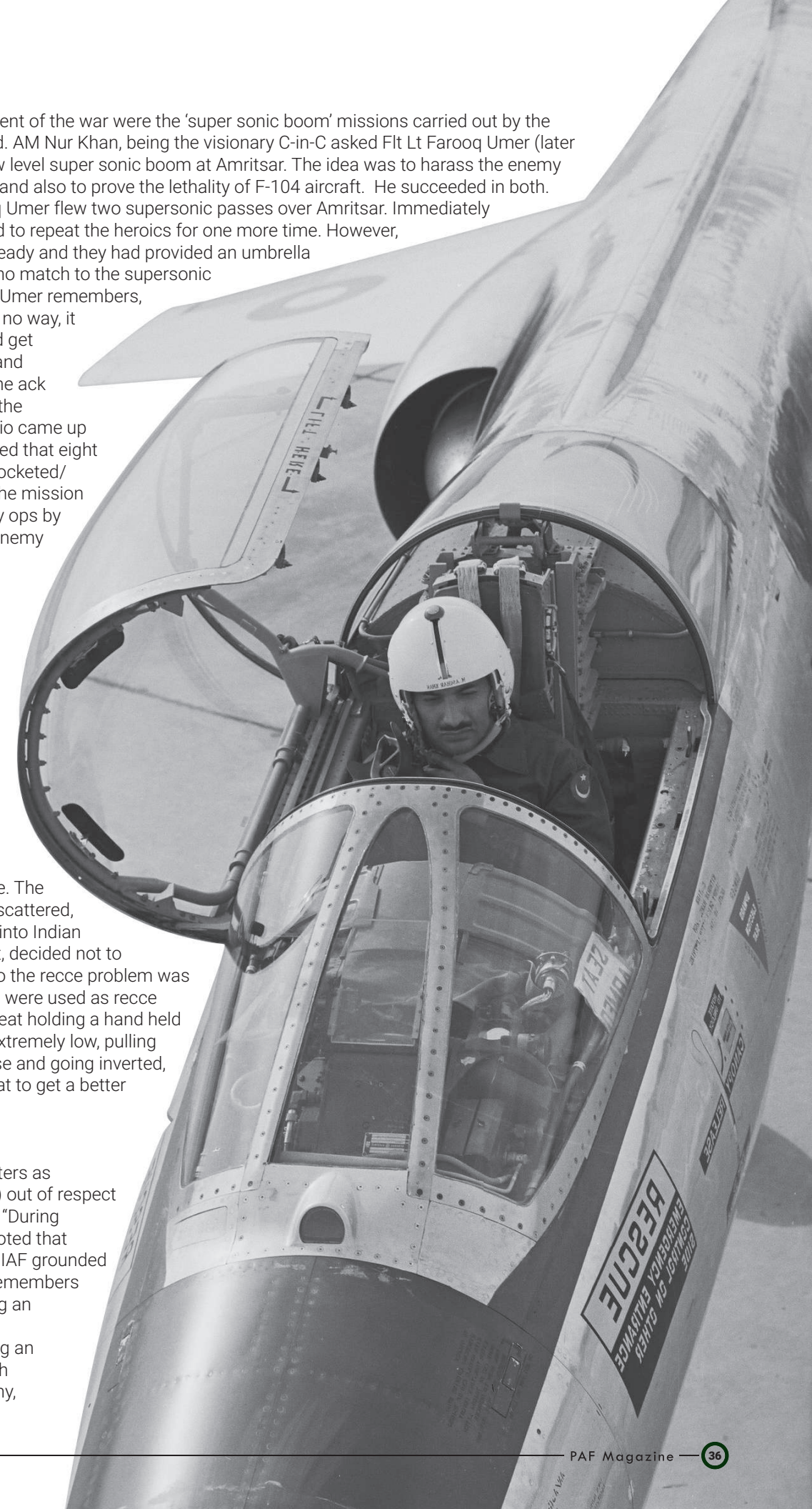
Perhaps the most interesting event of the war were the 'super sonic boom' missions carried out by the 'Speedster' over Amritsar airfield. AM Nur Khan, being the visionary C-in-C asked Flt Lt Farooq Umer (later retired as AVM) to perform a low level super sonic boom at Amritsar. The idea was to harass the enemy in the opening round of the war and also to prove the lethality of F-104 aircraft. He succeeded in both. On that fateful day, Flt Lt Farooq Umer flew two supersonic passes over Amritsar. Immediately after the first pass he was asked to repeat the heroics for one more time. However, this time the Indian guns were ready and they had provided an umbrella of ack ack fire but they were of no match to the supersonic flight of the Star Fighter. Faroor Umer remembers, "The sky was red and there was no way, it appeared, that any aircraft could get through, yet I was not deterred and went through the mountain of the ack ack fire for the second time. By the time I landed back, All India Radio came up with interesting stories. It narrated that eight F-86 aircraft attacked and had rocketed/ bombed the Amritsar airfield." The mission thus succeeded in achieving psy ops by creating confusion among the enemy ranks.

### Reconnaissance Role

PAF's reconnaissance fleet consisted of RT-33 aircraft, which were ill-suited for any recce missions in a high threat area. Therefore F-104s were used to escort any such recce missions and a pair of F-104s had to criss-cross the slower RT-33 to maintain formation. On at least one such mission the PAF formation came across an IAF Hunter formation, which appeared to be returning to base. The IAF Hunter formation promptly scattered, and the PAF F-104s being deep into Indian Territory with an RT-33 to escort, decided not to pursue. An innovative solution to the recce problem was found when two seater F-104Bs were used as recce birds with the pilot in the back seat holding a hand held camera. The F-104B would fly extremely low, pulling up slightly near the target airbase and going inverted, allowing the pilot in the back seat to get a better view for recce photos.

### Nick Named 'Badmash'

IAF had nicknamed the Starfighters as "Badmash" (meaning scoundrel) out of respect and dread it had for the aircraft. "During the 1965 war, the F-104 pilots noted that whenever they got airborne, the IAF grounded all its aircraft. It frustrated us," remembers Wg Cdr Aftab Alam (Retd) during an interview with the author. "My brother Flt Lt Mushtaq, flying an F-104 in the same squadron with me made contact with the enemy,





only to note the IAF Hunters disengaged well in time. Flt Lt "Micky" Abbas in a F-104 had a similar episode. This experience would be repeated for the F-104 pilots for all daytime interceptions. I personally patrolled in a lone F-104, at 30,000ft, deep inside Indian territory, over the two Indian fighter airfields of Adampur and Halwara for one hour. The Indians did not respond. This was total air superiority for PAF, and it displayed the supremacy of the Starfighter as well," reminisces Wg Cdr Aftab Alam (Retd). The star fighter became a nightmare for IAF pilots. The following episode would adequately summarise this claim.

On 3<sup>rd</sup> September, 1965 a CAP of two PAF Sabres was bounced by six IAF Gnats with PAF air defence controller scrambling an F-104 flown by Flg Off Abbas

Mirza to the aid of the Sabres. The IAF Gnats scattered on sighting the charging Starfighter, "Pajh oye ... 104 ayaeeee" is how Sqn Ldr Brij Pal Singh announced the arrival of the Starfighter. Roughly translated in English it means 'run...it's a 104'. But as translations go it misses the point and only a Punjabi speaker can understand the sheer panic and loss of composure of this call. In the meantime another F-104 was vectored to aid the fight. By the time, Flt Lt Hakimullah (later retired as ACM) arrived, the Gnats had already split. Perhaps mixing this Starfighter with the first one or realising that there are now two F-104s, Sqn Ldr Brij Pal Singh concluded that safely egressing to India was not possible against the supersonic Starfighter. Ultimately, he lowered his gears as a sign of surrender and landed at a nearby disused airfield at Pasrur

in Pakistan. The surrendered Gnat continues to serve as a war trophy at the PAF Museum at Karachi.

At medium and high altitudes the F-104 ruled the sky. The IAF refused to challenge the Starfighter. However, below 5,000ft a fierce battle raged between the F-86 and the IAF fighters, mainly the Hunters and Gnats. The F-86 was the workhorse of the PAF, it was under-powered, outnumbered, and out-gunned. Nevertheless the F-86 pilots showed courage, fearlessly engaging their opponents, and displayed an unusual skill for air combat, achieving an excellent kill ratio. Important thing was the F-104 controlling the sky at medium and high altitude, had reduced the workload for the F-86's to the extent that the numbers were manageable. The F-86's could now hold their own against the enemy at low altitude. The F-104/F-86 lethal duo had won the air battle for the country. From day one of war, PAF had fully established air superiority, thanks to the scare created by the handful of star fighters. "The job had been done; later the numbers did not matter much. The will of the enemy to fight the F-104 had been broken. The Starfighter reigned supreme. It had played a vital role for the defence of Pakistan and the supremacy of the PAF", concludes Wg Cdr Aftab Alam (Retd).

**Left Top: Sqn Ldr M Sadruddin (3<sup>rd</sup> from right) along with pilots of No 9 Sqn at PAF Sargodha during 1965 war.**

**Right Page Top: Flt Lt Farooq F Khan (later CAS, PAF) pose in style, in front of the sleek looking F-104 at PAF Sargodha.**

**Right Page Centre: Excellence is our standard and tradition-AM Nur Khan (C-in-C, PAF) having a quick word with Sqn Ldr Middlecoat after a training sortie on PAF F-104 at Sargodha.**

**Two Page Spread (Bottom)- PAF Armada: F-104 line up at PAF Sargodha kept giving sleepless nights to enemy during 1965 war.**

## Modifications

Resultantly, during 1968-69, at least one of the two F-104Bs was modified to carry Swedish made reconnaissance cameras (TA7M) in the rear seat. There were three cameras in one set of equipment, two oblique cameras and one vertical. The vertical camera was installed in the centre and oblique cameras fixed on either side of the vertical camera for a total photo coverage angle of 170 degrees. This gave the F-104B the capability to look deep inside the enemy territory from a safe distance with coverage area depending on the height at which the aircraft would be flying. This modification flew quite a few trial missions before the 1971 war and the results were encouraging. Another important modification was installation of radar homing device on a single F-104A aircraft. This device called SLARD (Short range Low Altitude Radar Detection) and alternately Radar Locator (RALOR) was sourced through an American source and initial trials were carried on a twin engine communication plane. Based on results of such trials it was decided to fit an F-104A aircraft with this equipment.

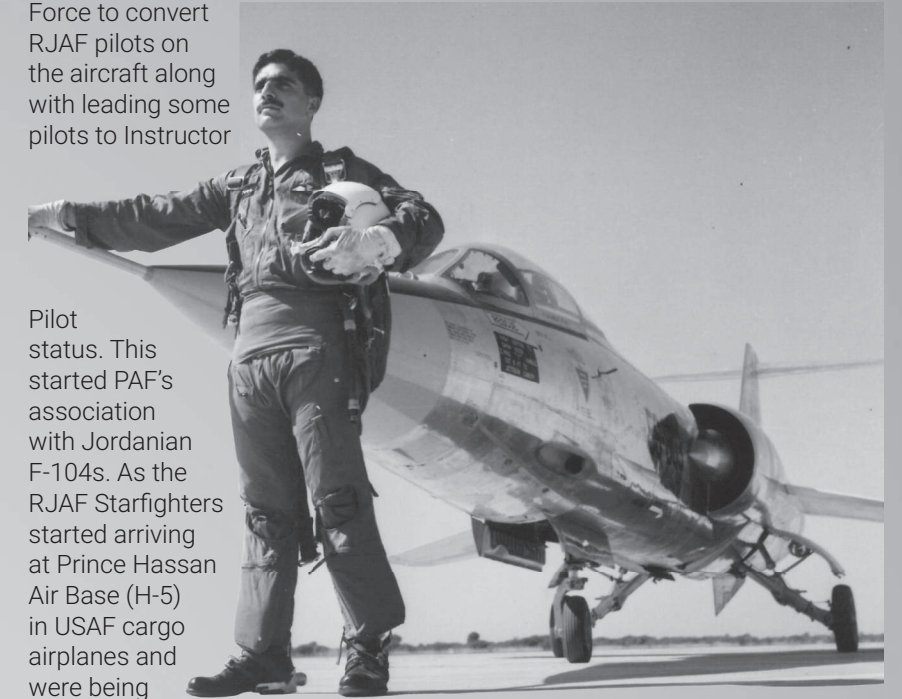
## Assistance to Royal Jordanian Air Force

In 1968 Royal Jordanian Air Force (RJAF) had inducted F-104 A&B Starfighter aircraft and a request was made to Pakistan Air

“ At medium and high altitudes the F-104 ruled the sky. The IAF refused to challenge the Starfighter. From day one of 1965 war, PAF had fully established air superiority, thanks to the scare created by the handful of star fighters. ”

Force to convert RJAF pilots on the aircraft along with leading some pilots to Instructor

Pilot status. This started PAF's association with Jordanian F-104s. As the RJAF Starfighters started arriving at Prince Hassan Air Base (H-5) in USAF cargo airplanes and were being assembled and test flown by test pilots from Lockheed Martin, PAF aviators deputed to RJAF started the pilot conversion program. Standard operating procedures, Flight Orders, check lists, flying syllabus, boards and charts, and all other operational aspects that were required for the establishment of fighter squadron, were produced. Initially 15 pilots were converted, including Major Ihsan Shurdum who later rose to command the RJAF. King Hussain of Jordan, himself a keen aviator, was a regular visitor to the F-104 squadron. This association with RJAF turned out to be useful during testing times for the country later, during the 1971 war.





### The Second Test-1971 War

As India-Pakistan tensions mounted around mid-1971, a number of pilots with previous F-104 experience were sent to Jordan for regaining currency on the aircraft. Pilots returning from Jordan were reposted to PAF's No 9 squadron. In Jordan, PAF pilots could also undertake Dissimilar Air Combat Training (DACT) with Jordanian Hunters (given the significant presence of the type with IAF). When war broke out in the first week of December, some pilots were still in Jordan and had to hurry back. Wg Cdr Middlecoat was one of the notables who rushed home

and joined No 9 Sqn stationed at Masroor. Later, he embraced Shahadat while attacking an IAF airfield and was awarded with Bar to SJ after the war. With outbreak of hostilities on 3<sup>rd</sup> December, PAF carried out pre-emptive strikes on forward Indian air force bases and radar units. As part of these pre-emptive strikes, No 9 Squadron was tasked to attack Amritsar, Faridkot and Bernala radar stations. Wg Cdr Arif Iqbal (OC No 9 Sqn), Sqn Ldr Amanullah, Sqn Ldr Amjad Hussain along with Sqn Ldr Bhatti played a key role in

neutralising Indian radar stations in the opening round of the war. During one of these missions on 5<sup>th</sup> December, Sqn Ldr Amjad's aircraft (Tail No 56-804) was hit by anti-aircraft guns deployed around the radar station. He turned towards Pakistan, hoping to recover when his wingman gave an ejection call, confirming that fire was spreading. Amjad ejected and was taken POW.

### Friends Join In

On 6<sup>th</sup> of December No 9 squadron was ordered to move to PAF Base Masroor, Karachi. For the rest of the war the squadron performed day and night Air Defence and Counter Air Operations from this base. It was at PAF base Masroor that the squadron received F-104s provided by the Kingdom of Jordan in support of Pakistan during the 1971 war. On 13<sup>th</sup> December, when the Jordanian No 9 Squadron pilots were about 200 miles out from Karachi, a PAF Starfighter formation led by Sqn Ldr Amanullah got airborne to escort them to Masroor as they were unarmed. Sqn Ldr Amanullah was in formation with Major Ihsan Shurdom and Awni Bilal to guide them

**Left: Picture Perfect - Sqn Ldr Jamal A Khan (later CAS, PAF) pose in front of F-104 A at PAF Sargodha.**

**Bottom 1<sup>st</sup>: First Supersonic Kill: Flt Lt Aftab Alam Khan shoots down an IAF Mystere during 1965 war.**

**Bottom 2<sup>nd</sup>: End of Night Intruder: Sqn Ldr Jamal A Khan shoots down IAF Canberra in Fazilka sector during 1965 war.**

**Right Page Center: Friends Come for Help: Sqn Ldr Amanullah escorts the arriving Jordanian Air Force F-104s at Karachi.**

**Right Page Bottom: Operating from PAF Mauripur (now PAF Masroor), a detachment of F-104 from No 9 Sqn proved equal to the task during 1965 war.**

F-104 Kills- 1965 War	
3 <sup>rd</sup> September 1965- Force Landing of an IAF Gnat	Sqn Ldr Brij Pal Singh Sikand while flying a Gnat (Serial No. IE1083) force landed on a disused PAF airfield after an aerial engagement with PAF F-104. The pilot was captured by Pakistan Army troops.
6th Sep 1965- Shooting Down of IAF Mystere	Sqn Ldr Aftab Alam Khan shoots down a Mystere near Rahwali railway station using a Sidewinder missile.
7th Sep 1965- Shooting Down of IAF Mystere,	Sqn Ldr Ajamada B Devayya from IAF No. 1 Sqn was shot down by F-104A flown by Flt Lt Amjad Hussain. The loss is confirmed and accepted by both sides.
14th Sep 1965- Shooting Down of IAF Canberra	Sqn Ldr M L Middlecoat intercepts and shoots down IAF Canberra's at night by firing Sidewinder. The Canberra was part of a larger formation that had just attacked Peshawar Air Base and was returning to India at 40,000 feet.
21st Sep 1965- Shooting Down of Canberra.	Sqn Ldr Jamal A. Khan shot down a Canberra using a Sidewinder, at night. The pilot was taken PoW while the navigator perished in the crash.



for landing at Masroor while orbiting overhead providing top cover.

### The Final Salute

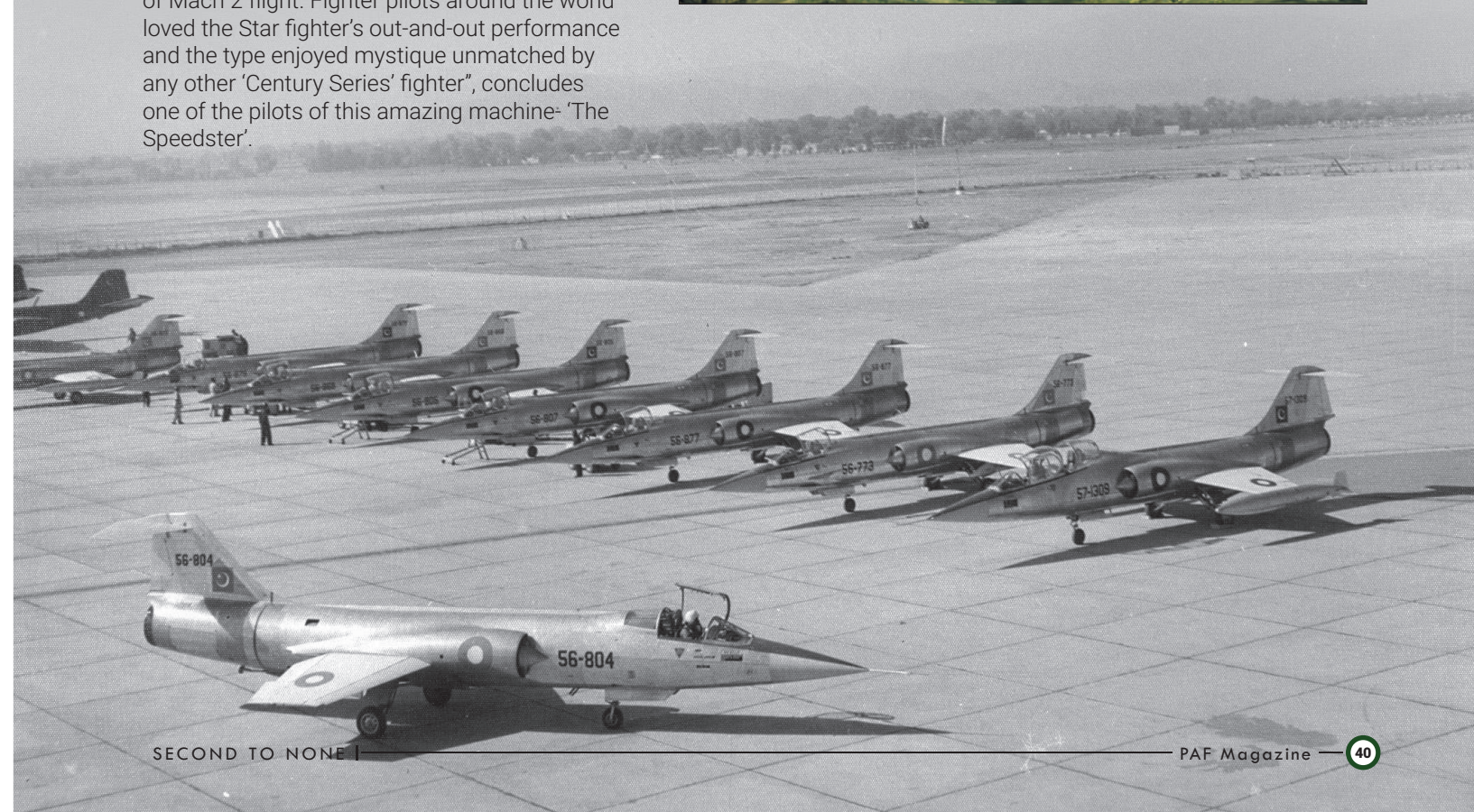
F-104s life in PAF was cut short by the US governments so called 'even-handed' arms embargo on both Pakistan and India after the two wars. The sanctions did not bother Indians much as they were hardly using any US military equipment. However, the embargo had a devastating impact on the PAF operations. In the face of growing difficulties in procuring spares for the US equipment, especially F-104s, PAF leadership ultimately decided to phase out the 'Star Fighters' in mid 1972.

A pair of F-104s lifts off from PAF Base Masroor on a humid afternoon of 21 June 1972, for a farewell flight, after serving the PAF for more than eleven eventful years including startling performance during two wars. Many heavy hearted pilots, technicians, families and enthusiasts witnessed the last flight. The honour of flying the last mission went to Sqn Ldr M Amanullah and Flt Lt Abbass H Mirza from No 9 Sqn. This ended the memorable story of PAF and its love with an engineering marvel, remembered by many as a "missile with a man in it".

"Yes, it was demanding to fly with a wingspan of just 21 ft 9 in. It had the engine-out glide ratio of the proverbial 'flying brick' – and nobody ever accused it of being manoeuvrable. But the Star fighter went fast, climbed like a homesick angel and introduced pilots of many nations to the joys of Mach 2 flight. Fighter pilots around the world loved the Star fighter's out-and-out performance and the type enjoyed mystique unmatched by any other 'Century Series' fighter", concludes one of the pilots of this amazing machine- 'The Speedster'.

### F-104 Kills- 1971 War

3 <sup>rd</sup> Dec-Destruction of Light Aircraft	While attacking the radar installation at Faridkot airfield, Sqn Ldr Amanullah strafed and destroyed a light aircraft. Later, Indian radio also confirmed the destruction of a light aircraft parked at Faridkot.
4 <sup>th</sup> Dec-Shooting Down of Gnat	Sqn Ldr Amanullah destroyed IAF Gnat using Sidewinder. IAF pilot, Wg Cdr Johnny Green ejected safely.
10 <sup>th</sup> Dec-Shooting Down of Alize of Indian Navy	Wg Cdr Arif Iqbal along with Sqn Ldr Manzoor Bokhari took off from Masroor Air Base in search for Indian Navy OSA Boats. Arif spotted an Indian Navy Alize aircraft at low level. Settling behind it in gun range, Arif shot it down with a gun burst. The Alize with its crew of three crashed into the sea.
11 <sup>th</sup> Dec-Destruction of HF-24 Marut of Indian Navy	Wg Cdr Arif Iqbal along with Sqn Ldr Amanullah as his wingman took off from PAF Masroor for a Fighter Sweep mission. Navigating at low level the Starfighter formation pulled over the Utterlai air base completely undetected and noticed two HF-24 Marut lined up on the runway for take-off. Amanullah aimed for one of the HF-24 and fired 170 rounds in one single burst, destroying the aircraft. Wg Cdr Arif got the other one.



# PAKISTAN'S DEFENSE BUDGET

## Myths & Realities

“Debunking the connotation that Pakistan Military is spending a mammoth chunk of the total GDP, the author takes us through an array of factual comparisons and logical arguments on Pakistan's Defense spending.”

by Dr. Usman W. Chohan

Centre for Aerospace and Security Studies (CASS)

In its idealized form, a budget should reflect how a society establishes its priorities given a finite amount of resources. At least that is what many scholars of the budget would like to think. In reality, there are many challenges that budgets have to surmount before they can be seen as adequate reflections of a society's aspirations. For Pakistan, there are several ways in which the federal budget does not reflect the aspirations of the people, including excessive debt servicing, as well as low expenditure on health and education. We now observe

that the competing constraints that the budget faces are intensifying as our finite resources pale in comparison to the country's needs.

As greater contenders vie for a slice of a stagnant (if not shrinking) economic pie, the tensions between competing priorities is heightened. It is in that context that specific interest groups have taken to sloganeering and media blitzes to target Pakistan's defense budget. They are egged on, of course, by external agents such as New Delhi, who would like to see Pakistan's defense capabilities weakened for their own designs. Their use of television, print media,

and social networks has propagated many myths about the role and scope of Pakistan's defense budget, and it is worth addressing their misinformation systematically.

### The Lion's Share?

One myth lies in the use of the expression "lion's share" to characterize the defense portion of the budget. There is in fact no "lion's share" in our federal budget, but the largest and most worrying chunk is in fact the debt servicing element. Nearly Rs. 3 trillion is to be spent in the fiscal year 2020/21 on interest payments (let alone retiring principal), which amounts to a staggering two-fifths of government expenditures. This debt servicing obligation is a form of cancerous servitude for the nation, and is a product of three underlying factors. First, it represents the anarchic sensibilities of an illiterate population that refuses to pay its share of taxes to fund a well-functioning state. Yet the public demands excellent schools and healthcare, without contributing a dime to the government coffers. Less than 2% of the population consists of taxpayers. Second, it represents the need to carry on the rudimentary functions of the state even when there is scant indigenous fiscal contribution. Third, it also represents the predatory nature of loan sharks such as the IMF, who have formulated lending agreements with many developing countries that swamp their populations with debt traps.

Defense spending is in fact Rs. 1.2 trillion in the current fiscal year, and so 2.5 times smaller than the debt servicing outlay of nearly Rs. 3 trillion.

This can be seen in Figure 1. Provincial transfers, subsidies, and running civil government are also important elements in addition to defense, but by far the largest segment is debt servicing. As such, since debt servicing is the real elephant in the room, drawing attention to the defense budget is a distractive gambit that should be considered in light of all expenditure categories.

### A Large Military?

It is often alleged that the Pakistani military is very large, notwithstanding the fact that it is the world's fifth largest country by population. Keeping the size of the national population in mind, Pakistan's number of military personnel per 1000 people is not even in the top 50 in the world. According to the International Institute of Strategic Studies' Military Balance report (Table 1), the total (active and reserve) military personnel per 1000 people in Pakistan is 88<sup>th</sup> in the world, which is in the same general range as the United States (70<sup>th</sup>) and India (95<sup>th</sup>), which also have large populations. Naturally, countries with forced conscription tend to rank much more highly, such as North and South Korea, Israel, and Finland. But to suggest that Pakistan's army is "large" misses both the regional security perspective as well as the context of a large population that must be protected. The population-adjusted assessment of

Rank [spaced]	Country	Total Military Personnel (Active + Reserve) per 1000 people
1	North Korea	306.1
2	South Korea	130.5
3	Cuba	110.9
4	Armenia	85.3
5	Taiwan	77.8
6	Israel	76.3
7	Singapore	65.6
8	Vietnam	56.9
13	Finland	45.5
15	Greece	34.1
16	Switzerland	28.9
21	Russia	24.3
22	Iran	24.3
70	United States	6.7
88	Pakistan	4.5
95	India	4.0
126	China	2.3

Table 1

“One myth lies in the use of the expression "lion's share" to characterize the defense portion of the budget. There is in fact no "lion's share" in our federal budget, but the largest and most worrying chunk is in fact the debt servicing element.”

interest. But the proportions of defense spending in relation to GDP have been much higher in the past, reflecting historic security challenges posed against the nation. Since 1947, Pakistan has been a stakeholder in the major global confrontations of each period: the de-colonization movement, where Pakistan was a liberator of nations from Algeria to Zimbabwe; the Cold War, where Pakistan was instrumental in the termination of the USSR; and the War on Terror, where Pakistan not only neutralized but defeated terrorism.

Pakistan relative to other countries helps dispel this myth.

### Rapid Growth

Another myth propagated is that of the defense budget's rapid growth, which would suggest that the military is beginning to siphon more of the state's resources for its own institutional

### Expenditures (Federal) 2020/21

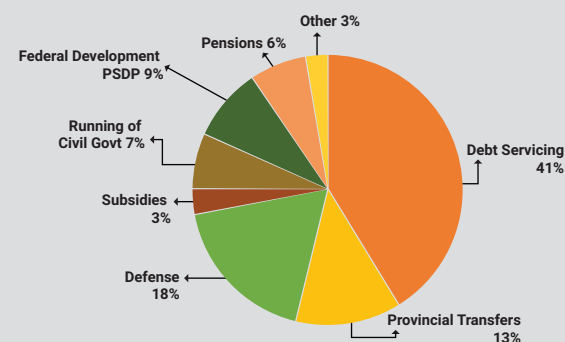


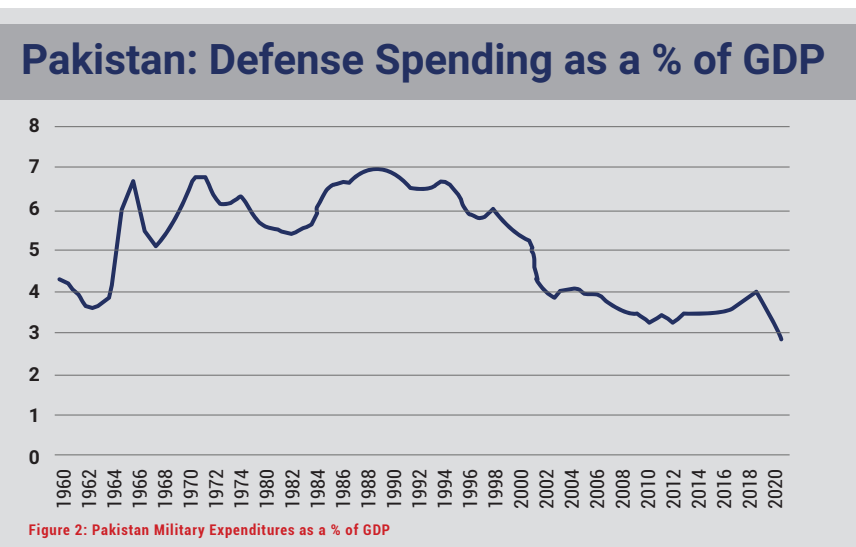
Figure 1: Federal Expenditures FY2020/21





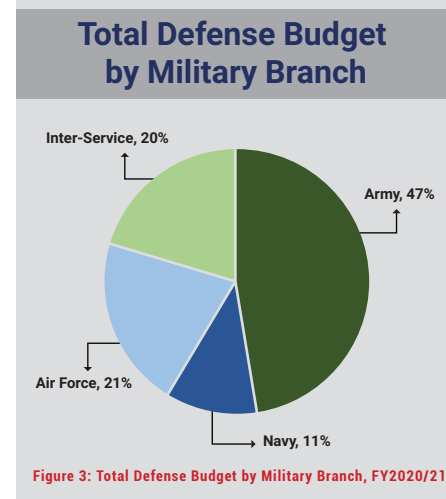
which indicates how the mid-20<sup>th</sup> century was characterized by spending in the range of 5-7% of GDP worth of annual military expenditures.

This declined considerably after 1995 and has ranged between 3.5%-4.0% of GDP over the past 20 years, declining further as current GDP consensus estimates and a military budget freeze in 2019 indicate. It is therefore difficult to claim that there has been a rapid growth in the country's military expenditures when seen in the context of the economy. In addition, one limitation in framing defense to GDP ratios is that fact that our GDP is not growing in tandem with many other countries. While all countries have borne the economic brunt of coronavirus in 2020, there are structural issues that impede our GDP trajectory and possible recovery. Our aim should nevertheless be to grow the GDP as denominator rather than cut defense as numerator.



### Army's Share?

Another myth is that the Pakistan Army takes up most of the military budget, leaving little for the other branches. There is some truth to the need to emphasize the importance of other branches, notably the Pakistan Air Force and its continued legacy of excellence in its defense of the realm through the optimization of its resources. But the notion that the army consumes the vast amount of the military budget is erroneous. This can be seen in Figure 3, where the army's share is less than 50% (Rs. 613 billion or 48%), while the PAF receives 21%, the Navy 11%, and an inter-services budget constitutes 20% of the total defense budget.



### Spending Per Capita?

An erroneous claim is sometimes made that Pakistan's military expenditures are the highest in the world on a per capita basis. Even a cursory glance at the claim would

“ Compared to the big spenders, Pakistan's military spending per capita is a true economist's bargain, creating value by providing security and defense to so large a population, and yet at so little a cost. ”

lead one to dismiss it out of hand, but it is worth examining global military expenditures per capita because they help to illustrate just how economical Pakistan's military expenditures are when adjusting for the size of the nation. Table 2 helps to state the case. According to the Stockholm International Peace Research Institute (SIPRI), military expenditure per capita in Pakistan is one of the lowest in the world. Despite this, it is a powerful fighting machine that has strived to defend the country against immense adversity through countless regional episodes. It helps to contrast the paltry \$47 per capita spending in Pakistan, which is comparable to Angola, Bolivia, and Mexico, and the effective use of that spending to thwart external aggression. Indeed, compared to the big spenders such as the United States and Israel, Pakistan's military spending

per capita is a true economist's bargain, creating value by providing security and defense to such a large population, and yet at so little a cost when adjusting for population.

### Discussion

Although scholars of the budget,

myself included, would like to think that the ideal budget would reflect the aspirations of a polity, the sad reality is that often they do not. The structure of Pakistan's government budget has been distorted in two basic ways. On the revenue side, the public has not borne its share of the nation-building effort through fiscal contributions, and so the tax base is a paltry 2% of the population. On the expenditures side, borrowing that has been undertaken in successive governments to fill the budget deficit has led to a ballooning of interest payments that swallow more than 40% of the entire expenditure segment, leaving little for the rest. It is in this context that, instead of seeing the economic pie grow, we find our national priorities stifled by a stagnant (perhaps shrinking) pie today. This leads to more bitter contention

Rank [Spaced]	Country	Military Expenditure per capita (\$USD)
1	Israel	\$2,402
2	USA	\$2,224
3	Singapore	\$1,932
4	Kuwait	\$1,833
5	Saudi Arabia	\$1,805
6	Oman	\$1,353
57	China	\$182
89	India	\$52
90	Bolivia	\$52
91	Mexico	\$51
92	El Salvador	\$50
93	Pakistan	\$47
94	Angola	\$46

Table 2

among vested interests who, rather than assume responsibility for their part in the problem, look to pointing fingers at everyone else, so that they might claim a larger budgetary slice. This is the situation in which local political interests, egged on by hostile agents abroad, create myths about defense spending in Pakistan that misinform the public and harm the longer-term security interests of the country. Some of the myths that were particularly prominent have been dispelled here, including: the supposedly high military spending as a percent of the national budget; a supposed growth in defense spending relative to the economy; supposed high per capita spending on the military; and supposedly bloated numbers of personnel. No access to privileged information was required to debunk such claims, and external databases have more than enough information to present the case for a lean, mean, fighting machine such as the Pakistani military, in all of its branches.

Would such counter-arguments stem the tide of fake news in local media and nefarious foreign outlets regarding

Pakistan's defense budget? Vested political interests would rather not have a look at the facts, and certainly avoiding letting the public know. In a post-truth era there is a dire need, above all in a largely illiterate society, to dispel propagandist elements and to show the commitment that the branches of the



Pakistani military hold to optimize their finite resources. Indeed, the ultimate aim of a sound budgetary architecture is to grow the pie, rather than shrink the pie and fight over the slices. In the terrible regional security environment that looms, with a fascist Hindu-supremacist state to the East, and a crumbled state of warlord factions to the West, security should not be taken lightly. After all, security forms the bedrock of all economic life.



# Hypersonic Weapons:

## The Next Arms Race?

“Hypersonic weapons have triggered the next arms race. With advanced nations and militaries scrambling to obtain this futuristic technology with immense and precise destructive power, it has become a major factor in determining which nation will emerge as the next big player on global scale.”

by Air Marshal M Ashfaque Arain (Retd) & Etfa Khurshid Mirza  
Centre for Aerospace and Security Studies (CASS)

The international strategic environment is characterized by a complex matrix of competing and overlapping security dynamics at various levels of global and regional order. Due to intensive qualitative or quantitative escalatory competition between two or more rival states, the focus is always on the acquisition of new offensive capabilities for power projection. Leading factors shaping the international military landscape include a number of complex internal and external environments.

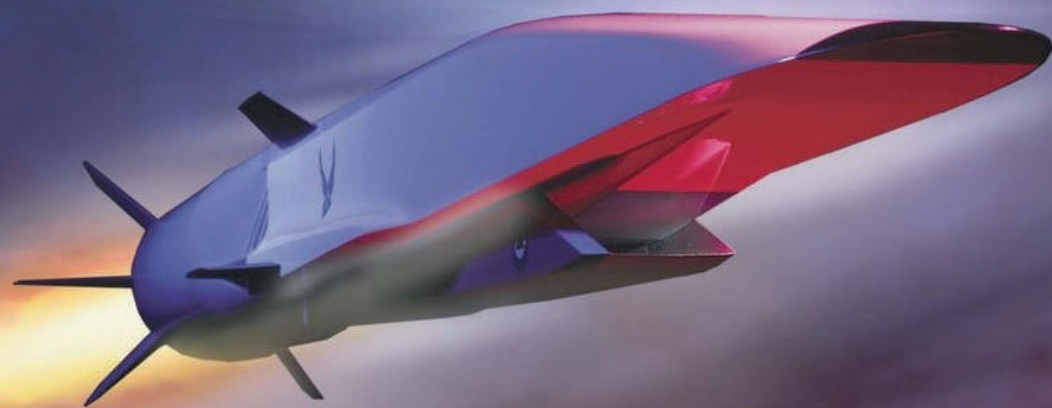
### Arms Race Leading to Technology Drive

The external environment shaping the arms race revolves around action-reaction model. Barry Buzan and Eric Herring describe this model as the strengthening of state's defence because of threats perceived from other states. This model implies that the dynamics affecting the arms race are driven primarily by the factors external to the state. Tensions and conflicts at the global and regional level contribute to instability, and continuation of these conflicts stimulates arms race among the contending states. Over-estimation of the threats perceived from the external environment leads to increased levels of arms spending. Arms manufacturers also accentuate the threat calculus for the states that are likely to invest in arms acquisition. Statistically, with over \$732 billion, the U.S ranked first in defense spending in 2019. Despite spending billions of dollars to establish dominance

over its rival, China, 'The U.S got ambushed by the future' writes Christian Brose in his book 'The Kill Chain: Defending America in the Future of High-Tech Warfare'. Here internal factors to arms race also come in to play as domestic influence dominates decision-making; leading to institutionalization of the military, research and development and diverting defence budget to developing new technology to achieve political objectives that play an important role in driving arms race. The race for military dominance always paves way for technological advancements.

### Birth of Hypersonic Missile Technology

Technological advancements by one side lead to the necessity and subsequent development of counter-measures by the opposing state. The new technology-lead arms competition always results in states making concerted efforts to amass their military power, focusing on incremental modernization to advance their defensive capabilities. This trend particularly makes countries embark on action-reaction arms acquisitions and pursue capabilities that are offensive in nature. Of late, however, enhancement of capabilities did not remain limited to long-range ballistic missiles, aircraft carriers, missile defenses and weaponization of outer space, but the



major powers went a step ahead in developing technology that is invincible to existing missile defenses due to its extensive manoeuvrability and fast speed i.e. the hypersonic missile technology. Hypersonic missiles, which include the hypersonic glide vehicles and hypersonic cruise missiles, introduce a new and potent threat to global security. Hypersonic glide vehicles operate on the same principles as the Intercontinental Ballistic Missiles (ICBMs); they use rocket boosters which carry them to the outer atmosphere. After reaching a certain height the glide vehicle separates from the booster, continues to glide and manoeuvre through

the space on its own power. Hypersonic cruise missiles (HCMs) are also called air-breathers owing to the scramjet engine which takes oxygen from the atmosphere, mixes it and creates combustion which is necessary to propel the hypersonic cruise missile.

#### Hypersonic vs. Ballistic Missiles

Hypersonic weapons are different from existing ICBMs due to their high manoeuvrability which makes them perceivably difficult to track and intercept. As present missile defenses are designed optimally to cater to the preeminent threat of ballistic missiles, therefore, hypersonic missiles travelling



close to two miles a second are not on their list. The usefulness of hypersonic weapons is due to their ability to strike high-value targets with precision at the onset of war, as the incapacitation of the adversary state helps the other state to get an early advantage at the beginning of the war. Speed is another significant factor which makes hypersonic weapons unique and it will consequently alter the calculus

Above: London to New York in Less Than an Hour: The X-51A Waverider possesses the ability to ride its own shockwave, accelerating to an impressive Mach 6. (Photo: dailymail.co.uk)

Left Bottom: The Ace Up Russia's sleeve: The imposing Russian Avangard hypersonic weapons system designed to counter conventional US ballistic missile systems. (Photo: Russian Ministry of Defence.)

“ A hypersonic weapon is a missile that travels at Mach 5 or higher, which is at least five times faster than the speed of sound. That means a hypersonic weapon can travel about two mile per second. ”



of war and deterrence equation. Due to their disruptive nature and ability to operate in certain areas, (A2/AD strategy) that limit ballistic and cruise missiles, makes hypersonic missiles the weapon of choice to have on inventory for countries like the U.S. The technological determinism and arms competition are driving major countries such as U.S, Russia and China to develop hypersonic weapons to enhance nuclear deterrence and strengthen their military capabilities.

#### Hypersonic Weapons Development by Major Countries – Strategic Rationale

The Hypersonic Arms Race is currently underway between the major powers of the world, with proven track of technological base coupled with the history of past rivalries as seen in the case of the U.S and Russia. The US and

China are now in an all-out competition and the race for scientific and technological supremacy makes their rivalry entirely different from the US-Russia case. Hypersonic weapons program of each country is influenced by a range of motives depending upon its strategic calculus and intended use of these weapons. The U.S is seeking hypersonic weapons to address China's growing military capabilities and to use these weapons in regional conflicts in conventional capacity. Hypersonic weapons program was part of the U.S global prompt strike program, which entails gaining the ability to target anywhere in the world within sixty minutes after a decision is made. After getting its program sacked due to several failed attempts in testing the hypersonic technology in 2010 and 2011, it got momentum again after Chinese test of the hypersonic glide vehicle DF-ZF. The U.S has again prioritized its hypersonic programme and is once again investing heavily in this technology. Russia's strategic manifestation of hypersonic weapons involves global and regional use concomitant of both

conventional and nuclear applications. After the U.S withdrawal from the ABM treaty, the U.S missile defences became an eminent threat for Russia's existing missiles; and to counter the unconstrained U.S missile defences, Russia developed hypersonic missiles. Countering NATO forces in Europe and the Atlantic is another motive for Russian pursuance of this technology. To counter these unwavering threats, Russia is developing various classes of hypersonic missiles to act as Night Witches, a Soviet asset crucial to its success during World War II. Chinese hypersonic program is focused in a regional context with its hypersonic glide vehicle DF-ZF apparently aimed to counter U.S threat in Asia-Pacific theatre. The end of cold war era envisaged the U.S-China rivalry to overtake the

while concurrently offsetting China in the technological domain. Indian hypersonic program is at the initial stage at present. Traditionally, India relied on proliferation or cooperation pathways to develop its weapons system; and this time again it is relying on Russia with around 49.5% Russian share in Indian BrahMos-II hypersonic missile development program.

#### Impact on Regional/Global Peace

The development of hypersonic weapons will increase the cost of war that these weapons would inflict on countries pursuing this trillion dollar arms race in the constrained defense budget era. China and Russia have deployed these weapons as



U.S- Soviet competition as the scholars speculated Asia-Pacific region to be 'ripe for rivalry'. Therefore, the Chinese strategic considerations related to hypersonic weapons are aimed at competing against the U.S forces in the region. Chinese ambitions in hypersonic weapons development are pushing regional states like India to indulge in similar endeavours as well. After the failed February 2019 misadventure against Pakistan, India is seeking hypersonic weapons to undermine Pakistan's capabilities and to gain an early advantage in conventional domain,

Anti-Access/Area Denial assets to undermine the U.S capability to operate in certain areas and to avoid U.S missile defenses. On the other hand, the U.S is using hypersonic weapons to counter Russian and Chinese A2/AD systems. For the U.S, in order to keep up with its rival states Russia and most pertinently China, it is important to tackle two major challenges. First is to develop and operationalize the hypersonic technology itself, and stay ahead of Russia and China. Second is to develop methods to defend against hypersonic weapons. The potential counter-measures that include directed energy weapons, space-based sensors, high powered lasers,



and electromagnetic guns and other means also have offensive applications as well; and their development will once again fuel the arms race dynamics with implications for international security, stability and peace.

Due to their capability to carry both conventional and nuclear warheads, the nuclear ambiguity is likely to lead to miscalculations and trigger pre-emptive strikes contributing to unwarranted escalation. Viewing from the defense economics perspective, each state indulging in hypersonic development race has three major challenges; feasibility, effectiveness and affordability. The development, testing and operationalization of these weapons are very costly, and keeping in view the defence budget constraints, affordability is a major challenge for the states developing such weapons.

Hypersonic missile technology also erodes the on-going and enduring struggle in arms control and disarmament domain. In the present international environment, there is a lack of political will to adopt policies and treaties that prohibit or limit their use. Despite their disruptive nature, there is no mechanism to regulate their development, testing, and production. This will provide, countries like India, a window to acquire this technology in the coming years, eventually having destabilizing effects for the



South Asian region. India's on-going technology fever coupled with arms exports will not only generate arms race in the region but will also push Pakistan to take qualitative and quantitative counter-measures to reinforce its strategic deterrent against India. Hypersonic weapons affect both components of strategic stability; arms race stability and crisis stability. On one hand, development of the hypersonic weapons by one state will provide thrust for rival states to pursue such technology leading to arms race instability. On the other hand, if a state is under threat of probable hypersonic attack – it would adopt counter-measures which may be destabilizing in nature, hence contributing to crisis instability. Hypersonic weapons program

of all the major powers is motivated by the need to offset the technological supremacy of their opponent. The Bomber Gap rationale from the Cold War era is playing its part in convincing the leadership and military-industrial complexes of these countries to stay ahead or at least equal to each other in military hypersonic technology to avoid catch 22 situation in a crisis. The hypersonic weapons race may take years or decades to reach its operational phase, but it is on, and countries pursuing this spell-binding technology have no other way but to chase it. These weapons will remain a cause of concern for international peace and stability unless stabilising treaties and protocols are established.

Above: AGM-183 Air Launched Rapid Response Weapon hypersonic missile which was chosen over the Hypersonic Conventional Strike Weapon by the US (Photo: Lockheed Martin artist concept.)

Bottom: Launched from aerial platforms, the Boeing X-51 Waverider is an unmanned research scramjet experimental aircraft for hypersonic flight at more than Mach 5 and an altitude of 70,000 feet. Below, it can be seen fitted under the wing of a B-52, ready for flight, at Edwards Air Force Base. (Photo: Boeing)





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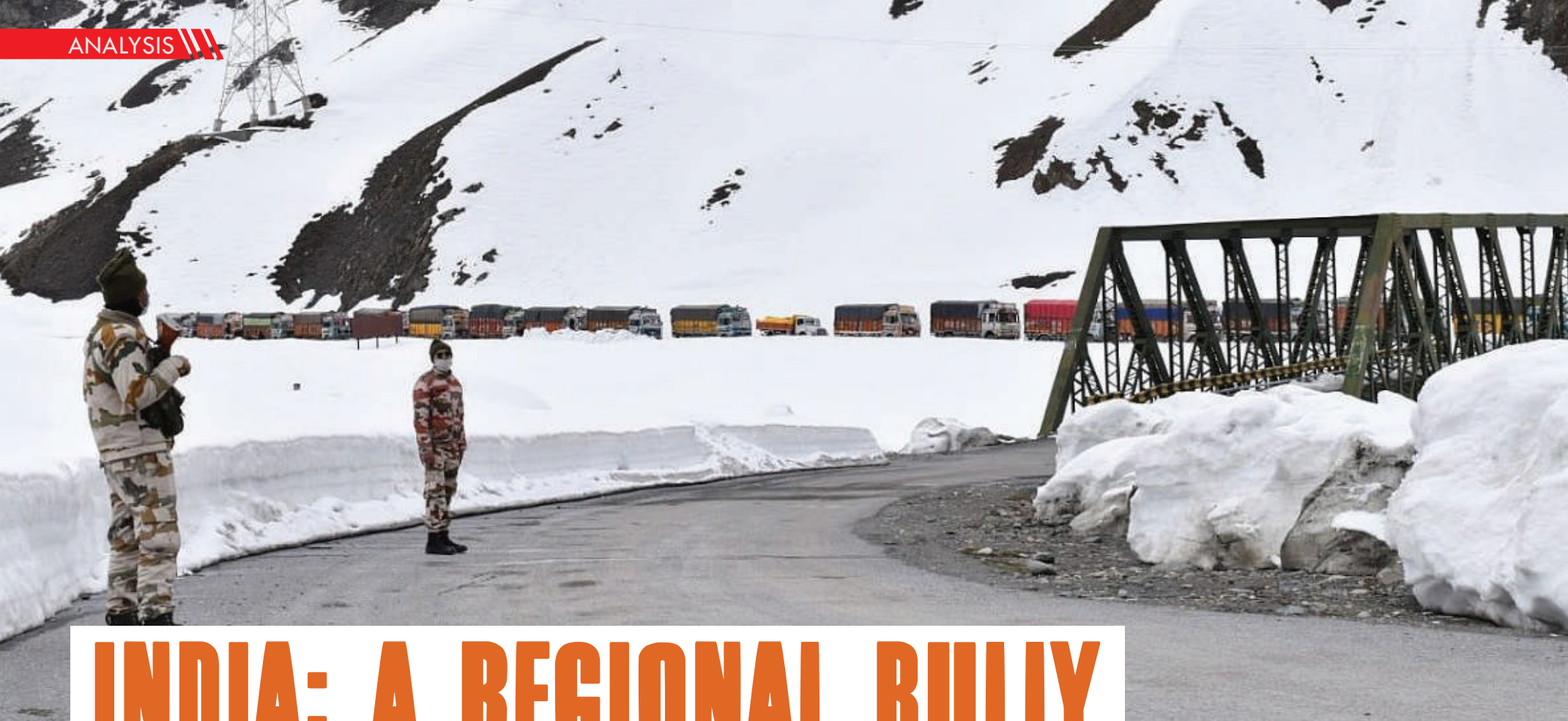
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# INDIA: A REGIONAL BULLY

IN THE BACKDROP OF RECENT DISPUTE WITH CHINA AND NEPAL

“As it attempts to strong-arm smaller states to further its hegemonic agenda, India has disillusioned the world to its claim of being an ethical democracy. Pakistan has identified India as the regional hooligan since its independence, fighting its ulterior ploys on every front. However, now, the need to curb its efforts is greater than ever, as it tries to dominate China and Nepal.”

by Aneeqa Safdar

Centre for Aerospace and Security Studies (CASS)



A country that has derived its national philosophy from schemers like Chanakya who had out rightly preached subtle wars against the fellow states has gradually reached a point where it no longer feels the need for covertness to extend its belligerence. The self-proclaimed big brother of South Asia, India, under its current ultra-Hindu-nationalist leadership is all geared up to ascend the revisionist and irredentist paradigm in a bullish way.

India's hegemonic aims were never veiled by its national leadership. They not only perceived India as a natural leader of the South Asian region given its size, location, and economic potential, but the founding fathers like Nehru

also foresaw it as a major player on the world stage owing to the 'greatness of their country'. This very desire of recognition and national prestige kindling in their hearts since independence when met with the rising wave of Hindu nationalism in the country emboldened India to exert itself as an indispensable player in the region.

India is currently being ruled by the Bharatiya Janata Party (BJP) under the premiership of Narendra Modi who is a great devotee of Hindu nationalism stalwart, Shri M. S. Golwalkar. Golwalkar viewed International Politics as a place where the law of jungle applied and advocated for a martial (Hindutva) spirit in the nation that can strike terror in the hearts of others. India, under the leadership of Narendra

Modi is pursuing the same ethos of Golwalkar by openly pursuing hegemonic as well as expansionist aims. These very actions of India, nevertheless, have come to take a toll at the overall stability of the South-Asian region.

India might have successfully deceived the world with its chauvinistic diplomacy that it was a proponent of Vasudhaiva Kutumbakam (Sanskrit for 'the world is one family'), but its neighbors have come to fully understand its nefarious designs. India's ongoing fervent military acquisitions and its ambitious force posture developments have also cautioned its neighbors of its expansionist outlook.

India has never been friendly to its western neighbor Pakistan as it never accepted its creation and the ensuing Kashmir issue further served to deteriorate the relations between the two. Nevertheless, driven by its hegemonic spirit, it has also not spared the other



neighbors and continues to evoke terror in its relatively smaller South-Asian neighbors by interfering in their domestic affairs. Almost every neighbor of India has some sort of dispute going on with it, be it a territorial or a political one. India which only used to bully its comparatively smaller neighbors has now ramped up to openly challenge the neighboring great power China too. The recent happenings in the South Asian region are portraying a picture that India's neighbors have effectively deciphered its designs and refused to submit.

Amidst the pandemic when the whole world is battling the common threat of coronavirus, thanks to the expansionist fervor of the state of India, South Asia has yet again become a flashpoint as tensions have soared in the Himalayas. The roof of the world is witnessing another military brawl between the nuclear-armed neighbors, China and India. Similarly, the border dispute which had been brewing for years between India and the smaller Himalayan state of Nepal has also come to the fore with the angered Nepal remonstrating strongly against India's recent expansionist surge.

## The Dispute with China

China and India formally began their diplomatic ties in 1950 when India ended ties with Taiwan and recognized the People's Republic of China. Since independence, the relationship between the two Asian neighbors has been complex and inherently competitive. Both the states despite having cooperative diplomatic and economic ties had occasionally engaged in tense border standoffs and also an all-out war, back in 1962.



“India is currently being ruled by the Bharatiya Janata Party (BJP) under Narendra Modi who is a great devotee of Hindu nationalism stalwart, Shri M. S. Golwalkar. Golwalkar viewed International Politics as a place where the law of jungle applied and advocated for a martial (Hindutva) spirit in the nation that can strike terror in the hearts of others.”

China and India have around 2100 miles loosely demarcated border which is commonly termed as Line of Actual Control (LAC). Both the states, who see themselves as the heirs of ancient empires, have different positions as to where the actual boundary lies and also at numerous points extend claim to areas administered by the other. For instance India claims Aksai Chin (the Chinese Administered Kashmir) as well as the part of Kashmir ceded by Pakistan to China. Similarly, China lays claim on Arunachal Pradesh (northeastern most state of India) which it regards as part of South Tibet.

Despite the fact that the two states had been holding conflicting geo-political positions, they did manage to avoid a deadly clash for forty-five years. Even in the fairly recent Doklam crisis of 2017, where the troops engaged in a 73-day standoff, not a single casualty occurred. However, it was until the June of 2020 when the two engaged in an eye ball to eye ball situation at the LAC in the Ladakh region of the Himalayas, substantively changing how things stand. The ensuing scuffle at the Galwan Valley which consumed the lives of 20 Indian troops (no official figures are available for the Chinese soldiers) has brought to fore the geopolitical tensions between the two neighbors.

The current stand-off is said to have started when India disregarded the status quo and started expanding its strategic border infrastructure along the disputed LAC in the Ladakh region. The Indian Border Road Organization (BRO) expedited building a branch network from the Darbuk Shyokh Daulat Beg Oldie (DSDBO) road towards the disputed border which sensitized China. Incidentally, it happens to be the same terrain where the two countries went to war in 1962.

Since Aksai Chin and Ladakh region holds a significant strategic value for China as it connects its two restive provinces Tibet and Xinjiang, China responded to Indian border activities by enhancing the military buildup along its side of disputed border. But, tensions spiked when Indian soldiers allegedly trespassed the Chinese territory and a bloody clash broke out. Although high level military and diplomatic engagements are taking place to disengage at the border, the break of trust that has taken place is unlikely to diminish soon.

Analysts are of the view that China's recent actions in Ladakh are not solely linked to the construction of border facilities as India had been constructing them since long but China never challenged in the past. China did not put up a fight when the historic Daulat Beg Oldie airbase, which was abandoned after the 1962 Sino-India war, was opened back in 2008.



Similarly, it did not react when the strategic DSDBO road was constructed over a period of two decades. China's assertiveness this time can especially be attributed to the renewed nationalist drive in India under the leadership of BJP supremacists. China was already conscious of India's aggressive policy towards Gilgit Baltistan and Azad Jammu and Kashmir because of the China Pakistan Economic Corridor (CPEC), the flagship project of China's Belt and Road Initiative (BRI). Nevertheless, when Indian home minister Amit Shah, another Hindutva stalwart, after the revocation of Article 370 and establishment Delhi's direct rule over Ladakh, reiterated the Indian claim on Aksai Chin alongside Pakistani administered Kashmir, China had no choice but to defend its territorial integrity. Although annexation of Kashmir had been on the agenda of every Indian government, the BJP unlike Congress and other political parties, following in the footsteps of its parent body the Rashtriya Swayamsevak Sangh, a militant Hindu body, is also ideologically committed to capture the entire Kashmir. With such a hostile Indian attitude, the tensions in the region are only to aggravate, pushing the region into further instability.

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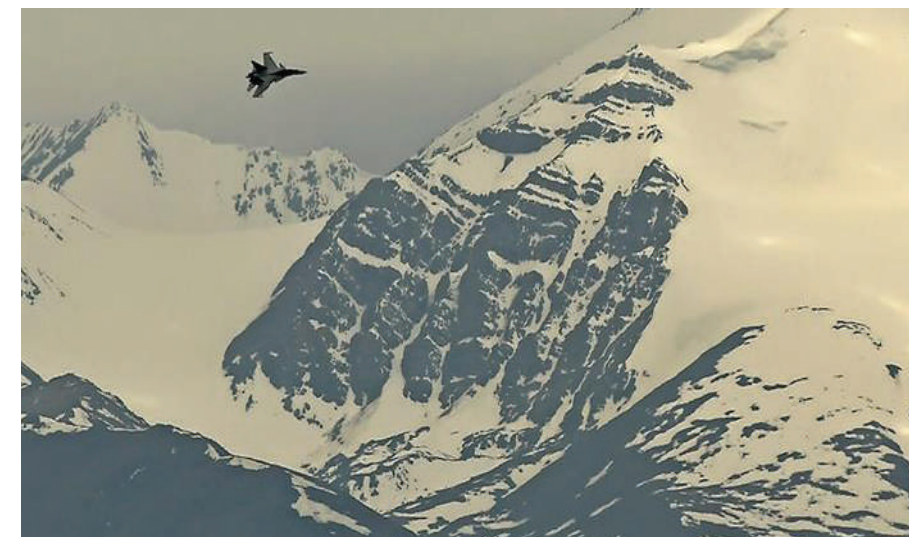
### The Dispute with Nepal

India and Nepal happen to be the only two Hindu majority nations in the world and had historically been considered as diplomatically cordial states. Nepal too, like every other Indian neighbor had its border differences with India but despite that the two states continued to pull off friendly ties apart from few disruptions. This was in part because of the geographic and strategic compulsions of the state of Nepal. Nepal being a landlocked country happens to share its longest border



with India and has been dependent upon the state of India for its economic activity. These geopolitical constraints of Nepal made it yield to Indian influence in the past but India's continued policy of interference and subjugation of Nepal made it to end its policy of appeasement, and rethink its relationship with India. The Indo-Nepal relationship had witnessed a significant paradigm shift post 2008 when Nepal made its transition from a Hindu monarchy to a secularist diplomatic polity. A significant breach of trust took place with India's unofficial economic blockade of Nepal in 2015, months after it was hit by devastating earthquakes. The roots of worst humanitarian and geo-political crisis in the region lie in the fact that the hegemon (India) was vengeful as it didn't get to mingle in the making of Nepalese constitution in 2015.

The recent row in the bilateral relations sparked following India's calculated maneuvering in the Himalayas post August 5<sup>th</sup> (the formal annexation of Indian-held Kashmir). The ostentatious political maps released by India depicting the status of the newly created Union Territories of Jammu and Kashmir and Ladakh also showed the region of Kalapani as part of the Indian Territory, resurfacing the once dormant territorial row with Nepal. The enmity intensified in May 2020 when Indian Defence Minister inaugurated the eighty km link road that connected its northern Uttarakhand state of Dharchula with the disputed Lipulekh pass on the border with Tibet.



Nepal bases its territorial boundaries claim in the Treaty of Sagauli signed between the East India Company and the then King of Nepal following the Anglo-Nepalese War of 1814-16, and considers the strategic north-western lands of Kalapani, Limpiyadhura and Lipulekh as part of its sovereign territory. Despite Nepal's strong protest upon the inauguration of the disputed road, India refused to sit for bilateral talks. Annoyed by India's belligerence of unilaterally changing the status quo, the government of Nepal also published its updated maps in June 2020 through a unanimous agreement in parliament. India categorically rejected Nepal's position by regarding it as an artificial enlargement of territorial claims which could not be accepted by India. Questioning India's current behavior, the PM of Nepal Khadga Prasad Sharma Oli, rightly alluded to India's motive as 'Singhamev Jayate' that is making the lion prevail. Then again, who else could have been the torch bearer of such an ideology but for the current Indian leadership of BJP? This recent diplomatic row termed as

cartographic war by many is again going to linger as the official positions of both sides have hardened. But even if it recedes in near future, it will always remain a yet another thorn in the relations of the two neighbors.

### Epilogue

Pakistan has always tried to show the fellow regional countries the true monstrous face of India but sadly due to the vested capitalist interests of each state, they turned a blind eye to India's egregious conduct. However, it was only until today that the whole of South-Asian region has learnt the reality of Indian bellicosity. Indian adventurism in the region lately has touched new grounds and has brought the region on the brink of an all-out devastation. What India does not realize is that this warmongering mindset may not only harm the regional peace but is equally suicidal for India itself. Peace in South Asia warrants global attention too as the world community needs to wake up to India's selfish ambitions before it is too late. For Pakistan, which has always played its role as an open challenger to Indian hegemony in the region, in the near future must effectively brace itself to counter the bully's growing irredentism, which is seeing no bounds.



# WILL THE REAL '8-PASS CHARLIE' STAND UP!



“It is a rare feat indeed to have your name glorified by the enemy. Such was the enigmatic prowess of Air Cdre Najeeb A. Khan, a pilot that left the Indians impressed by his noiseless, impeccably timed bombing runs in the 1965 war. After decades, on the insistence of his friends and colleagues, he has personally penned down which is undoubtedly one of the most intriguing anectodes of the war.”

by Air Cdre Najeeb A. Khan, SJ, Tbt, (Retd)



I have deliberately resisted for a long time joining the debate about the identity of the Pakistan Air Force (PAF) bomber pilot whom the Indian Air Force (IAF) started calling “8-Pass Charlie” during the 1965 India-Pakistan air war. My natural aversion to publicity and self-promotion has, for many decades, prevented me from doing so. Soon after retiring from the PAF, I migrated to Canada where the demands of the new environment kept me very busy. Over half a century later, I feel the history of the PAF’s B-57 operations would remain incomplete without clearing up this interesting mystery. Bowing to persistent demands by several colleagues and seniors, I have reluctantly decided to pen these lines.

were to carry out strikes at regular intervals throughout the night cratering the runways and attacking other targets, thus forcing the maintenance crew to remain in the trenches rather than on the flight lines and in the maintenance hangars. The IAF’s bases were strung all along the border, and to easily reach all of them, a part of our bomber force operated from the staging base of Peshawar while the rest flew from their home base at Mauripur (now PAF Base Masroor). On the afternoon of 6 September, I re-positioned with three other B-57s to Peshawar, to await our night tasks.

I was the Squadron Commander of No 7 B-57 Squadron when the 1965 war broke out. Our mission was to disrupt operations at the IAF bases along West Pakistan’s eastern border from Pathankot in the North to Jamnagar in the South. Our bomber operations were directed at preventing the IAF from the critical preparatory work during the night for launching missions the next morning in support of the Indian Army and strikes against the PAF bases. To this end B-57 aircraft

I had barely switched off my aircraft at Peshawar when I saw the base commander climb up the cockpit ladder to hand me a small note. Without saying a word, he then climbed down and got back to his waiting Jeep. I looked at the chit and saw three words on it – “Adampur 1700 hours”. The message did not need any elaboration, and since we were running a bit late for meeting that messaged time-on-target (TOT), we rushed things as much as possible.

IAF Airfield Ambala



Flying low level as we crossed the border into India, the sky darkened; I asked my formation members to stagger behind me at 10-minute intervals. As the lead aircraft in the stream, I pressed on towards the target on our first real-life war mission. It was no longer the usual low-level approach to the bombing range; this was going to be the real thing.

At that stage, our primary concern was accurate night navigation to reach the target (no super inertial systems or GPS in those days), my navigator and I concentrated on that critical task. Soon the moment of truth arrived, and I pulled up for the attack. As the field of vision expanded with rising altitude, I looked out for the target. In a picture-perfect manner, Adampur airfield

emerged into view exactly where it was supposed to – at 10 o'clock about 3-4 miles to the left. By now it was quite dark, and we didn't think the Indian fighter pilots or ack-ack gunners would be able to spot us easily. As I manoeuvred to position for attacking the beginning of runway 31, I was surprised to see that all lights at the base, including the runway lights were on. The runway was an easy target lengthwise, but its limited width still required lateral accuracy. For this mission, we carried 4 x 1,000 lb bombs, and we dropped one bomb in each dive to increase the chances of scoring direct hits. When I exited after spending about 8 minutes over the target, all the lights were still on. The remaining three aircraft had no difficulty reaching the target as the exploding bombs of the aircraft ahead acted as homing beacons. Having delivered our attacks, all four aircraft returned safely in just under two hours. Our first mission had gone on perfectly. It seemed to be a lot simpler than the one we had visualized before taking off.



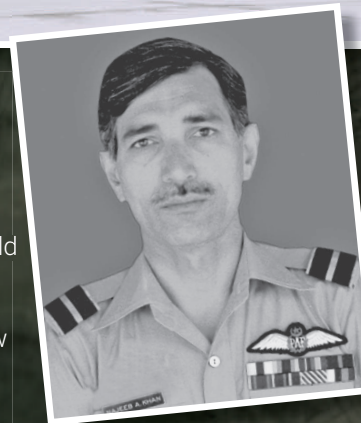
**Top: Nicknamed 'Baba', a PAF B-57 Bomber in a typical black livery, proceeding for a bombing mission.**

**Above: A formation of B-57 participating in a Pak Day Parade fly-past after 1965 war.**

**Right Page Top: A busy flight line at PAF Base Mauripur (now Masroor) during 1965 war.**

However, it was not risk-free, as we soon found out. The ground crew discovered a 40 mm hole in the wing of the second bomber, between the fuselage and the left engine, about five feet from the cockpit. On seeing it, we realized it was a close call indeed. Luckily the shell had missed both the cockpit and the engine, and pierced the wing at a point where there was nothing between the top and bottom layers of the wing's skin. The maintenance crew quickly patched up the holes, and the aircraft was ready to fly again. Happy with the way we had breezed through our first war mission, we did not make much of this incident at the time. Encouraged by our first successful mission, we prepared for our next tasks, entering the first night of our routine of two sorties per night. That was the usual tasking for each bomber team, night after night.

**“ During the 1965 war, Sqn Ldr Najeeb A Khan was commanding the No 7 squadron equipped with B-57 Bomber aircraft. For his unflinching professionalism and devotion to duty, he was awarded with gallantry award of 'Sitara-e-Jurat' after the war. ”**



**Paddy Earle, an IAF fighter pilot, paid tribute to '8 Pass Charlie' by saying:**

**“I have the utmost respect for the Pakistani Canberra bloke who loved to ruin the equanimity of our dreary lives! 8-Pass Charlie was an ace, but he had this nasty habit of turning up about 30 min. after moonrise, just as we were downing our first drink! Seriously, he was a cool dude and a professional of the highest order. To disguise the direction of his run, he used to cut the throttles before entering a dive and by the time the ack-ack opened up he was beneath the umbrella of fire. After dropping his load he'd apply full throttle and climb out above the umbrella.”**

As the war progressed and as a Squadron Commander keen on improving bombing accuracy, I decided to experiment with some reasoned tactics and to set an example of how our missions could be made more effective. All pilots who have done dive-bombing with WW2 vintage (dumb) bombs know that steeper dive angles tend to improve accuracy. So, it stood to reason to make the dive angles substantially steeper than usual. However, steeper dive angles made the aircraft accelerate rapidly towards the ground and severely limited the time available to the pilot during which to manoeuvre the B-57 bombsight onto the aiming point. Equally, steep dives tended to expose the pilot to more risky pull-out heights.

To solve the two issues, it was necessary to slow down the closure rate to the ground. To that end, I decided to reduce my dive-entry speed and to pull the throttles back

to idle while entering the steep dive, and to use recalculated bomb trajectory and bombsight settings. For some attacks with dive angles of 55-60 degrees, it was necessary to extend the speed brakes to control the bomber's rapid acceleration towards the ground. This technique gave me the required additional seconds for proper aiming on the chosen target. As soon as I had pressed the bomb release button, I would shift my focus to pulling out of the dive. Once the B-57 was safely pointing towards the sky and still climbing under the energy



**Front Row: Flt Lt Osman Khan, Flt Lt M.K. Bashar, Sqn Ldr Najeeb A Khan, (O C 7 Squadron), Flt Lt I.A. Ghori, Flt Lt Qayaam  
Back Row: Flt Lt Iftikhar, Flt Lt Irfan, Flt Lt William Hamey, Flt Lt K.S. Mahmood, Flt Lt Rashid, Flt Off Shamim  
Flt Off J. Akbar, Flt Off Hassan, Flt Off Peter Chirity, Flt Lt Mazhar, Flt Lt Aftab  
Pilots and Navigators of No.7 B-57 Squadron, PAF Mauripur, 18 November, 1965**





it had gained during the dive, I would move the throttles to full power to gain height and re-position for the next attack. Encouraged by the success in the just-completed attacks, we would eagerly manoeuvre to enter the next. The sight of the secondary explosions and fires that we had set off gave us a fair idea of how our bombing had improved. On some occasions in the pitch-dark blackout nights, the fires that we started served as a welcome navigation aid to the B-57s following ours at 15-30 minute intervals.

Ground intelligence from one of the targeted airfields reported that one morning, an IAF Station

Commander had even gathered his pilots on the runway targeted by the B-57s on the previous night. He then pointed to the craters on the runway, and to demand from them a similar quality of attacks on the PAF airbases. In other cases, the damage and disruption of high-value targets have also been described by the IAF's senior commanders. In yet another case, intelligence conveyed that after the bulk fuel storage was hit at Adampur, the station was forced to relocate its aircraft to another base where fuel was available. Although with the modified

parameter change in the dive angle the bomb impacts became more accurate, I shared this method with only the most experienced pilots, to avoid exposing younger pilots to unnecessary risks. This care was necessary also because no central briefings could be held as our bomber teams operated from busy and dispersed sites. There was also no time for additional supervised training during the war.

It was more than a decade later that I learned from several personal accounts how the IAF pilots were impressed by the persistent and rather unique profiles of my raids. The repeated experience – from the Indian trenches – of an enemy bomber's engine noise cycling between the roar of full throttles to eerie silence every three minutes left the witnesses guessing about what the pilot was trying to do. I knew, of course, but even now can fully appreciate the confusing effect that the sounds of my bombing profile must have been causing

Top: A PAF B-57 displaying its lethal armament.

Bottom: A Handful of B-57 fleet rests on the tarmac of PAF Mauripur (now Masroor).

Right Page Inlet 1: A formation of four B-57 made a world record by pulling up a loop during an aerial display.

Right Page Inlet 2: A B-57 taxis out for a bombing run against enemy airfield during 1965 war.

Bottom: A painting by Gp Capt Hussaini (Retd) depicts the destruction caused by a PAF B-57 against IAF airfield.



Back Row: Flt Lt Osman Khan, Flt Lt. Iftikhar, Flt Lt. I.A. Ghorl, Sqn Ldr Najeeb A Khan, Flt Lt Bashar, Flt Lt Mazhar, Flt Lt A Qayaam, Flt Lt Aftab : Front: Flg Off Shamim, Flt Lt. Rashid, Flt Lt. K.S. Mahmood, Flg Off J. Akbar, Flg Off Hassan, Flt Lt William Harney Flt Lt Irfan, Flg Off Peter Christy  
Pilots and Navigators of No.7 B-57 Squadron, PAF Mauripur, 18 November, 1965

below! Meanwhile, unknown to me, the IAF pilots sheltering on the ground and not knowing who it was, had given me the nickname of "8-Pass Charlie". Over several nights, they learned quickly to recognize me by the sound of my attacks whenever I was targeting their base. As time passed, I found it fascinating to come across many Internet and other media messages from those IAF witnesses who had lived through my attacks. I was told that while in the trenches, some of them had developed a sense of respect for the grit of the unknown enemy pilot. A few soft-hearted ones among them admitted even to secretly hoping that the PAF pilot would escape the scores of ack-ack guns that would be continuously firing at his plane.

The accounts of Wing Commander Paddy Earle of the IAF and Indian war historian Samir Chopra have

highlighted yet another facet of this story. I think it was Wing Commander Paddy Earl who – conferring on me the Americanized title of a "cool dude" – even suggested that I was pulling my throttles back to idle before entering a dive to deceive the anti-aircraft gunners about my actual position in the sky. I must admit that those anti-aircraft gunners still did their best. I do recall seeing anti-aircraft shells catching up to my wingtips in volleys of four, and then lagging behind as my aircraft seemed to out-climb them under full power.

In conclusion, this writing is to unmask the anonymity of the "8-Pass Charlie" for the sake of putting the historical facts in a proper perspective. It also serves as a long-delayed admission on my part of being the one – the only "8-Pass

“ Ground intelligence from one of the targeted airfields reported that one morning, an IAF Station Commander gathered his pilots on the runway targeted by the PAF's B-57s on the previous night. He then pointed to the craters on the runway and demanded from them a similar quality of attacks on the PAF airbases. ”



Charlie" – recorded in the IAF history. It is quite a unique distinction for combat pilots to be bestowed with such catchy titles. The two nicknames were exceptional because both came voluntarily from the enemy camp, while acknowledging high military daring and professionalism. On the formal side of history, the role played by No 7 B-57 Squadron is well illustrated by the award of 14 gallantry medals to its aircrew. All those medals were won for performance under fire, and all were Sitara-e-Jurats (or SJs, equivalents of the British DFCs) – a record for the 1965 War. In the broader context of the 1965 B-57 operations, including my role in it, there is ample evidence from ground intelligence as well as post-war accounts written by the IAF's senior commanders and others.

The comments and writings of Indian authors and the IAF pilots highlight an aspect of my missions that would have passed unnoticed had they not commented on it. The IAF's interpretation of my motive came as a complete surprise to me since I hadn't ever thought that diving with throttles at idle would deny the ack-ack gunners the ability to fix the location of my bomber by the sound of its engines. My power-less dives did

indeed deny that advantage to the Indian gunners, however unintended that effect was on my part. But ack-ack gunners don't stop firing just because the target's volume of sound suddenly drops. In reality, I saw that they continued to fire relentlessly and locked on to the sound of my engines as soon as they picked it up again. While concentrating on my dive and aligning the bombsight with the target, I was aware of the hundreds of shells forming a sphere of glowing red balls over the airfield. The shells fired from numerous points on the airfield perimeter crisscrossed in front, on the sides, above and below me forming a lethal red dome over the airbase.

All those gunners who were pointing their guns at me were obviously hoping that some of their shells might cross paths with my B-57. My reaction to this display of fireworks was to tell myself "Ignore, and do your job". The observers on the ground could understandably think that my use of dives at idle power was merely stealth to become invisible to the gunners' aim. However, my motivation for doing so was a different one: As a professional in the line of duty, to focus intently on making my mission as effective as I possibly could, in the righteous defence of my country.

Top: A 'Baba' takes-off for an operational training mission.

Centre: A PAF B-57 flying over famous Churna island near Karachi.

Bottom: A line-up of B-57s starting up for routine mission at a PAF Base.



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# ARTIFICIAL INTELLIGENCE

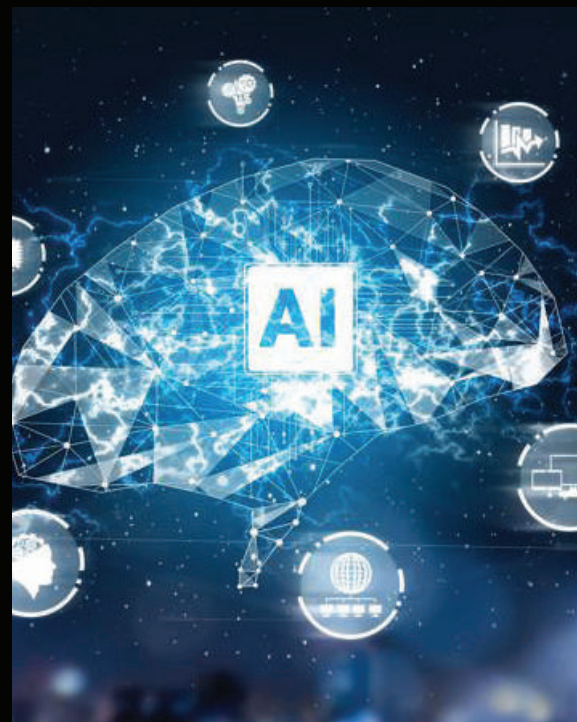
## SHAPING THE FUTURE OF AIR POWER

“Artificial Intelligence is evolving rapidly and with its advent, new ways are being explored to form a communion between man and machine. This enigmatic merger means groundbreaking advancements in air warfare, which will lead to better control with increased destructive power while simultaneously increasing the ever-growing capabilities of pilots and crew.”

by Maheen Shafeeq & Shaza Arif  
Centre for Aerospace and Security Studies (CASS)

**A**irpower is born out of technology and is nurtured by its modernization. It certainly will not be surprising if rapid advancement of artificial intelligence (AI) is applied to airpower to meet future defence and security-related challenges. Many countries are already developing unique AI abilities as an essential component of future airpower. Although prediction of the future of airpower is not an accurate science, given the current pace of technological advancement the predictive throw-forward of airpower presented in this article would only be viable for strategizing air operations of next 20 years. Timely and astute induction of AI in

airpower will revolutionize the prevailing conceptualization of airpower in warfare. In aerial platform employment regime, it will provide a quantum leap to unmanned missions by introducing autonomous unmanned aerial vehicles (UAVs) and miniature decoys. These AI-based systems will increase expeditionary capabilities, provide beyond-line-of-sight command and control or C<sup>2</sup> and offer a wide variety of payload capabilities while focusing on reliability and survivability of unmanned missions. These systems will change the way air forces operate. While AI will increase the durability of the unmanned missions, it will also be instrumental in detecting and managing enemy drones in the



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“Lockheed Martin and several other AI start-ups are aiming to develop an AI-based system that will empower pilots by providing them a common picture of information from all domains such as air, space, cyberspace, sea and land-based sensors.”

Above: When Science Fiction Becomes Reality: Weaponized drone swarms have been depicted in fiction several times and are now becoming a lethal reality (Photo: Azrobotics.com.)

Bottom: Lesser Time in the Cockpit: A pilot student trains on a virtual-reality flight simulator at the Armed Forces Reserve Center in Texas, US. (Photo: Sean M. Worrell/U.S. Air Force)



by AI algorithms, which will ultimately increase the war fighter's efficiency and lower the cost when stakes are high. War fighting efficiency will further increase as AI will be able to absorb more data on the battleground that will ease the pilots' burden during critical missions. In next-generation aircraft, AI will become the best partner of pilots who, with advanced warfare techniques and concepts, will have more and more synthesised information to observe, process and respond to while in the cockpit. In this capacity, AI will gather, monitor, sense, filter and compare historical data with real-time data, under limited time and provide the most

relevant information to the pilots to accomplish their missions while avoiding threats. As warfare technologies are evolving, a swarm of threats is emerging. One of the most critical threats posed is adaptive radars. AI and machine learning may be able to help in this scenario by differentiating between 5G and other radio frequencies; thus, providing more awareness to the user during critical missions. BAE Systems is working with DARPA to bring AI to the radio frequency domain that will detect, decode and distinguish radio frequency signals sent out by the adversary communication or radar system. It will become an important component in an increasingly

crowded RF spectrum especially in electronic warfare. These RF AI systems will make sense of RF signals intercepted from the enemy to anticipate threats and provide real-time analysis of the battle-space; in turn enabling faster adaptation to tactics of the adversary.

In most cases, an adversary's first tactic during the aerial confrontation is jamming the communication and radar system of hostile aircraft. To address this issue, AI will provide the reverse solution to this problem. From an embedded computing standpoint, AI will enable space-time adaptive processing (STAP) radar and cognitive electronic warfare (CEW) that will overcome the jamming techniques of the adversary. It will employ AI to better jam the adversary's radar or disable the enemy's jammer completely while giving them a false picture that everything is working as per plan.

“ AI will gather, monitor, sense, filter and compare historical data with real-time data, under limited time and provide the most relevant information to the pilots to accomplish their missions while avoiding threats. ”

Bottom: Boeing's largest military investment outside of the US, the sleek aircraft, nicknamed Loyal Wingman, is part of Boeing's Aircraft Teaming System designed to rely heavily on artificial intelligence. (Photo: Boeing)

Right page center: A Prop From the Star Wars Movie Set? - The IAI Harop is an anti-radiation, loitering munition drone developed by the MBT division of Israel Aerospace Industries. (Photo: free3d.com)

Right page bottom: A technician calibrates Lockheed Martin's next iteration of the F-35's ALIS (Autonomic Logistics Information System) which has been approved for installation at US Air Force and US Navy F-35 aircraft. (Photo: flickr.com)

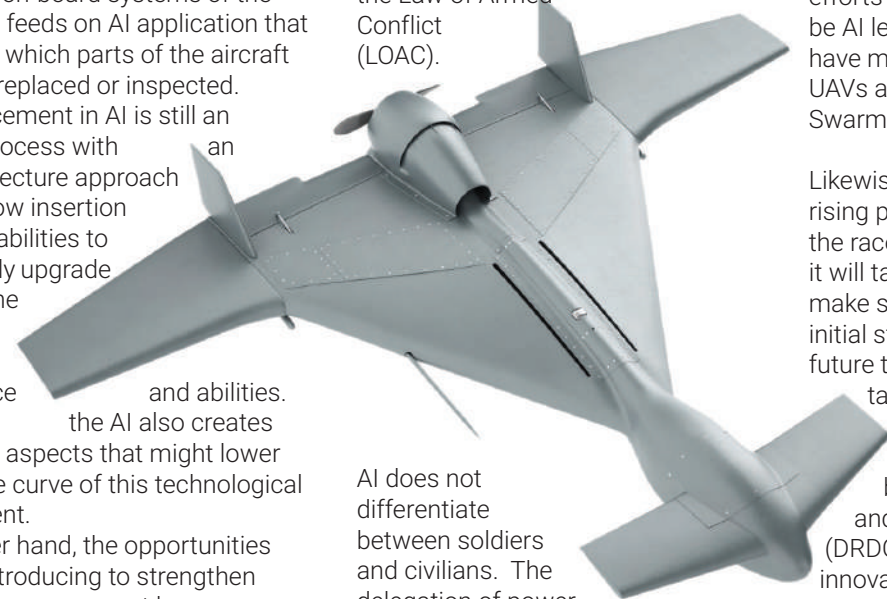
AI will not only enhance survivability factors during critical missions but it will also look after the health of the aircraft. AI-enabled predictive aircraft maintenance and repair software for aircraft will provide real-time technical data of maintenance and suggest upgrades required in an aircraft. This approach is currently utilized by F-35's Autonomic Logistics Information System (ALIS) that collects data from real-time sensors embedded in the engine and on-board systems of the aircraft and feeds on AI application that determines which parts of the aircraft need to be replaced or inspected. The advancement in AI is still an on-going process with an open-architecture approach that will allow insertion of new capabilities to continuously upgrade and uplift the airpower's

performance and abilities. However, the AI also creates threatening aspects that might lower the humane curve of this technological advancement.

On the other hand, the opportunities that AI is introducing to strengthen airpower may or may not be interpreted aptly by the operators or programmers. The possibility that machines will overwhelm human warfare skills remain an important issue for consideration. If airpower is considered, a pressing aspect engulfed with AI is the level of autonomy that is to be imparted to engage their targets. Technology experts such as Elon Musk and Stephan Hawking have repeatedly asserted that artificial intelligence is an extremely dangerous technology and can present challenges that are alien to policymakers. Once it crosses a certain threshold, human beings are withdrawn of any control over it. Consequently, the experts have stressed upon the fact that humans should always be kept in the loop and have oversight over the operations being executed by AI-powered aerial vehicles. Conversely, for certain policymakers, human oversight is considered as a hindrance in technological advancement, as machine learning can enable task execution at a much expedited rate as compared to human decision making.

The lethal potentials of autonomous aerial drones cannot be compared to those of fighter jets or other conventional weaponry, paving way for uncertainty and leaving ample room for escalation in a case where machine misinterprets the intentions of its adversary.

Furthermore, enhancing the airpower capabilities comes with the legal obligations to abide by the Law of Armed Conflict (LOAC).



AI does not differentiate between soldiers and civilians. The delegation of power to autonomous weapons can put the lives of civilians into grave dangers in case a conflict emerges. Likewise, post-conflict, attribution challenges will also be posed as to who should be held responsible if humanitarian laws were not abided by.

If the progress of strengthening airpower with AI is considered; frontrunners in the field are USA and China and to some extent Russia. In addition, South Asia has witnessed

“ Technology experts such as Elon Musk and Stephan Hawking have repeatedly asserted that artificial intelligence is an extremely dangerous technology and can present challenges that are alien to policymakers. ”

the trend of militarization of AI. China, in particular, has made expeditious efforts in the field of AI and aims to be AI leader by 2030. Chinese forces have made significant progress with UAVs and are heavily investing in Swarming technology.

Likewise, India envisions itself as a rising power and has also jumped into the race of militarization of AI. Though it will take India a number of years to make significant advancements in AI, initial steps on the trajectory of this future technology has already been

taken. The Centre for Artificial Intelligence and Robotics (CAIR) established in 1986, by the Defence Research and Development Organization (DRDO) is facilitating research and innovation in AI, assisting the armed forces to integrate it in the latest weaponry.

Rustom, Nishant and Lakshya are some of the autonomous drones; developed by DRDO, which are to be used in intelligence, reconnaissance and surveillance (ISR) operations. In 2019, an agreement for purchase of 54 Israeli HAROP killer drone was signed which will supplement the existing capability of 110 such drones.

The Indian armed forces are already



taking the aid of UAVs for border control, reconnaissance and maritime patrol. Swarming technology has also been sought to a great extent and India is encouraging start-up projects in this regard.

Considering regional security dynamics and the recent aerial exchange between India and Pakistan; there is ample room for a limited conflict. The blend of robust air defence systems comprising of the S-400 and AI-equipped aerial capabilities may act as a potent incentive for India to conduct any misadventure in Pakistani territory. In future wartime scenarios, these autonomous UAVs can lead to escalation between the arch-rivals and bring us to a stage where de-escalation might be difficult.

“ The blend of robust air defence systems comprising of the S-400 and AI-equipped aerial capabilities may act as a potent incentive for India to conduct any misadventure in Pakistani territory. ”

Lastly, artificial intelligence will redefine the dynamics of airpower in future. Air forces will be inclined to employ this technology to make them more efficient and compelling. In addition, artificial intelligence is sustainable when it is developed through indigenous resources. Universities, private companies and research institutions will be pivotal for transformation of

future air forces. Consequently, Pakistan must endeavour to develop potential platforms which can play an effective role to make speedy advancement in this emerging field and play a transformative role for its air force.



Top: IAF's Nishant UAV has day and night observation capabilities and offers easy deployment. (Photo: Mail today)

Center: IAF's Remotely Pilotless Target Aircraft 'Lakshya' produced by DRDO. (Photo: defenceasian)

Bottom: Rustom 2 is a medium-altitude long-endurance UAV, capable of carrying different combination of payloads including synthetic aperture radar, electronic intelligence systems and situational awareness systems. (Photo: Hindustan Times)



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Vitalik Buterin just landed in Moscow. Having appeared on CNBC just a few days prior, the 23-year-old has arrived in Moscow to give a talk. A chauffeured Mercedes picks him up to take him to the venue. As he steps out of the car, throngs of adoring admirers swarm around him. Inside, Vitalik gives a moving talk, earning him a standing ovation. He doesn't have time to linger, though. He has to prepare for a meeting with representatives of the central bank. One would assume a 23-year-old would be intimidated by the prospect, but for Vitalik, it's not his first waltz with the big guns. He has met with government and central bank officials from UK, Australia, Thailand amongst several other national authorities. However, something did happen on this particular trip which rattled the scrawny, young adult. Vitalik was informed that Vladimir Putin had summoned him. Putin, one of the most powerful men on the planet, had a one-on-one with this enigmatic 23-year-old. So, what makes this man so sought

after? Is he a celebrity of some sort? Maybe a world-famous athlete or perhaps a scientist? Nada. He is none of these. Vitalik Buterin is the inventor of Ethereum, the most powerful cryptocurrency after Bitcoin.

Picture this. You search for something online, visit a certain website or, at times, even talk about something with your friends. Next thing you know you start getting ads about it. You can't shake the feeling that you're being watched by banks, governments, marketers or even service providers. We've all been there. With the advent of technology, information sharing became much easier. However, it came at a cost. An unforeseen increase in surveillance and regulation. In the contemporary digital world, most traditional transactions online are traced and regulated. Although, this has its advantages, it has left a substantial number of people feeling over-scrutinized, with the state being aware of their every financial move. Escaping that was the promise of the first cryptocurrency. The enigmatic 'Bitcoin'.

It was cash, but not printed. Not monitored by a central authority but by normal internet citizens, powered by code. It is a form of currency that became so powerful that, in 2017, it became as powerful as the big banks it competed against. Spread across the world, it found its way into every sort of transaction, with users ranging in the millions. The promise of anonymity also brought with itself illegal transaction, with people using cryptocurrency for everything ranging from a few grams of marijuana to even assassinations. Now, with the advent of thousands of cryptocurrencies, it is more important than ever to understand what exactly cryptocurrencies are and what they mean for our future.

By definition, cryptocurrency is an internet-based medium of exchange which uses cryptographic functions to conduct financial transactions. Cryptocurrencies leverage blockchain technology to gain decentralization, transparency, and immutability.

The most important feature of a cryptocurrency is that it is not controlled by any central authority. The decentralized nature of the blockchain makes cryptocurrencies theoretically immune to the old ways of government control and interference. Cryptocurrencies can be sent directly between two parties via the use of secure private and public keys. These transfers can be done with minimal

“Cryptocurrency has left experts polarized, from some claiming it to be the biggest innovation since the internet to others believing it to be an illegal bubble that will burst at any given moment.”

by Muhammad Khan

# Cryptocurrency

## The Future of Currency?



processing fees, allowing users to avoid the steep fees charged by traditional financial institutions.

To understand the genesis of cryptocurrency, we need to go back to an earlier form of digital money. It started as the 'Diner's club'. Sold as the ticket to a modern world, it was the first credit card, immensely successful. By the 70s, half of all-American households had one. It was freedom from cash. But credit cards came with heavy regulations and traceability. There existed a dream for digital cash that imitated physical cash in the way that it was anonymous, untraceable and instant. It also needed to be free to use and be able to interoperate with computer networks.

With experts professing it to be the future of currency to being the 'Tulip Mania' of modern times, cryptocurrency has left people divided. A get rich quick scheme or a viable investment, there's no doubt that cryptocurrency is making waves around the world. Cryptocurrency has been given many labels. At its core, cryptocurrency is a way to make transactions online without big brother watching.

The fundamental promise of bitcoin is decentralization. Imagine a recordkeeper who keeps ledgers and maintains accounts for an entire district, holding the ability to impose regulations or exercise control over the cash flow. As one can imagine, trust would be an immense issue in this arrangement. A substantial number of members would not trust the recordkeeper. This perception would be justified, owing to the fact that the recordkeeper could be swayed by stronger members or he could manipulate records in a way

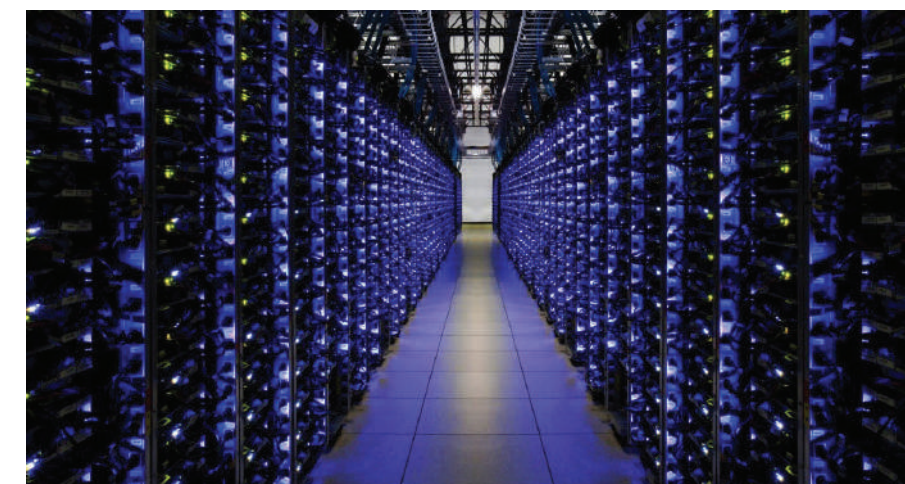
that would directly or indirectly favour him. Moreover, gradually yet surely, the recordkeeper will have enough power in his hands to act without accountability.

Now, imagine the members came up with a system that does not require a recordkeeper. Some of the members maintain a ledger of transactions amongst themselves and copies of that ledger are distributed to every member in the district. This ledger is automatically, flawlessly updated and is independent of each other. That would entail that every member of the community is a part of the verification system, yet at the same time, no member can influence the integrity of the system in any way. Although, this is an oversimplification of the process, it can give one a basic idea of how cryptocurrencies work.

When applied to cryptocurrency, this process is known as 'Blockchain'. The blockchain is the ledger that records all the transactions of any given cryptocurrency on a global scale. That means an imaginable amount of work and processing power. But it's no one's job to do the work. Instead, the system pays out cryptocurrency to those who volunteer to do it. Essentially, you have a distributed network which is used to reach a consensus about all the transactions that happened on the network. This allows for a completely decentralized, 'trustless' ledger, with a network of independent people maintaining it. This doesn't just solve the problem of cash on the internet, it also solves the problem of trust on the internet. Blockchain operates under the assumption that no single individual is

a trusted user. It is a new type of online interaction that wasn't possible before. It is a money system with nobody in control, no laws and no regulations. The part where the system rewards those who validate and maintain its ledgers is done through a process known as 'mining'.

Take the example of an ethereum mining facility in Iceland, aptly named 'Enigma Mine'. Set up in the frozen, distant region of North Iceland, it would be hard to imagine by looking at it that the facility generates millions of dollars in revenue every year. The site emits a constant low buzz, generated by the thousands of computers endlessly making calculations required for crypto mining. Marco Streng is a co-founder of the mine. He started mining ethereum cryptocurrency years ago with a single computer, in his college dorm. Now, several years and millions of dollars later, Streng is expanding the facility exponentially and constantly. Dressed in khakis and a thick, practical jacket, it would be hard to say that this man is worth millions of dollars. Streng is not alone. Early adopters of cryptocurrency have similar tales of overnight riches. A few years after the advent of Bitcoin, the internet was rife with videos and articles about high school dropouts and young people riding the crypto wave. The content depicted cryptocurrency investors as a fortunate few who went from dull, drab individuals to millionaires travelling the world in fast cars and private jets. This laid the ground for a snowball phenomenon. People invested in bitcoin in hordes. This, of course, led to its escalation. It kept getting



bigger and bigger and gathering more momentum. To put it into perspective, 1 bitcoin was worth \$0.06 at its invention. 50 Bitcoins would have been just enough for a cup of coffee. At its peak in 2017, the same number of bitcoins were worth a whopping 850 million dollars.

Another factor for Bitcoin's success was its impeccable timing. The meltdown of Wall Street in 2009. The biggest bankruptcy in US history. Millions lost their money. Everyone was furious with big banks. People were becoming more and more aware that there was something broken with the old, centralized architecture of money. Enter Bitcoin. A new money. The press ate it up. Then, came the online drug market, the likes of Silk Road, making the cryptocurrency even more infamous. Bitcoin made it to prime time. Businesses began to make their own cryptocurrencies and started selling the coins, like shares on a stock market. People started treating cryptocurrencies like a stock market, investing in different ones, buying at low value and selling it off when it got high. And during the following years, it sold high alright. Seemingly overnight, the internet was filled with stories of young cryptocurrency investors becoming millionaires by investing at the right time and in the right cryptocurrency. Fast cars, huge mansions, expensive clothes, the crypto millionaires flaunted it with no end. But as it is with every get-rich-quick scheme, there's a catch. Just like gold's value comes from people agreeing and trusting the

value of gold, the only inherent value of cryptocurrency is how much value people a cryptocurrency has and using that as a standard to put existing monetary value. Warren Buffet, the billionaire investor, certainly agrees with this notion. "Bitcoin has no unique value at all," Buffett told CNBC. "It is a delusion, basically."

He is not alone in his scepticism. Leaders Bill Gates, J. P. Morgan CEO Jamie Dimon and renowned economists Nouriel Roubini and Robert Shiller are all verbose critics of Bitcoin. These individuals believe that the cryptocurrency market is fated to fail because of lack of acceptance, the lack of government adoption and exchange-trade fund support. Not to mention the several scams and fraud cases that have rocked the cryptocurrency world ever since Bitcoin's take-off. The fact that out of 2000 cryptocurrencies, more than 800 are virtually dead, worthless less a few a rupees. Another factor that experts claim will be the downfall of cryptocurrency is the efforts of governments all across the globe for regulatory efforts. The leeway and unchecked freedom enjoyed by cryptocurrency could come to an end, taking away one of its most important features.

On the other side of the argument are pretty big names, as well. From the quintessential intellectual Elon Musk, to celebrities like Mike Tyson, Johny Depp, Lionel Messi and Madonna, cryptocurrency has big bucks and even bigger faces supporting it. "We would love to see something become a global currency. It enables more access", Said Twitter CEO Jack

**“ 1 bitcoin was worth \$0.06 at its invention. 50 Bitcoins would have been just enough for a cup of coffee. At its peak in 2017, the same number of bitcoins would be worth a whopping 850 million dollars. ”**

Dorsey. "It allows to serve more people. It allows us to move much faster around the world."

These claims are not without merit. While Bitcoin prices might have taken a hit in 2018, the crypto market is much less volatile now. This has attracted experienced institutional investors, who might be the salvation that cryptocurrencies need. Cryptocurrencies are finally losing some of the stigma and gaining steady adoption. Even some its biggest critics have changed sides, including banks, tech firms and other corporations. Even governments have started considering cryptocurrencies to bypass sanctions and augment their economies. Cryptocurrencies offer user autonomy over their own assets, much more than fiat currencies, doing away with banks and regulatory authorities. Another feature that has attracted investors is the discretion across transactions and peer-to-peer mechanism. This means that parties can transfer cryptocurrency with one another discreetly and without the involvement of any third party or authority.

When Bitcoin first entered the scene, it was poised to be a much better alternative to fiat currency. Which would require it to be usable like traditional fiat currency. However, it quickly became apparent that it could never compete with the already existing systems, which have evolved to be much more efficient. The problem was Bitcoin's 7 transactions per second (tps) as compared to Visa which can easily handle 24,000 tps. A few years ago, as the number of transactions increased, the system was overloaded and the wait time increased to multiple hours for a single transaction. This also caused the transaction fee to sky rocket.

However, currently, the waiting time has come down to a 10-30 minutes mark and the transaction fees dropped back to around \$1. Moreover, there are systems like the Lightning Network, which is hailed to be the solution to Bitcoin's scalability problem is being actively and successfully tested at the moment. Once fully implemented, it might make the community's dreams of Bitcoin competing with Visa a reality. Currently, the acceptance for Bitcoin is on the rise. Although, it will take a substantial amount of time for cryptocurrency to be as accessible as other modes of payment, Bitcoin is being adopted by multiple corporations every single day. In tourism Expedia, CheapAir and several others accept bitcoins. In a different business tactic, Pizzaforcoins is a California-based service which allows you to order pizza from all major pizza chains. You can give Lieferando.de a go, a German food delivery service with over 11,000 restaurants under its belt. Microsoft accepts bitcoin in its Xbox and windows stores. When it comes to shopping, Etsy, Shopify, Overstock, Reeds and various other brands support Bitcoin as mode of payment.

In Pakistan, these options are narrowed down to transactions with foreign businesses only. Although, Bitcoin is not considered legal tender, the laws are not adequately formulated. This leaves room for loopholes. Cryptocurrencies like Bitcoin are not legal tender in any country, the truth is that any asset doesn't need to be a legal tender to be of value. Gold, Silver, oil, etc are not legal tenders and even then, they are considered valuable assets for any nation state. Similarly, Bitcoin doesn't need to become legal tender to be considered a credible medium of exchange. It only needs to become a globally accepted entity just like any other decentralized asset mentioned above.

Whenever you buy cryptocurrency, it is stored in your 'wallet'. You can access your wallet through several different software. There are also different kinds of wallet, which allow

you different features and levels of security. You could use a paper wallet which is essentially a document that contains a public address for receiving Bitcoin and a private key, which allows you to spend or transfer Bitcoin stored in that address. A paper wallet can be generated using services like BitAddress or Bitcoinpaperwallet. This sort of wallet is very secure because the keys are stored offline. Then, there's 'Physical Bitcoin', which comes with a preloaded amount of bitcoin. For those actively using Bitcoin on a daily basis, paying for goods in shops or trading them face-to-face, a mobile bitcoin wallet is the obvious choice. It runs as an app on your smartphone, storing your private keys and allowing you to pay for things directly from your phone. The biggest setback is that its vulnerable to hacking attacks. Some popular mobile wallets are FreeWallet, Edge and Atomic Wallet. You can also access you wallet from your web browser using services like Coinbase and Lumi Wallet. However, again, these services are risky. Other than these, you can also use desktop wallets and wallets that are in the form of physical hardware, like Ledger Nano S and TREZOR.

There is no denying the future uses of cryptocurrencies. Our government needs to adopt a progressive approach by allowing a sandbox based approach towards regulating cryptocurrencies. Some important benefits for Pakistan to regulate the cryptocurrency sector include:

- Reduced dependency on the US Dollar: Since Bitcoin is swiftly becoming a universally verifiable and exchangeable currency, it is one of the best shots at challenging the hegemony of the mighty greenback. Pakistan remains one of the countries with current heavy current account deficits and thus, through Bitcoin, the country can have alternative foreign exchange options in addition to traditional currencies.
- New Industry to create highly skilled jobs: The sector is expanding around the world and not just cryptocurrencies but the underlying blockchain technology as well. The sector is hiring top

quality trained workforce from around the world and Pakistan can definitely offer the best of it considering its already strong IT industry. Breaking the shackles: Bitcoin can lead to the breaking of the

perpetual inflation problems rampant in countries like ours. In the current system we are caught in a constant cycle of debt, currency inflation and high interest rates. Slowly, the disruption brought forward by Bitcoin can help us break these long in place shackles and free our economy to succeed in the future.

### The Bottom Line

Despite its many doubters and doomsayers, the crypto market has continued to plug along and thrive. Although prices have fluctuated wildly—and in some cases, enormously to the downside—the sector is finally starting to stabilize and increasingly appears to be leaving its infancy behind. As more companies discover uses for crypto and blockchain and more users accept them as a way to simplify their lives, they will remain a central point of conversation in technology. More interestingly, as it better demonstrates its value in a variety of situations—from banking to buying coffee—the technology will further ingrain itself. Coins may come and go, and many cryptocurrencies are indeed likely to fail, but the sector will continue to forge ahead unabated.



# Brave Heart Rafiqui



“A man immortalized through his sacrifice, Sqn Ldr Sarfaraz Ahmed Rafiqui has the honor of being amongst those rare breed of men who keep inspiring thousands even after their death. He was awarded the Hilal-i-Jur'at, as well as a Sitara-i-Jur'at for his services in the 65 war. His claim to glory is his decision to stay and defend his comrades even after his guns jammed in a dogfight, a day after he had successfully taken down 4 IAF vampires with Flt Lt Imtiaz Bhatti. His willing sacrifice not only spurred the morale of his then comrades; it continues to inspire young pilots and soldiers to this day.”

by Air Cdre (R) Kaiser Tufail

Some days after the war had started in September 1965, a poignant message arrived by telegram at 22, ILACO House, Victoria Road, Karachi. It read, “Regret to inform, your son Sqn Ldr Sarfaraz Ahmed Rafiqui failed to return from a mission against enemy...”

The Rafiquis — whose grief over an earlier loss of their elder son Ijaz in a Fury crash a few years ago, hadn't yet subsided — did not know what to make of this message. But gradually, sorrow began to blend with pride as details followed about the epic air battle at Halwara, in which their son had fearlessly fought in mortal combat. He was brave and chivalrous till his last. Another son had gone down with honour, a distinction reserved for the bravest of the brave.

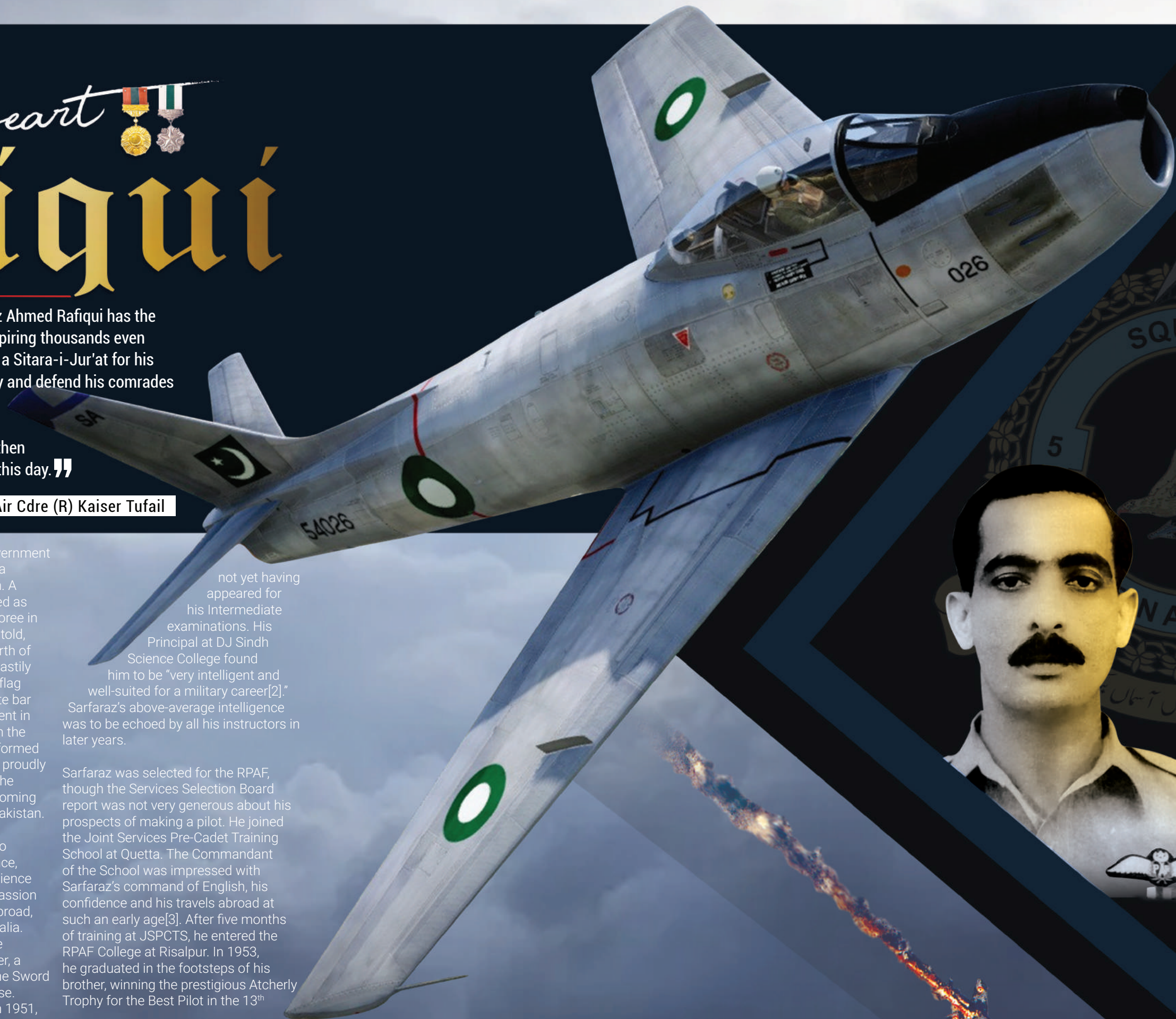
Born in Rajshahi (erstwhile East Pakistan) on 18<sup>th</sup> July 1935, Sarfaraz had three brothers and a sister. He started his education at St Anthony's High School in Lahore, where his father worked with an Insurance Company.

Sarfaraz matriculated from Government High School, Multan in 1948 at a remarkably early age of thirteen. A year earlier, he had been selected as a King's Scout to attend a jamboree in UK and France. In Paris, we are told, his fervour for the impending birth of Pakistan knew no bounds. He hastily had his version of the Pakistan flag stitched by the Girl Guides (white bar consigned to the bottom, crescent in one corner, star in the other)! On the eve of Independence, Sarfaraz formed a troop of three Muslim scouts, proudly flaunting the new flag[1]. After the jamboree, it was quite a homecoming for a twelve-year old to a new Pakistan.

When the elder Rafiqui moved to Karachi as Controller of Insurance, Sarfaraz joined the DJ Sindh Science College. Scouting remained a passion and he managed another trip abroad, this time to a jamboree in Australia. But thoughts soon turned to the Air Force, where his elder brother, a dashing young pilot, had won the Sword of Honour in the 4<sup>th</sup> GD(P) Course. Sarfaraz applied for the RPAF in 1951,

not yet having appeared for his Intermediate examinations. His Principal at DJ Sindh Science College found him to be “very intelligent and well-suited for a military career[2].” Sarfaraz's above-average intelligence was to be echoed by all his instructors in later years.

Sarfaraz was selected for the RPAF, though the Services Selection Board report was not very generous about his prospects of making a pilot. He joined the Joint Services Pre-Cadet Training School at Quetta. The Commandant of the School was impressed with Sarfaraz's command of English, his confidence and his travels abroad at such an early age[3]. After five months of training at JSPCTS, he entered the RPAF College at Risalpur. In 1953, he graduated in the footsteps of his brother, winning the prestigious Atcherly Trophy for the Best Pilot in the 13<sup>th</sup>





GD(P) Course (and turning the Selection Board report on its head)!

Flying came easily to Sarfaraz, an ability that led him to exhibit careless tendencies and some over-confidence, as some of his instructors noted. He once pranged a Fury in Miranshah, breaking one of its landing gear; only a belly-landing at the better-endowed airfield of Peshawar saved the day. To sober him up, he was promptly administered a reprimand. Born fliers are known to follow the line of least resistance, but luckily for Sarfaraz, guidance was always at hand. He continued with a string of above average reports in his Advanced Flying Course as well as the Fighter Weapons Instructors' Course, both done in USA. He again showed his prowess as a superb fighter pilot by topping the course at PAF's Fighter Leaders' School in 1960. After yet another course at RAF's prestigious Fighter Combat School, he ended up piling a unique assortment of highly-rated qualifications that served him (and the PAF) in good stead. As an exchange pilot in UK, he flew Hunters for two years. Sarfaraz's Officer Commanding in No 19 Squadron (RAF), reporting on his flying abilities, eloquently wrote, "In the air his experience and skill combine to make him a very effective fighter pilot and leader who creates an impression of disciplined efficiency in all that he does[4]." On

return from UK in 1962, he was given command of No 14 Squadron. A year later, he was given command of the elite No 5 Squadron, in which he was to achieve martyrdom and eternal glory. He came to be well known as much for his highly assertive and effective control of the Unit as for his spirited attitude towards flying. Sarfaraz's sense of humour, seldom evident from his sole published photograph, was a very genial trait, amply noted at home and across the shores. As an officer, he was found to be courteous and well-mannered with a pleasant personality. He was extremely popular and, socially well accepted. Swimming took up his leisure time, though his keenness for flying determined the daily routine.

An incident that deserves special mention relates to Sarfaraz's steadfastness in matters of honour and righteousness. During a RAF dining-out night, he was enraged when the Pakistani 'representatives' (exchange pilots) were denied the customary toast to their Head of State, while the Europeans merrily drank to their royalty. He walked out of the dinner proceedings and, next morning, informed the bewildered Officer Commanding that he would prefer to be repatriated rather than suffer such scorn. The matter got a bit complicated, but an unyielding



Sarfaraz would accept nothing short of an apology. The OC repented publicly and, later made sure that the Pakistanis were never slighted again[5]. Sarfaraz also drove home a point that it was respect, not pennies that counted.

Sarfaraz was unconventional in more ways than one. His aversion to an arranged marriage invoked the ire of his conservative father, who had failed to incline Sarfaraz towards one particular offer; which included fringe benefits of a house and a good bit of cash besides the damsel! Star-crossed perhaps, he ran short of time looking for the right mate. The mess remained his home and hearth till the end.

#### Deadly Stroke

Two memorable aerial encounters, each a classic of modern jet warfare, capped Sarfaraz Rafiqui's illustrious career as a fighter

**Above: Flt Cadet Sarfaraz Rafiqui taking a last minute lesson from his instructor pilot before going for his first solo mission at PAF Risalpur.**

**Bottom: Gp Capt Hussaini (Retd) depicts last minutes of the hero through his paint and brush.**

**Right Page Bottom: Sqn Ldr Sarfaraz (OC No 5 Sqn - fourth from right) along with fellow fighter pilots in a picture of class and style.**

pilot. The evening of 1<sup>st</sup> September 1965 saw hectic and desperate attempts by the IAF to stop the rapid advance of Pak Army's 12<sup>th</sup> Division offensive against Akhnoor. Vampires, obsolescent but considered suitable for providing close support in the valleys of Kashmir, were hastily called into action. No 45 Squadron was moved from Poona to Pathankot. The grim situation on the ground found the Vampires at work immediately.

Three strikes of four Vampires each had been launched in succession that evening. Much has been made of their success by the IAF, but Maj Gen G S Sandhu is not impressed; in his book History of Indian Cavalry, he recounts how the first Vampire strike of four "leisurely proceeded to destroy three AMX-13 tanks of India's own 20 Lancers, plus the only recovery vehicle and the only ammunition vehicle available during this hard-pressed fight. The second flight attacked Indian infantry and gun positions, blowing up several ammunition vehicles." The Indian forces were spared further ignominy at their own hands when an element of two Sabres arrived on scene. Sqn Ldr Rafiqui and Flt Lt Imtiaz Bhatti were patrolling at 20,000 ft near Chamb. On being vectored by the radar,

they descended and picked up contact with two Vampires in the fading light. Rafiqui closed in rapidly and before another two Vampires turned in on the Sabres, made short work of the first two with a blazing volley from the lethal 0.5" Browning six-shooter. Then, with a quick-witted defensive break he readjusted on the wing of Bhatti, who got busy with his quarry. While Rafiqui cleared tails, Bhatti did an equally fast trigger job. One Vampire nosed over into the ground, which was not too far below; the other, smoking and badly damaged, ducked into the trees. It's shaken pilot, Flg Off Sondhi staggered back to tell the horrifying tale. The less fortunate Flt Lt A K Bhagwagar, V M Joshi and S Bharadwaj went down with their ghoulish Vampires, in full view of the horrified Indian troops. Only minutes before, Flg Off S V Pathak of another Vampire formation had bailed out after being hit by ground fire. The mauling had been thorough[6].

#### Target Halwara

On the evening of 6<sup>th</sup> September 1965, an ill-fated formation of three aircraft took off from Sargodha for a raid on Halwara, one of

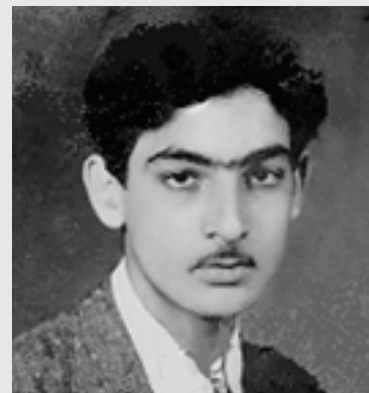
the three that had been singled out for a pre-emptive strike. Led by Sqn Ldr Rafiqui, with Flt Lt Cecil Choudhry as No 2 and Flt Lt Yunus Hussain as No 3, the formation hurtled across into enemy territory in fast fading light. Sqn Ldr M M Alam's formation, also of three aircraft, which had taken-off ten minutes earlier, was returning after an abortive raid on Adampur. Four Hunters, themselves proceeding on a mission against Pak Army formations, had bounced them. Rafiqui was warned by Alam's section to watch out for Hunters in the area.

At Halwara, IAF's No 7 Squadron[7] equipped with Hunters had flown four strikes during the day. These were armed reconnaissance missions, which had had little success in finding worthwhile targets. The fourth and last strike for the day was on its way to the precincts of Lahore, when it had encountered Alam's formation near Tarn Taran. In that engagement Sqn Ldr A K Rawlley's Hunter impacted the ground as he did a defensive break at very low level, with Alam firing at him from stern. The remaining three Hunters aborted the mission and were taxiing back after landing, when Rafiqui's formation pulled up for what



was to be a gun attack on the parked aircraft.

That evening, two pairs of Hunter CAPs (Combat Air Patrols) were airborne, one from No 7 Squadron with Flg Off P S Pingale and Flg Off A R Gandhi and the other from No 27 Squadron with Flt Lt D N Rathore and Flg Off V K Neb. Pingale and Gandhi were in a left-hand orbit over the airfield when Rafiqui broke off his attack and closed in on the nearest aircraft (Pingale). Rafiqui's guns, as usual, found their mark. Pingale, not sure what hit him, lost control of his Hunter and ejected. Next, Rafiqui deftly manoeuvred behind Gandhi and fired at him, registering some hits. Just then, Cecil heard his Squadron Commander call



over the radio, "Cecil, my guns have stopped firing, you have the lead." Cecil promptly moved in to lead, with Rafiqui sliding back as wingman. Gandhi did not let go of the momentary slack and manoeuvred behind Rafiqui who was readjusting in his new position. Gandhi fired at Rafiqui's Sabre, but couldn't get him because of a careless aim. While Gandhi followed the Sabre, Cecil bored in and shot him in turn, the bullets finding their mark on the left wing. Gandhi, seeing his aircraft come apart, ejected near the airfield[8].

Running out of fuel as well as daylight, Rafiqui deemed it prudent to exit. Gathering his formation, he headed north-west, but with two more Hunters lurking around, a get-away wasn't easy. Happy on home ground, Rathore and Neb dived in to give chase. Rathore got behind Rafiqui who was on the right while Neb singled out Yunus on the left. Overtaking rapidly, Rathore fired from about 600 yards registering some hits. Closing in still further he fired again, this time mortally hitting Rafiqui's Sabre. It banked sharply to the left and then dove into the ground near Heren village, some six miles from Halwara.

Meanwhile, Cecil looked around and noticing Yunus in trouble called a defensive break but Yunus, for some incomprehensible reason pulled upwards, assisting Neb to catch up. Neb did not let go of the chance and fired a well-aimed volley, which Yunus did not survive. A puff of smoke rapidly turned into a sheet of flame as the Sabre disintegrated in mid air and fell to the ground. Left alone, Cecil bravely fought his way out and dashed across after a nerve-racking encounter[9].

### Greatest Contribution to the 1965 Air War

In this epic encounter, Rafiqui

was at his leadership best. Of course he had scored a confirmed kill a third time. But more importantly, the significance of the mission was not lost on him and, despite heavy odds, he did his best to get the formation to put in the attack. As a Squadron Commander, he demonstrably inspired other Squadron Commanders and pilots to lead fearlessly. This may well have been Rafiqui's greatest contribution to the 1965 air war. The award of the Hilal-i-Jur'at, as well as a Sitara-i-Jur'at acknowledged his gallant leadership and selfless devotion to duty[12]. PAF Base, Rafiqui (Shorkot), named after him, rekindles the spirit of his chivalry. Sarfaraz Rafiqui Welfare Trust, based on 77 acres of prime agricultural land in Faisalabad



Division, continues to benefit the poor and the needy. The land, given by the Government of Pakistan as recompense with the awards of HJ & SJ, was most generously bequeathed by Sarfaraz's parents for the Trust, which is administered by the PAF. Cecil recounted later that Rafiqui had accepted the mission orders unflinchingly, despite the odds. "It is a one way trip, I am sure about that," Rafiqui had tragically guessed while waiting at the flight lines as the aircraft were being readied for the mission. "Why don't you discuss it with the authorities?" asked Cecil. It was obvious that the significance of the mission was not lost on Rafiqui, when he replied, "It

**Insets: Young Sarfaraz Rafiqui over the years.**

**Right Page: Sqn Ldr Sarfaraz Rafiqui along with a group of No 5 Sqn pilots pose in front of a PAF Sabre. Sqn Ldr Muneer uddin also seen standing next to him.**



is an order, I can't do that." The answer was reminiscent of Tennyson's famous refrain[4]:

Theirs not to make reply,  
Theirs not to reason why,  
Theirs but to do and die.

"... Any further news about him will be conveyed immediately. Letter follows," finished the telegram, addressed to Mr B A Rafiqui. The fate of Sqn Ldr Sarfaraz Rafiqui was officially known only after the war, when dreadfully, he was not amongst the POWs being exchanged. He has lain in some unmarked spot in Halwara for many decades[13]. Fate denied Sarfaraz a last homecoming – to the country for which he once eagerly flew the flag as a little boy, in a far-away land. But his soul lives on in the homeland, serving as a beacon for the youth of today and tomorrow.

### Footnotes:

[1] Based on published account by late Mr Iqbal Shehzad, fellow scout at jamboree.

[2] Remarks by Mr A L Shaikh, Principal, Dayaram Jethmul (DJ) Sindh Science College, 1951.

[3] Remarks by Lt Col Gul Mawaz Khan, Commandant JSPCTS, Quetta, 1951.

[4] Remarks by Sqn Ldr L W Phipps, OC, No 19 Squadron, RAF, 1961.

[5] Incident narrated by Gp Capt Cecil Choudhry (Retd), SJ.

[6] Chamb encounter based on portions of accounts having common ground from: – Air Attack: Outbreak of the War (Sep 1<sup>st</sup>-6<sup>th</sup>) on Bharat Rakshak - Vayu Sena (Internet) <http://www.bharat-rakshak.com/IAF/History/1965War/Chapter3.html>. – Bhatti, Sqn Ldr Imtiaz, 'Death of Four Vampires,' Shaheen – Journal of the Pakistan Air Force, Winter 1968. – Choudhry, Brig Amjad Ali Khan, September '65 – Before and After, Ferozsons Ltd, Lahore, 1977.

– Fricker, John, Battle for Pakistan – The Air War of 1965, Ian Allan Ltd, London, 1978. – Singh, Pushpindar, The Battle Axes – No 7 Squadron IAF 1942-1992, Society for Aerospace Studies, New Delhi, 1991. [7] No 7 Squadron, considered IAF's most elite unit, was at the receiving end of PAF's onslaught, losing eight Hunters and five pilots during the war; today it is equipped with Mirage-2000H. [8] Many years later, Gandhi met Cecil in Iraq where both were on deputation. Gandhi duly acknowledged Cecil as the victor. (As told by Cecil.) [9] Reconstruction of Halwara encounter based on portions of accounts having common ground, from:

– Air Attack: Outbreak of the War (Sep 1<sup>st</sup>-6<sup>th</sup>) on Bharat Rakshak - Vayu Sena (Internet) <http://www.bharat-rakshak.com/IAF/History/1965War/Chapter3.html>.

– Choudhry, Flt Lt Cecil, 'Target Halwara,' Shaheen – Journal of the Pakistan Air Force, Winter 1969.

– Flt Lt Cecil Choudhry's statement to Court of Inquiry constituted on 24-9-65.

– Interrogation Report of Flg Off Mohinder Vir Singh (POW) who was eyewitness to Halwara encounter.

– Singh, Pushpindar, The Battle Axes – No 7 Squadron IAF 1942-1992, Society for Aerospace



Studies, New Delhi, 1991.

[10] Final outcome presupposes veracity of losses acknowledged by IAF.

[11] Rathore, Gandhi and Neb were awarded the Vir Chakra for gallantry in Halwara encounter – India's Highest Gallantry Awards and the Men Who Won Them, 1947-1995 – edited by S S Gandhi, Defence Review, New Delhi, 1995.

[12] Rafiqui's wingmen Yunus and Cecil, as well as Bhatti of the Chamb encounter, were awarded the Sitara-i-Jur'at.

[13] Rafiqui's body was reportedly found intact and buried with proper rites. The Service ID card found on his person was returned by IAF through PAF's Air Adviser in Delhi. The wreckage of Rafiqui's aircraft #52-5248 alongwith Yunus's #53-1173 lies in IAF Museum at Palam.

# A Tribute to Our SAVIOURS

## A Day in the Life of a PAF's Birdshooter

“Imagine a bird weighing barely 2 pounds disabling a combat aircraft weighing thousands of pounds. Even a sparrow has mass, which, combined with velocity, can do catastrophic damage when it hits a jet engine. They can cause millions of dollars of damage to Pakistan Air Force assets. More importantly, it can even result in the loss of a life. No matter how qualified PAF pilots are, a bird strike to an aircraft engine is something they cannot control. There is no silver bullet to prevent bird strikes against planes. It is a 365 days of the year and a 24/7 endeavour to keep problem birds away from the runways and make the airport an unattractive habitat.”

by S.Khalil

**G**hulam Abbas maneuvered his pick-up to reposition himself behind the eagle and fired off the gas cannon. His goals are to scare the eagle to move away from the airfield without harming the bird. “You have probably seen a vehicle mounted with a cannon but never knew what it was for. The gas cannon is a disincentive for birds to be here on the airfield,” said Ghulam Abbas, a bird shooter at Nur Khan Air Force Base Chaklala.

For millions of years birds have had the skies to themselves. Free and unconstrained, they floated on free winds. But aircraft now encroach into their air space, causing collisions that can, at times, end in major aviation disasters. Although air transportation is the safest means to travel, bird strikes remain an inherent danger at every airport.



Airports around the world attract all kinds of birds and Nur Khan base is no different. That is where seasoned bird shooters like Ghulam Abbas come in. Ghulam Abbas has spent more than two decades monitoring birds at airports and air bases around the country. At the Nur Khan Air Base, where he has served 15 years, his mission is to walk around the air strip, and taxiways, clearing unwelcome winged visitors to avoid collisions with aircraft.

He is one of the six bird shooters deployed around the runway. They start with the relatively softer ecological approach. The idea is to make the premises as unfavourable as possible for uninvited birds. Their weapons? Pyrotechnics, gas guns and pump action shotguns for lethal control, but only as a last resort, when the ecological approach does not work.

“Any air field is an attractive area for birds to congregate and feed. Some bird species like to come to the Nur Khan base where there is open grassland to feed, rest and even nest. One of the major attractions is the rubbish dumped around the boundary of the airbase and in close proximity. They have become perfect feeding grounds for vultures and crows,” Ghulam Abbas said.

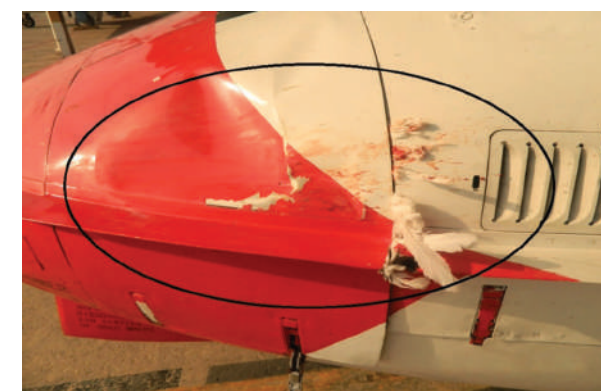
Incidents of bird collisions continue to haunt officials at the airbase. Probably nowhere else in the city does garbage pose as a serious threat to human lives as in the vicinity of the airports, where it can set off a chain of events leading to aircraft accidents. Garbage is the main reason birds are drawn to the airport. It is so at all air bases, and it is particularly a problem at the Faisal Air Base Karachi, where the surrounding areas have been turned into landfills.

To reduce risks of collisions, it is

necessary for the air base to employ staff that undergo specialized training. Their effectiveness depends on their professionalism and motivation. It involves scaring birds away and keeping them far away from the airfield. A series of technical measures, both passive and active, are needed to chase birds from the airport. Besides the pyrotechnics, scare crows and the gas gun, acoustic devices are also used to sound off cries of distress. This is an equally efficient and less hazardous means of scaring off birds.

“The Directorate of Flight Safety continuously provide guidelines to the bases to minimise risks, as the threat is real. Bird damage is difficult to evaluate when in flight. A multiple collision with several small birds is just as dangerous as with one big bird. Damage can range from the wingtip to engine destruction, which is the most risk exposed component to foreign object ingestion. Any foreign body penetrating the combustion chamber can cause engine breakdown,” said Flight Safety officer at the Nur Khan Air Base, Chaklala.

According to Gp Capt Usman, OC Flying Wing at Nur Khan, most impacts with wild birds occur in close proximity to bases during take offs and landings. This is particularly dangerous because aircraft speed is the slowest and it is less manoeuvrable. Bird ingestion inevitably results in extensive engine inspection and the rest of the aircraft. Damages can run into millions of dollars. Damage to a plane’s windshield, fuselage,



wings, and the jet engines cause delays in flights and missions or completely put the aircraft out of commission until it can be repaired”, the senior official added.

Monsoon season from July to September is when birds and planes are fighting for air space the most. It is the hardest keeping Kites at bay. “Usually pyrotechnics fired into the air are enough to scare off anything with wings. But Kites are stubborn and there are times when nothing gets them

“Garbage is the main reason birds are drawn to the airport. It is so at all air bases, and it is particularly a problem at the Faisal Air Base Karachi, where the surrounding areas have been turned into landfills.”



Left Page: The Sky Watch - Ghulam Abbas, a bird shooter of PAF Nur Khan scanning the skies for hovering birds. (Photo: S. Khalil)

Above: Force of Nature - A bird may seem like a harmless little feather-ball, but for an aircraft at an altitude cruising at Mach 0.8, it can prove no less lethal than an AMRAAM.

going. They sit in the centre of the runway and do not budge despite all the scare tactics and abatement systems. We are left with no choice but to shoot them," Ghulam Abbas said.

Ghulam Abbas prefers not to kill crows, which are also plenty around the airstrip. "Crows are quite intelligent. They keep their distance and cannot be easily deterred. And when we do have to kill one, dozens more gather to mourn, creating an even bigger problem," he said.

This is a fairly light day for Abbas, so aircraft operations at Nur Khan air base continue without interruption. But the inventory of species in and around the airport sites increases during winters. Besides the eagles and crows, the ground crews become concerned about migratory birds running into aircraft engines or when they perch on antennas that can cause interference with pilot instruments. October, April and May become equally



busy months, when migratory patterns bring from the chilling North more unwanted birds through the base's airspace.

Keeping the runway as bird free as possible is not all they do to help keep our aircraft up in the sky and our pilots safe. Bird shooters are the eyes and ears of the control tower on the airstrip, men who give the final clearance.

In one particular incident at the Sumungli Air Base, home to the No 23 and No 17 squadrons, where Ghulam Abbas started working initially, it was business as usual. Ghulam Abbas, who was standing at the end of the runway, spotted a leak from the fuel tank of an F-7 jet readying for take-off. "I immediately informed the control tower about the anomaly and the flight was aborted. The pilot was grateful and I felt satisfied" Ghulam Abbas said.

Similarly, on Basant earlier in March at Chaklala, a kite got caught in the wingtip of an aircraft that neither the control tower nor the pilot noticed. It was the bird shooter at the end of the runway who radioed the control tower, which informed the captain of the plane, Ghulam Abbas said. Several such incidents were reported where only the bird shooters spotted something and warned the control tower and the pilots that

saved their lives and loss of aircraft.

Bird shooters are an important part of a vigorous flight-safety program that enables the PAF to accomplish our missions of transporting crew and supplies across the country.

"We are the men with the final word. In our business, it's all about mission capability," the bird shooter said dressed in his orange overall. It's a sunrise to sunset job for Ghulam Abbas. He wishes there were fewer stray dogs and birds around the airbase. While the bird shooter is doing his bit to keep pilots and millions of dollars worth of the country's assets safe, he wishes people will also realise their responsibilities and do not litter.

"Know that everytime people toss a wrapper out onto the road around airstrips, it puts a pilot's life at high risk. It is the last thing to see a catastrophe caused by a bird strike. Together we need to help support air force missions and make flying a lot safer," he urged.

“ At the time of take-off or landing, when you see the birds fly away from the airfield due to your efforts, your job is done and you feel satisfied. - Ghulam Abbas ”

**Above: Bird-hits have proven to be more damaging than bad weather, often blowing parts of the aircraft to smithereens.**

**Left: A vigilant Guardian - Ghulam Abbas aims at poaching birds. (Photo: S. Khalil)**

**Right Page Above: Consequence of Littering: An aircraft's wing can be seen destroyed due to a bird hit. Dispose-off your trash responsibly!**

**Right Page Bottom: An accomplished bird-shooter struts the airfield as an aircraft safely takes off, thanks to his efforts! (Photo: Alan Warnes)**



Nonetheless, for Ghulam Abbas who clocks in around 6 am, it's a ceaseless job of uninterrupted surveillance to make the air base inhospitable for birds and minimize bird-aircraft collision. He finds himself where very few people are allowed to go, and that's the infield of a major air force base.

"It is satisfying to almost immediately see the results of your work. We use these various harassment tools to minimize habituation and the element of surprise is maximized. At the time of take-off or landing, when you see the birds fly away from the airfield due to your efforts, your job is done....you feel satisfied" he said.



# CHANGING THE NATURE OF WAR

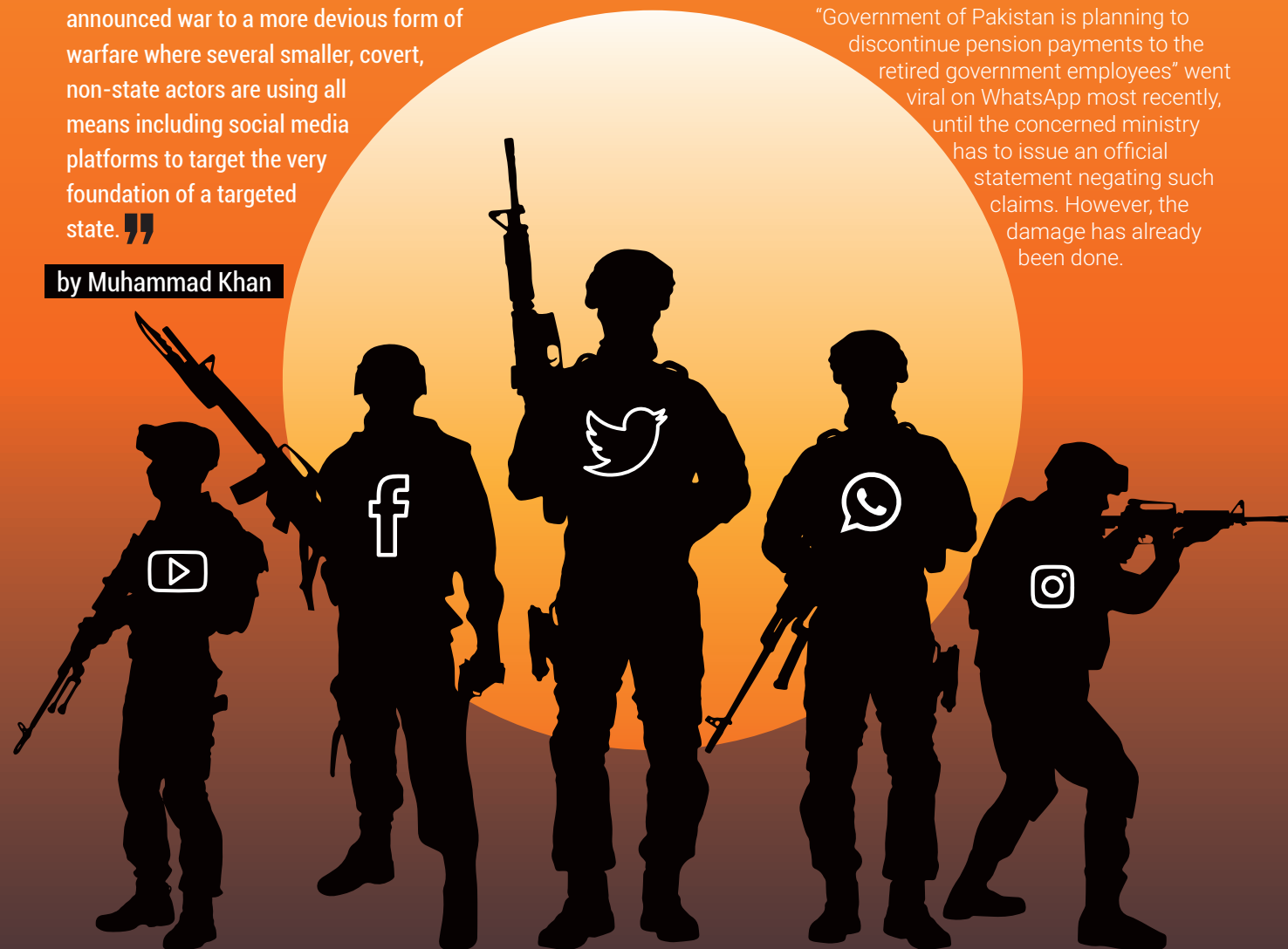
## Social Media: Tool of 5th Generation Warfare

“War is one of the most primitive pursuits of mankind. As technology advanced, new tactics and strategies emerged to make the already-deadly endeavours progressively more lethal. However, contemporary war, termed 5<sup>th</sup> generation warfare, stands out from its predecessors in its nature and form. Social media is at the forefront of this new structure of warfare. It has shifted the onus from the usual state military fighting an announced war to a more devious form of warfare where several smaller, covert, non-state actors are using all means including social media platforms to target the very foundation of a targeted state.”

by Muhammad Khan

AF pilot Abhinandan has shot down a Pakistan Air Force F-16, flown by Gp Capt Agha Mehar Gul. The news, along with the picture of the mentioned pilot, went viral especially in Indian circles. The Indian public was on moon, media went hysteric, celebrations started all across major Indian cities till the time the officer himself has to come up on the TV channels and social media websites stating 'I am here...I am alive...take a close look'. Indian hysteria and festivity remained short lived.

“Government of Pakistan is planning to discontinue pension payments to the retired government employees” went viral on WhatsApp most recently, until the concerned ministry has to issue an official statement negating such claims. However, the damage has already been done.



Dr Fozia, a medical doctor in UK, was surprised to be bombarded with fake news as she worked on the covid wards and even more shocked to discover that some of the messages were coming from prominent people in the local community. They accused doctors of forcing people to sign 'Do Not Resuscitate forms', suggested that Covid-19 didn't actually exist and one even told her she would be: "held responsible in the court of Allah for the deaths of these people, for negligence in this life, and life is very short."

What is it? This is the question which keeps coming to our minds, keeps bothering us....with no convincing and absolute answers. Next up...Who is spreading this misinformation, fake news, and disinformation? Is it deliberate effort by some individual or a well-planned activity orchestrated by states, governments, spy agencies or is it just a few enthusiasts trying to get millions of likes, hits for gaining cheap popularity and making money in return. Or is it, somehow, linked to the present day most talked about, most sought-after buzz word, 5GW (Fifth Generation Warfare). In subsequent paragraphs we would try to understand the concept and most importantly the core of its dynamics, the 'Social Media'.

In the history of mankind, no pursuit has been undertaken with such vigor as the art of waging war. There have been revolutionary advancements, innovative approaches, information tactics, non-conventional actors, the list goes on. From wars fought with weapons fashioned from wood to high-precision missiles to information warfare, it is apparent that humans are highly innovative when it comes to killing each other. According to researchers, mankind has gone through 4 stages of war, each deadlier and more complex than the last. The Five generations of warfare can be labeled as:

- **1<sup>st</sup> Generation Warfare:** War of Line and Column.
- **2<sup>nd</sup> Generation Warfare:** Trench Warfare.
- **3<sup>rd</sup> Generation Warfare:** Maneuver Warfare.
- **4<sup>th</sup> Generation Warfare:** Irregular

Warfare (Guerrilla war).

- **5<sup>th</sup> Generation Warfare:** A war of motives, technology and empowered individuals.

The lines between 4<sup>th</sup> and 5<sup>th</sup> generation warfare are blurred. The stage is being set for centuries for this evolved form of war. A horrifying instance of unconventional warfare was the use of radio in the Rwandan Genocide. A single Hutu influential station, Radio des Mille Collines (RTL) played a major role in fear-mongering, rumors and panic after the plane carrying President Juvenal Habyarimana of Rwanda crashed under dubious circumstances. The radio station ceaselessly blared out verbal rhetoric promoting a kill-or-be-killed doctrine to the Hutu people. The radio, along with other propaganda mechanisms sparked a massive killing spree over 3 months that left up to 1 million Rwandans Tutsi massacred and 2 million refugees seeking safety in neighboring nations. Another very famous example can be Iraq's 'Weapons of Mass Destruction' (WMD) as claimed by Bush Administration which turned out to be Weapons of Mass Deception, later.

Other earlier examples are Caesar and Alexander exploiting public relations messages, Napoleon using print media and the infamous Nazi propaganda machine designed by Hitler. In the contemporary world stage, technological innovation with tools like the media and the internet has made propaganda and the manipulation of facts easier than ever before. Owing to the speed and the vast spread of these mediums, the consequences and effects of information warfare have increased drastically. In 5<sup>th</sup> generation warfare, one of the primary objectives is to undertake violence so discreetly and in such a way that the victim is not even aware that he is a victim of war or the fact that he is losing. The secrecy of this type of tactics make 5<sup>th</sup> generation warfare the deadliest and

“The nature and pervasiveness of social media makes it the perfect tool for 5<sup>th</sup> generation warfare. Since 5<sup>th</sup> generation warfare mandates exploitation and manipulation of perceptions of the general public, social media's design gives it the ability to be yielded for these ulterior motives.”

most complex warfare in the course of history. Interestingly, 5<sup>th</sup> generation warfare would never even be identified. 5<sup>th</sup> generation warfare focuses on culture and morality, distorting the perception of the populace to give a distorted vision of the world and politics. These elusive tactics uses the 'rage of the people' and the 'rationality of the state.' to instigate conflict and strife. Practitioners of 5<sup>th</sup> generation warfare utilize cultural, religious and moral icons to defeat an icon. 5<sup>th</sup> generation warfare is the next step in the evolution of warfare. A set of tactics, albeit logically foreseeable, but still extremely complex and manipulative. Scholars and tacticians have identified 4 basic characteristics of the phenomenon:

- New Domains of Conflict.
- Changing Nature of Adversaries.
- Changing Nature of Objectives.
- Changing Nature of Force.

#### (a) New Domains of Conflict:

4<sup>th</sup> generation warfare took conflict beyond the physical battlefield into political domain. 5<sup>th</sup> generation warfare augmented 4<sup>th</sup> generation warfare by transcending the conflict further into fields of information, cognitive and social domains in addition to the physical and political arenas.



**(b) Changing Nature of Adversaries:**

5<sup>th</sup> generation warfare expands battlefield beyond the domains of 3GW and 4GW and makes it omnipresent. Official militaries no longer possess total dominance over warfare as it can be influenced and affected to an extent by non-state actors. Super-empowered individuals, gangs, ethnic or religious interests groups, social and political networks which potentially form influential combinations.

**(c) Changing Nature of Objectives:**

Wars have objectives and are dictated by 'defeat mechanisms'. Defeat Mechanisms are the various processes and rationale that cause the physical and psychological damage that drive armies and states to defeat. In 5<sup>th</sup> generation warfare, defeat mechanism have changed drastically to involve targeting leadership development, alliance building, public and ideological narrative, acquisition of funding, material, infrastructure, recruitment, organization of efforts, indoctrination and training of personnel, planning and target, movement and operations, communication, the list goes on.

**(d) Changing Nature of Force:**

In 5<sup>th</sup> generation warfare "Force as a concept" exceeds to involve all sorts of means imaginable, kinetic or non-kinetic, military or non-military and is utilized in different combinations to overcome a military adversary. States may be less likely to be opponents; non-state actors, transnational entities, and even intelligentsia-backed individuals will become more relevant, so that a state may face several small enemies, rather than one or two major ones. As Sun Tzu said in "The Art of

War": "The best victory is when the opponent surrenders of its own accord before there are any actual hostilities.... it is best to win without fighting."

**Social Media at the Core**

The nature and pervasiveness of social media makes it the perfect tool for 5<sup>th</sup> generation warfare. Since 5<sup>th</sup> generation warfare mandates exploitation and manipulation of perceptions of the general public, social media's design gives it the ability to be yielded for these ulterior motives. Sun Tzu predicted these tactics as the "Acme of skill (a victory without fighting)". According to analysts, Pakistan's geographical position and its plethora of resources is a gift as well as a challenge, as it has prompted a never-ending onslaught from foreign forces. Over the years, instead of being an advantage, it has caused constant meddling by global influences in its national workings. This highly damaging phenomenon has been exacerbated since 9/11, putting Pakistan, along with several other Muslim countries, on the forefront of the terrorism debate. Paradoxically, these countries are accused of being the transgressors of such atrocities while simultaneously deemed responsible for being on the frontline of the offense of such nefarious forces. It is a confusing paradigm, a war of information and perspectives.

When it comes to Pakistan, social media is at the forefront of this evolved form of warfare. In just one small example, a recent investigation by Facebook found India "coordinated inauthentic behavior". The predominant political parties, Bharatiya Janata Party

(BJP) and the Indian National Congress (INC) were allegedly posting instigating content against Pakistan with uncanny regularity. The amount that was spent on these activities can give one an idea about the staggering amount of thought and resources that was poured into this insidious practice. During the years 2014-19, INC spent \$39, 000 on ads and questionable content using a total of 687 Facebook accounts. These accounts appeared to be autonomous but the investigation found that they followed a coordinated and synergized agenda. Similarly, BJP spent \$70, 000 for the same purpose from a mere tiny number of 15 Facebook accounts.

Social media is a near-perfect tool for perpetrators of 5<sup>th</sup> generation warfare. It has made dissemination of information rapid and accessible, while simultaneously making it difficult to track and monitor. It allows non-state actors to build an intricate web of misinformation and propaganda, paving the way for insurgencies and non-kinetic warfare. This is then exacerbated by local media, which provides fuel to the fire for their own monetary or political gain. Pakistan is now engaged in 2 different types of war. First is the kinetic warfare in the form of operations like Zarb-e-azab and the conventional confrontations on LOC. The second is a war of narratives. Social media has played a huge role in instigating separatist movements, sectarian violence, linguistic divides, extremism, sabotage and mistrust in national institutions. Instigators have targeted the very ideology of Pakistan. Facebook is the primary source of fake news targeted at impressionable youth who have neither the maturity nor the resources to verify the authenticity of such claims. The repetition and ubiquitous nature of the content guarantees a constant onslaught of small bursts of misinformation seemingly from multiple sources. This gradually but surely cripples the perspective of the user, giving the false impression that Pakistan is a nation fated to implode and disintegrate.

Almost the entirety of anti-Pakistan content has its origin on foreign shores, making it extremely cumbersome to take action against it. The enemy is

trying to target the most vulnerable and present asset of Pakistan, its youth. According to a UN report, Pakistan is the 5<sup>th</sup> largest 'young country' in the world, with about 63% of its populace between 18 to 33 years. These are individuals plagued by administrative problems, poor infrastructure, political instability, few economic opportunities, an education system in shambles, unemployment and an ever-present sense of chaotic uncertainty. It doesn't take a genius to ascertain that such a populace would be more than easy misled. And misled it has been. Be it obviously foreign influences, or by 'one of our own' sorts, the nation's youth was targeted with one campaign after another. Blinded by ethnic or religious hatred, ill-advised ambitions and glorified false expectations, the youth have de-tracked from their socio-national roots, shaking the very foundation of Pakistani society. Social media and other similar mediums have caught the youth in a snare, which were already deeply frustrated from the state of affairs. Creating a whirlwind of misinformation and narratives, social media with its dynamic role has twisted nationalist values and distorted the worldview of its millions of users. The effects has ranged from cyber-attacks, fake news, money laundering, hacking of bank accounts, sabotage of CPEC and development projects, the emerging of separatist movements like BLA, righteous mobs committing murder in the name of blasphemy, targeting of minorities, to name a few. Foreign influence has orchestrated recent attacks the likes of the attacks on Naval and Kamra base and attempts to sabotage Chinese foreign missions. The agenda is clear, to corrupt the credibility of the state, create distance between the military and the executive, create mass unrest and portray Pakistan as an unsuitable and unsafe state at a global level.

**Recommendations:**

A good start to counter such an elusive enemy lies in a response in kind and on all levels. The state needs to equip all of its institutions to reciprocate and fight all efforts of the enemy in both kinetic and non-kinetic forms. A feasible and long-term analysis must be undertaken to understand and dissect this new form of warfare,



so it can be tackled efficiently and effectively. The focus must shift from a purely kinetic form of military action to encompass a broad spectrum response on all fronts which are relevant. All institutions must come together to formulate Pakistan's national identity which would be more relevant to the current world order. The objective should be to revive the national spirit and ideology of Pakistan, which the youth can own and be proud of. Empowerment and accountability both need to be strengthened simultaneously, with local governing bodies being given more autonomy but also being much more accountable for their actions.

Worship places, madrasas and religious parties need to be monitored closely and data must be gathered about their activities. This is crucial for curbing extremism and sectarian violence. Similarly, we need to ensure that no group or party is allowed to promote division by spewing hate or rhetoric against any sect or ethnic group. Media management is vital, undertaken by a guiding set of carefully formed principles and moral values.

A review of the state's foreign relations and foreign policy is also in order, with the purpose of ensuring that no unwanted personnel and groups can enter the state. Another update that is long due is a revision of national curriculum implemented in educational institutions. While also crucial for a well-educated youth, it must also prepare young minds to distinguish between false and true narratives. Social media and other mediums which have recently emerged need to be properly monitored and utilized to ensure that the true and official narrative of the state is prevalent on local and international level. Cybercrime and IT authorities need to amplify their efforts to curb and counter the attempts being made by foreign and local forces to undermine Pakistan's sovereignty. On the split side, the government must realize that the biggest defense against 5<sup>th</sup> generation warfare is, and will always be, a happy and content populace. Prosperity through economical and social well-being remains to be the most important determining factor in hindering nefarious forces that seek the collapse of Pakistan.

To conclude, we need to realize that, in this era, winning hearts and minds of the populace is just as crucial as winning sorties on the battlefield. Pakistan is being targeted by countless internal and external forces which seek to destroy its very spirit. The only prudent way to counter these threats is to first understand the new prevalent paradigm of warfare and then, devise a broad-spectrum national strategy to counter this still-evolving phenomenon.



# A Bird Eye View of MUJAHIDEEN-E-AFLAK *Ko Salam*

“On 7<sup>th</sup> Sept every year, the nation celebrates Air Force day with usual fervor and motivation. The day reminds us all that a small but motivated air force prevented the enemy, five times bigger in size, from achieving its malicious designs during 1965 war. Its leadership, shuhada and ghazis all rose to the occasion and came up to the expectations of its people. Besides plethora of events occurring on this memorable day, PAF annual show 'Mujahideen-e-Aflak Ko Salam' remained in the limelight especially in national media. This special feature recaps the entire event in a manner where the reader would find himself amidst the galaxy of celebrities, veterans and proud men in blue.”

by Talha Ul Huda



On 7<sup>th</sup> September 2020, Pakistani nation glued to their TV screens as the much-awaited PAF's annual program "Mujahideen-e-Aflak Ko Salaam" was aired. As PAF has always held a special place in the hearts of Pakistani people due to its professionalism, all the national news channels considered airing the program during the prime time. As always the theme of the program mostly revolved around PAF's stellar performance during 1965 war, paying tributes to its Shuhada and Ghazis besides acknowledging its role during present times. The program also highlighted the contributions made by PAF in various nation building efforts over the years.

The star-studded arena at Convention Centre Islamabad was graced by Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff PAF, former Air Chiefs and senior serving and retired officers, war veterans of PAF, families of PAF Shuhada, senior Army and Navy officers, civilian leadership and children from PAF Fazaia Schools.

The event was opened by veteran artists of the television industry, Ms Bushra Ansari and Mr Bahroz Sabzwari. In the first offering, a well-placed and crafted documentary tribute to PAF's finest, Sqn Ldr Sarfaraz Rafiqi (Shaheed), Air Commodore (R) Syed Sajjad Haider and Air Commodore M M Alam (deceased) was presented to the audience. The video highlighted the illustrious

Above: A panoramic glimpse of the event.

Right 1<sup>st</sup>: Senior artists Behroz Sabzwari and Bushra Ansari opened the show with their stellar performance.

Right 2<sup>nd</sup>: War veteran of 1965 war, Sqn Ldr (R) Ghani Akbar, SJ paid a rich tribute to his former comrade and war hero, Gp Capt Saif ul Azam, SJ (deceased).

Right 3<sup>rd</sup>: Niece of Fit Lt Sarmad Ali Changezi (Shaheed), SJ spoke at length about the great shaheed of 1971 war.

All Pics : (PAF Archives)



contributions made by this legendary trio during 1965 war. These brave men fought valiantly against an enemy five times greater in number and equipment thus setting an example for the generations to come.

The tribute was followed by a segment in the honour of Ace of Aces, Group Captain Saif Ul Azam, SJ. Gp Capt Saif Ul Azam would be remembered in the history as the one who while remaining in four different air forces shot down aircraft of two different countries. For his gallantry in the 1965 war he was awarded Sitara-e-Jurat by the Government of Pakistan while for downing two Israeli aircraft in the Arab Israel War, he was awarded with Wissam-al-Istaqlal and Nawt-al-Shuja'a. Sqn Ldr Ghani Akbar SJ, a veteran of the 1965 war graced the stage and spoke at length about his friend and comrade, Group Captain Saif Ul Azam.

Next in line was the segment in the honour of war veteran, Air Vice Marshal



1

### STAR PRESENTERS

- Bahroz Sabszwari
- Bushra Ansari
- Farooq Hassan
- Shiffa Yousufzai
- Mikhaal Zulfiqar
- Hareem Farooq

### ARTISTS

- Sahir Ali Bagga
- Shabana Benjamin
- Shabnam Majeed



2

1. Family of late Junaid Jamshed receiving life time achievement award from Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, PAF.



3

2. Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, PAF being asked by a Fazaia student to come up on the stage during the finale of the event.

3. Artists Mikhaal Zulfiqar & Hareem Farooq were also amongst the team of hosts at the event.

4. Sqn Ldr Sibtain describing the events of 27<sup>th</sup> February, 2019.



4



Akhtar Saeed Ansari (Retd) whose gallantry led to the destruction of IAF's Jam Nagar air base in 1965. The veteran graced the podium amidst applause where he spoke about the grit, gut and greatness of the men that protected Pakistan 55 years ago.

In the Shuhada segment, Flt Lt Samad Ali Changezi (Shaheed) SJ, a dauntless son of the soil hailing from Quetta, was honored at the ceremony. His shahadat during 1971 war is a shining example of courage, honour and beyond the call of duty. During the segment, Ms Nargis Ali, niece of the Shaheed, was requested to come up on the stage to talk about the national hero.

Later, anchorpersons Farooq Hassan and Shiffa Yousafzai took the stage and introduced a heart-wrenching memoir of the Shuhada of the fateful PAF bus attack in 2007, which claimed 11 innocent lives including 7 officers. The memoir reminded the audience of the sacrifices made by the resilient Pakistani people and its armed forces to bring peace and stability in the country.

Over the years, PAF played a key role in Ops Zarb-e-Azb in eradicating the menace of terrorism from the country. PAF airstrikes against terrorists, without any collateral damage, proved to be the turning point in the war against terrorism in the country. To talk about the success of these operations, Gp Capt Umer Rasheed was called

“The show highlighted the magnificent aerial victory of the 1965 war, in which the very young but professional PAF exhumed the enemy's advances and made a colossal mark in aviation warfare history”

Above: All in attendance stand in respect of our national anthem.

Right Insets: Gp Capt Omer, Air Vice Marshal (R) Akhtar Saeed Ansari, SJ and Chief Tech Sajjad during a conversation with the hosts.





on the stage. In continuation of PAF's operations against the terrorists, a heartwarming story of brave PAF airmen came up last year. Chief Technician Sajjad Afridi, being heavily wounded and despite all odds never gave-in to attacking terrorists and safeguarded the post till the very last. To talk about this heroic act, the airmen himself appeared on the stage amidst warm applause.

Next up, famous celebrity Mikhaal Zulfiqar, who had enthralled audiences in PAF movie "Sherdil" along with actress Hareem Farooq took over and introduced a breathtaking tribute to Pakistan's rock star-turned-religious scholar, the late Junaid Jamshaid. Being an aviation enthusiast, Junaid Jamshaid had a lifelong association with the PAF, having been the son of an Air Commodore.

**“ Pakistan Air Force has always played an integral role in nation building as part of its manifesto and duty: the men in blue have rubbed shoulders with their Pakistani brethren in every catastrophe and developmental strife. ”**

Junaid Jamshaid's Dil Dil Pakistan is considered to be a parallel national anthem for Pakistan, warming hearts and boosting morale in every dark hour. He had also produced various songs for PAF which became a huge success during 90s. To acknowledge the great contributions made to the nation and PAF, by the legend the Chief of the Air Staff, ACM Mujahid Anwar Khan presented life-time achievement award to his family. His brother and son received the

coveted award amidst applause that hopefully reached our fallen hero.

Next in the show was the segment on 'Operation Swift Retort'. PAF's quick and precise response to enemy's so called and false surgical strike on the morning of 27 Feb 2019 was shown to the audience through a documentary. The video reminded the nation that the defence of the aerial frontiers of Pakistan is in safe hands and whenever the situation arises again, PAF is ever ready to take on the challenge. During this segment, Sqn Ldr Sibtain came up on the stage and gave the details of air strike against enemy on the morning of 27 February 2019. It is considered in PAF that the aircraft belongs to its technicians/ airmen, the pilots only lend it from them to perform their duties. These men are the back bone of PAF

**Bottom: Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, PAF waving Pakistani flag along with hosts and singers during the finale of the event.**

**Right Page Inset: Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, PAF addressing on the occasion.**

**Right Page Above: A memorable group photo of Air Chief along with artists and Fazaia School children at the closing of the show.**



operations and the leadership has always valued their great contributions in this regard. The next segment was in the honour of these unsung heroes. Chief Technician Mudassar Iqbal, was asked to come up on the stage to shed light on his role and to represent these great men that enable our birds to fly safe.

Pakistan Air Force has always played an integral role in nation building: the men in blue have rubbed shoulders with their Pakistani brethren in every catastrophe and developmental strife. The PAF's response and efforts in the aftermath of

**“ The CAS told nation that Quaid-e-Azam's Air Force upheld its values on 27<sup>th</sup> of February 2019, and will continue to defend its skies with the same vigilance and duty. ”**

Covid-19 were acknowledged at the national level as the PAF flew day in and day out to provide medical aid / supplies to Pakistan as well as abroad. PAF's measures to protect its personnel and the logistical support provided to the government of Pakistan during these testing times were also displayed through a video documentary.

Towards the finale of the show, artists Sahir Ali Bagga, Shabana Benjamin and Shabnam Majeed enthralled the audience with ever-green patriotic songs, which in words of the CAS, added to the beauty and character of this auspicious event.

The last segment of the show was kept for the address by

Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, PAF. CAS opened his address with the acknowledgement of the great purpose behind the event: honoring the sacrifice of PAF's Shuhada and crediting the contributions of its veterans. The CAS told the nation that Quaid-e-Azam's Air Force upheld its values on 27<sup>th</sup> of February 2019, and will continue to defend its skies with the same vigilance and duty. He further said that PAF was always ready to respond to any misadventure perpetrated by the enemy. The CAS also acknowledged the PAF's steadfast efforts against Covid-19 and contributions made by its personnel in nation building efforts. In his closing remarks, the CAS expressed his gratitude for the untiring efforts made by the team, spearheaded by Air Marshal Ahmer Shehzad Leghari, Vice Chief of Air Staff, for orchestrating this grand event. In the finale of the event, students from various Fazaia institutions came up on the stage along with Air Chief, artists and guests to participate in the national song which concluded this mega event.

## PAF C-130 TRANSPORTS DEAD BODIES OF SIKH YATREES

**4<sup>th</sup> July, 2020:-** On the instructions of Government of Pakistan, a PAF C-130 aircraft carrying dead bodies of Sikh Yatrees landed at PAF Base Peshawar. The dead bodies of 21 Sikh Yatrees and a driver, who died in a dreadful collision between a coaster and train near Sheikhpura, were airlifted from PAF Base, Lahore last night. The relatives of the deceased had gathered at the PAF base Peshawar to receive the dead bodies. 11 males, 10 females and a four year child died in the accident, while 05 injured are under treatment at the hospital.



Meanwhile, Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, Pakistan Air Force in his message has said that he is grieved at the loss of precious lives in the tragic accident. He also expressed heartfelt condolences with the bereaved families who lost their dear ones and also prayed for the early recovery of the injured.



## PAF JF-17 THUNDER PARTICIPATES IN VIRTUAL ROYAL AIR TATTOO SHOW

**20<sup>th</sup> JULY, 2020:-** It was a moment of pride for the country when the Pride of Pakistan JF-17 Thunder participated in Virtual Air Tattoo Show-2020 at Royal Air Force Base Fairford (UK). Besides the indigenously manufactured multirole fighter aircraft of No 16 Squadron, the time tested C-130 Hercules from No 21 Squadron also participated in the mega event. This year, owing to the Covid-19 pandemic, air forces from all over the world were asked to send short video clips of the participating aircraft and aircrew.

international market besides projecting the soft image of the country across the world. Fans of the Royal International Air Tattoo enjoyed a weekend of virtual flying displays, interviews and never seen before aerial footages of modern aircraft. Ranked among the biggest air shows of the world, Royal International Air Tattoo features aircraft from the leading air forces across the globe. Various Air Forces, aircraft manufacturers, aerospace technology firms participate in this mega show each year.

As per the conditions, PAF sent short video clips of each participating aircraft along with message from the aircrew. These clips were telecast on the official social media channels of RIAT and were widely appreciated by the online users. The event would go a long way in showcasing the potential of JF-17 for the



## PAF DISTRIBUTES RATION IN RAIN AFFECTED AREAS OF KHI

**31<sup>st</sup> August, 2020:-** Keeping the tradition of serving the nation during natural calamities, Pakistan Air Force came to the succor of rain affected families of Karachi. On the special instructions of Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, Pakistan Air Force, PAF Bases situated in Karachi are actively participating in relief operations in the rain affected areas. Pakistan Air Force besides actively participating in relief efforts in flood like situation in some parts of the city is also reaching out to the needy families whose houses have been inundated in the natural calamity. As a humanitarian gesture, ration packs carrying basic food items and commodities such as flour, rice, sugar, oil, pulses etc were distributed amongst over 1000 needy families of the worst hit areas in the recent torrential rains. In the first phase ration packs were delivered in various low lying areas in the vicinity of PAF Base Faisal and PAF Base Masroor, including Grex, Masroor Colony, Budhni Goth, Haji Muhammad Goth, Musharraf Colony, Bilal Colony, Shah Faisal Colony and Al-Falah Society.



## CAS LAYS FLORAL WREATH AT SHUHADA MONUMENT AT AHQ

**7<sup>th</sup> September 2020:-** Chief of the Air Staff, Pakistan Air Force (PAF), Air Chief Marshal Mujahid Anwar Khan on Monday, 7<sup>th</sup> September said Pakistan's valiant Armed Forces were well versed in protecting national borders and people and were fully capable of defeating the enemy. The Air Chief said : "On the memorable and historic day of September 7, I pay tribute to all heroes of Pakistan Air Force who stood like a rock against enemy aggression." He was addressing as Chief Guest during a Martyrs' Day ceremony held at Air Headquarters here in Islamabad.



He said: "Today we salute our martyrs and veterans for their determination, courage and spirit of sacrifice and renew our pledge that we will never allow any harm to our sacred homeland." Highlighting the current situation in Illegally Indian Occupied Jammu and Kashmir (IIOJK), he said : "We also express our solidarity with the Kashmiri brothers and sisters who have been fighting against oppression and tyranny for seven decades.

" To pay homage to the martyrs, the Air Chief laid floral wreath at the Martyrs' Monument and offered "Fateha". Principal Staff Officers, officers, Airmen and PAF civilians attended the ceremony.

## Naval Chief Pays Farewell Visit to AHQ



**29<sup>th</sup> SEPTEMBER, 2020:-** Outgoing Chief of the Naval Staff, Admiral Zafar Mahmood Abbasi, visited Air Headquarters, Islamabad today. On arrival, he was received by Air Chief Marshal Mujahid Anwar Khan, Chief of the Air Staff, Pakistan Air Force. A smartly turned out contingent of PAF presented him guard of honour. The Naval Chief laid floral wreath on martyrs' monument to pay homage to PAF martyrs who laid down their lives for the defence of the motherland.

Later on, Admiral Zafar Mahmood Abbasi called on Air Chief Marshal Mujahid Anwar Khan in his office. Various matters pertaining to regional security and professional interest were discussed during the meeting. The Air Chief lauded various indigenous projects being undertaken by Pakistan Navy in the recent years, which have transformed it into a potent force. The Air Chief also reiterated to augment the existing synergy between the sister services and taking it to further heights. Admiral Zafar acknowledged PAF's all-out support to Pakistan Navy in strengthening the maritime defence of the country.

## Conduct of Astronomy Nights at Pakistan Air Force Bases



**3<sup>rd</sup> OCTOBER, 2020:-** An 'Astronomy Night' under the auspices of Lahore Astronomical Society (LAST) was curated here at E-9 Complex, Islamabad. The event was attended by a large number of officers and their families. The night was filled with interesting activities, including celestial observations using powerful telescopes, hands-on demonstrations and lectures about astronomy, solar systems and planets. Personnel from LAST were impressed by the interest shown by the audience and the knowledge already possessed by the attendees.

Astronomy Nights are being conducted at PAF Bases in a phased-manner; in collaboration with Lahore Astronomical Society (LAST). To date, these events have been successfully conducted at AHQ Islamabad and three Bases (Lahore, Mushaf, and Nur Khan); with rest of PAF Bases planned in six months timeframe. Pursuant to the Air Staff vision, PAF-wide Astronomy/Space Sciences clubs are planned to be established to formalize space-related activities including the World Space Week and Astronomy Nights on a regular basis.

PAF Space Program was initiated to contribute in the national effort towards Space Sciences and Technology, and fill gaps in these domains at the organizational level. It is the vision of Air Staff to impart Space Education at all tiers, i.e., from grass root to the Higher Education tiers. To promote a culture of Space Sciences and Astronomy amongst PAF community, celebration of World Space Week (a UN-sponsored event) and conduct of Astronomy Nights have been initiated by PAF Space Program.

In present era, Space Exploration, Space Science & Technology, and Astronomy have become corner-stones of the strategic roadmap of advanced nations. Growing number of countries are developing their own national space capabilities to boast their socio-economic, scientific and security outlook.

## PAF Carries Out Road Runway Operations



**7<sup>th</sup> OCTOBER, 2020:-** PAF fighter aircraft landed on the Islamabad Lahore motorway as it carried out Road Runway operations today. Mr Murad Saeed, Federal Minister for Communications & Postal Services was the Chief Guest at the occasion. On his arrival at the venue, he was received by Air Vice Marshal Zaffar Aslam, Air Officer Commanding, Central Air Command.

Fighter jets along with trainer aircraft from various Squadrons of PAF, participated in the exercise. After landing on the carpeted road, the aircraft were refueled before taking off for their respective bases. Interacting with the participating ground and aircrew, the Federal Minister said that Pakistan Air Force

is respected for its professionalism and is a true symbol of pride for the nation. He also lauded PAF personnel for living up to the expectation of the nation on 27 February, 2019, when it gave befitting response to the enemy.

PAF regularly undertakes Road runway operations as part of its operational preparedness plan. Air Vice Marshal Zaffar Aslam acknowledged the close coordination and support of various civil and military departments especially National Highway Authority, FWO and Motorway Police, whose assistance played an instrumental role in conduct of this exercise.

The exercise was aimed at preparing PAF combat crew for utilization of vast network of highways for conducting air operations during warlike situations.

# Moroccan Order for 24 AH-64E Apaches



An Indonesian Army/11<sup>th</sup> Squadron AH-64E Apache participating in the Garuda Shield 19 join live fire exercise with the US on August 24, 2019. Morocco has become a new customer for the AH-64E with an order for 24 and is the 17<sup>th</sup> country to acquire the Apache. US Army/Major Leah Ganoni

BOEING HAS been awarded a production contract for 24 new-built AH-64E Apaches for Morocco. The \$439,179,677 Foreign Military Sales (FMS) deal, awarded to the company today, June 25<sup>th</sup>, by US Army Contracting Command, is a modification to a previous contract and also includes Longbow crew trainers. Deliveries are expected to begin in 2024 and the estimated completion date is March 1, 2025.

The US Defense Security Cooperation Agency (DSCA) had announced on November 20<sup>th</sup>, 2019, that US State Department approval had been granted for the FMS sale of 36 AH-64Es to Morocco and Congress had been notified of the potential sale the previous day. The DSCA stated that the deal, which comprises a firm order for 24, with options on the remaining 12, is worth an estimated \$4.25 billion including all related equipment, assuming all options are taken up.

**Note:** International News Bulletin is courtesy of Warnesy World, Alan Warnes.

New Kazakhstan Air Defence Force Mi-35M Hind-E '09 Red' arriving on delivery. Kazakhstan MOD



## A Further Four Mi-35Ms Delivered to Kazakhstan

KAZKHSTAN'S DEFENCE Ministry announced the arrival on June 23<sup>th</sup>, of four additional Mi-35M Hind-E attack helicopters for the Kazakhstan Air Defence Force (KADF) at an air base in the west of the country.

Although the base was not specified, the 605<sup>th</sup> Air Base at Aktau is the only KADF base in western Kazakhstan. The new arrivals comprised '09 Red', '10 Red', '11 Red' and '12 Red.' The delivery is part of the ongoing modernisation of the KADF and the helicopters were acquired through a military-technical co-operation agreement between Kazakhstan and Russia. The purchase contract for these four was signed in May 2018 between the Ministry of Defense of Kazakhstan and Russia's Rosoboronexport. Pilots and ground crew have already undertaken conversion training on the Mi-35M.

The new deliveries bring the total number of Mi-35Ms in KADF service to 12. An initial batch of four ('01 Red' to '04 Red') were delivered in December 2016 and a contract for four more was placed the following month, January 2017. The latter ('05 Red' to '08 Red') were delivered on September 13<sup>th</sup>, 2018.

## South Korea begins KF-X final assembly

KOREA AEROSPACE Industries (KAI) has begun final assembly of the prototype of the indigenous KF-X next-generation fighter. The company said that mating of the forward, centre and rear fuselage, along with the wing and empennage, took place on September 1 at its production facility in Sacheon, North Gyeongsang province. Roll out of the prototype is planned for

April 2021, followed by first flight in 2022. The overall system development programme is scheduled for completion by 2026. Six prototypes will be used in the flight test programme, all of which are due for completion by 2021. The Republic of Korea Air Force plans to purchase 120 KF-Xs to replace its F-4D/E Phantom II and F-5E/F Tiger II fleets.



The prototype KF-X, final assembly of which began on September 1, in production at KAI' Sacheon facility. KAI



## Boeing Building First Two F-15EXs

BOEING HAS been awarded a development and production contract for the latest variant of the Eagle, the F-15EX, which could eventually involve purchase of up to 200 aircraft. The deal, which has a maximum value of \$22.89 billion, was awarded on July 13<sup>th</sup> by the US Air Force. The initial delivery order is worth \$1.19 billion. It covers design, development and manufacturing of the first two aircraft, which are already in production at Boeing's facility in St Louis, Missouri, options on a further six. Work is expected to be completed on December 31<sup>st</sup>, 2023.

The F-15EX will replace the oldest F-15C/Ds in the USAF inventory. The first eight were approved in the fiscal year 2020 budget and 12 were requested in the FY21 budget. The

USAF plans to buy 76 F-15EX aircraft over the five-year Future Years Defense Program. The service had previously stated that it envisages eventually acquiring up to 144 of the type. However, the new deal will fund up to a maximum 200 F-15EXs, with 144 being the projected minimum. The first eight will operate from Eglin Air Force Base, Florida, to support testing efforts. The first two are scheduled for delivery in the second quarter of fiscal year 2021, with the remaining six to follow in FY23. On August 14<sup>th</sup>, the USAF announced that Kingsley Field Air National Guard Base (ANGB), Oregon, will receive the first F-15EXs in 2022 and house the first F-15EX formal training unit. From 2023, another Oregon base, Portland ANGB, will house the first operational F-15EX squadron.

• The first F-15EX for the US Air Force, serial number 20-0001, in production on July 13<sup>th</sup> - USAF



## Georgian Air Force to return Mi-24s and Su-25s to service

ON JULY 24<sup>th</sup> the Georgian Ministry of Defence announced that it has decided to refurbish and upgrade the grounded Georgian Air Force fleet of Mi-24 Hind attack helicopters and Su-25 Frogfoot aircraft. The plan was announced by the new Minister of Defense of Georgia, Irakli Gharibashvili. By the time of the announcement, the aircraft and helicopters had already been dismantled at Marneuli Air Base and transported by road to the facilities of JSC Tbilviamsheni (Tbilisi Aircraft Manufacturing - TAM) in Tbilisi.

The work will be carried out by TAM in association with the Tbilisi-based State Military Scientific-Technical Centre, STC Delta. Georgia is believed to have about ten single-seat Su-25Ks and two Su-25UBs remaining in its inventory, along with three Mi-24Ps and two Mi-24Vs. In parallel with restoration of the airframes, personnel will be retrained and new support infrastructure created.

Georgian Air Force Su-25UB '20 Blue' being dismantled at Marneuli Air Base prior to being transported by road to TAM in Tbilisi to be restored to airworthiness and upgraded - Georgian MOD

## US State Department approves 105 more F-35s for Japan

THE US Defense Security Cooperation Agency (DSCA) announced on July 9<sup>th</sup> that US State Department approval has been granted for the possible Foreign Military Sale (FMS) to the Government of Japan of 105 F-35 Lightning IIs and related



equipment at a total estimated cost of \$23.11 billion. Japan's request is for 63 F-35As and 42 F-35Bs, along with 110 Pratt and Whitney F135 engines, which includes five spares. The aircraft will be used to continue the progressive replacement of the Japan Air Self-Defense Force's (JASDF's) F-4 Phantoms, which are being steadily withdrawn as F-35s are added to the inventory. Japan is already in the process of acquiring 42 F-35As, 18 of which have been delivered to date, although there was an attrition loss on April 9, 2019. The Japanese Cabinet approved plans for the additional 105 aircraft on December 17, 2018.

Note: International News Bulletin is courtesy of Warnesy World, Alan Warnes.

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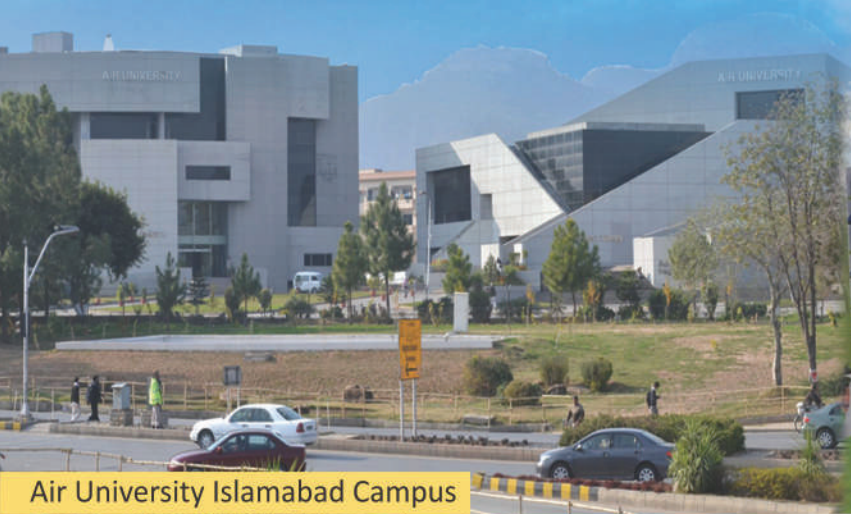
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