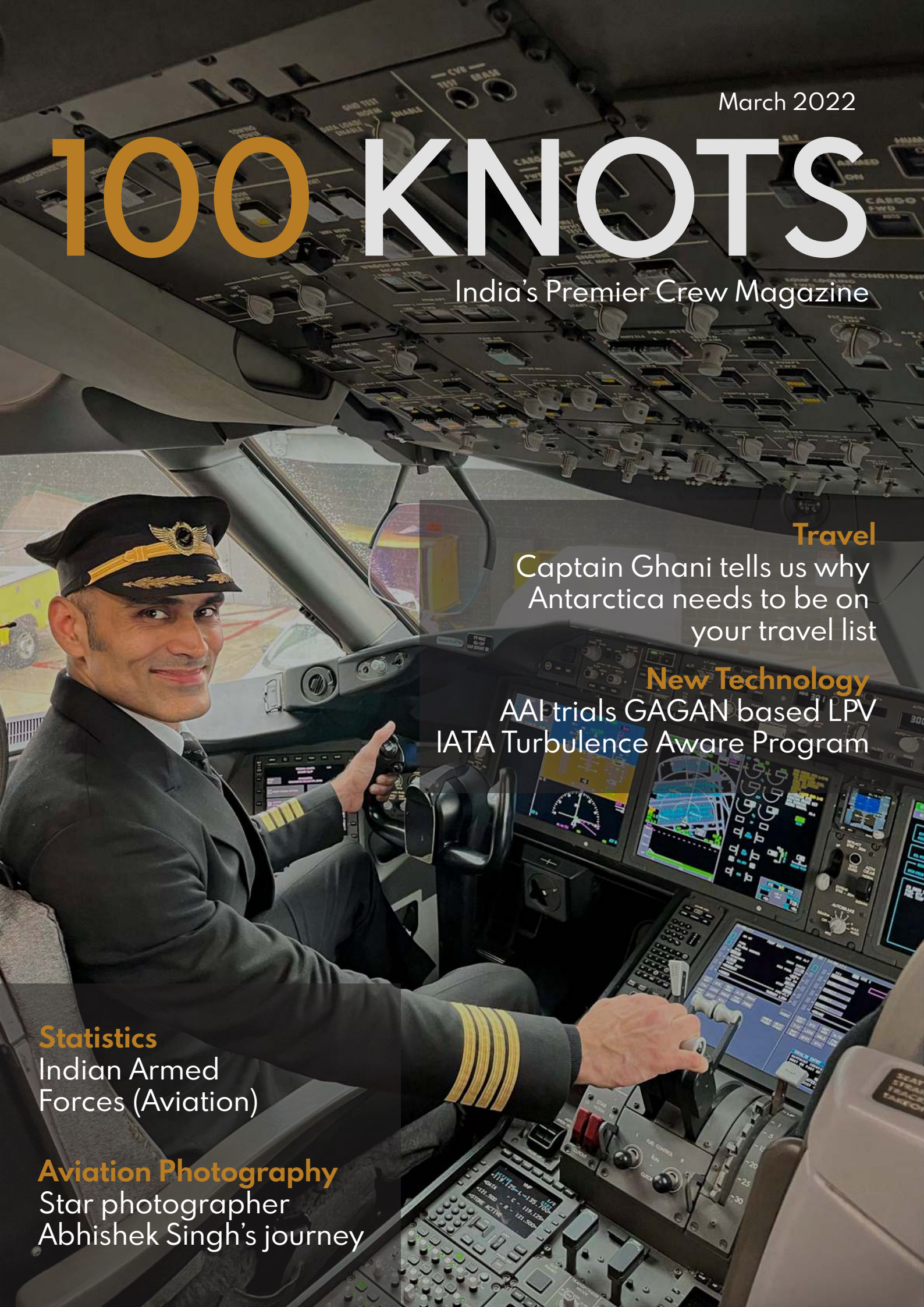
March 2022

100 KNOTS

India's Premier Crew Magazine



Travel
Captain Ghani tells us why Antarctica needs to be on your travel list

New Technology
AAI trials GAGAN based LPV
IATA Turbulence Aware Program

Statistics
Indian Armed Forces (Aviation)

Aviation Photography
Star photographer Abhishek Singh's journey

Editor
Preet Palash

Correspondents
Radhika Bansal
Prashant Prabhakar

Contributors
Anoop Kachroo
Abhishek Singh
Ghani Khan
Saurav Chordia

Design Head
Ashiba Saeed

For Advestising, Queries and Suggestions
Mail: **editor@100knots.com**

Preet Palash
Editor

Message from the Editor

Dear Readers,

Welcome to the March edition of the 100 KNOTS Magazine.

I would like to take this opportunity to thank each one of you for your support in making the launch edition of this magazine, a huge success. We couldn't have asked for a better launch. We were overwhelmed with 2000+ downloads in the first few hours of our publishing coupled with numerous appreciation messages from industry leaders. I was also humbled to see that various industry professionals are coming forward with interesting ideas and feedback, demonstrating how strong, unique and connected we are as a community.

In the march edition we have covered critical defence aviation insights as it coincides with celebration of 73rd Republic day. It will hold a special place in our hearts because it was celebrated in the 75th year of independence as "Azadi ka Amrit Mahotsav". March has a lot in store for the Indian aviation and defence community. We will be witnessing DEFEXPO (10th-13TH March) and Wings India (24th-27th March), where aviation and defence enthusiasts can expect to see major displays, announcements and deals.

In this particular issue, we will talk about a future defining trial undertaken by the Airport Authority of India officials where first GAGAN based LPV approach was successfully conducted. India's most celebrated photographer Abhishek Singh (Aviation Wall), discusses his passion and remarkable journey. We also get candid with the Indian Air Force's favourite graphic designer, Saurav Chordia as he explains us how he does what he does..

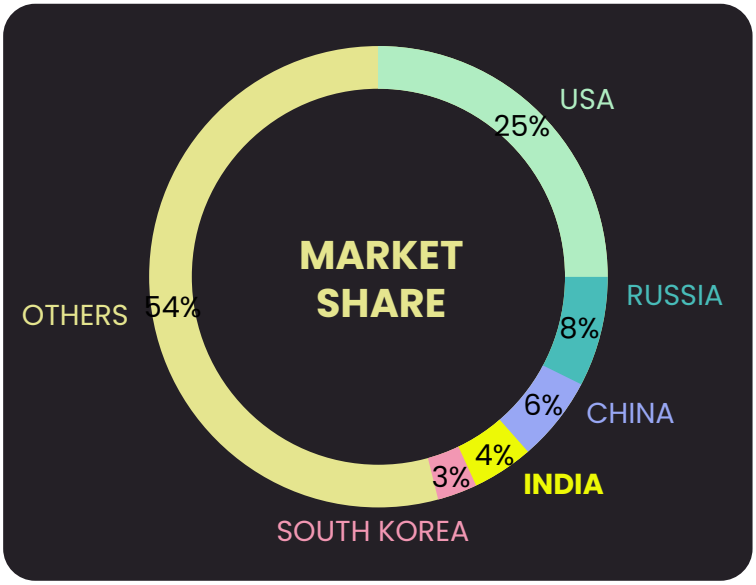
I close this message by inviting everyone to submit their exciting ideas to 100 Knots. All papers are received with a high degree of enthusiasm and it find a home in the future issues. We are committed to publishing all discoveries, methods, resources, and reviews that significantly covers Indian aviation sector at large.

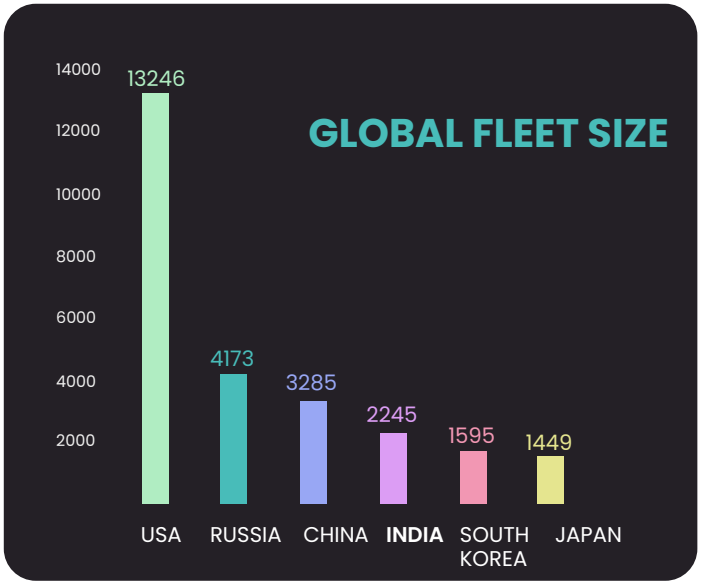
Our sincere thanks to all the contributors for their support and interest. We hope to hear from you soon, and we welcome your feedback !

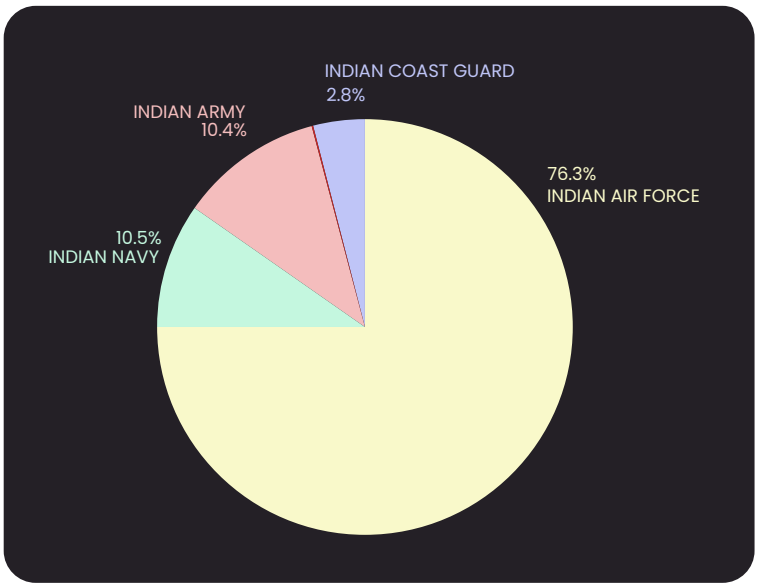

FORCE
5149
15TH WG
154TH WG

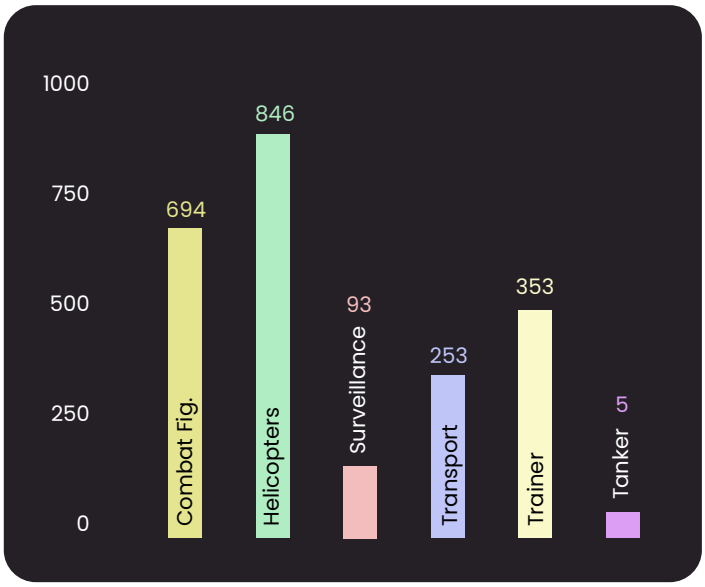
THIS ISSUE

Defence Aviation









FLEET BY FORCE

Fleet Total - 2245

Indian air force
1715

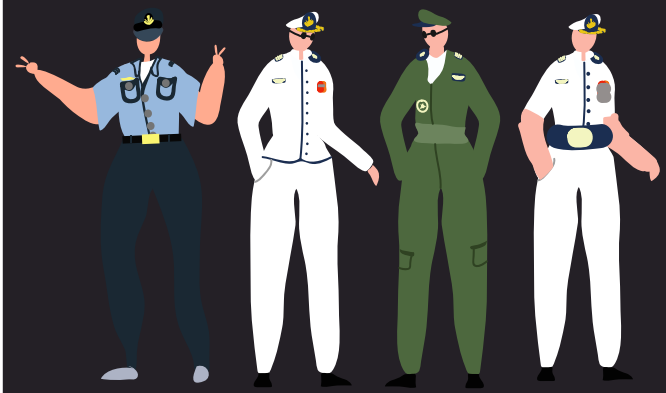
Army aviation corps
232

Indian Coast guard
63

Indian navy
235

PILOTS

Total 5251



Indian Air Force (3855)

Indian Navy (644))

Army Aviation Corps 602

Indian Coast Guard (150)

Combat

Sukhoi SU-30 248

Operator - Indian Air Force
Country of Origin – Russia
Price – US$ 47m (2020)
Range – 1,600 nm
Cruise Speed – Mach 2.0

Sepecat Jaguar 130

Operator – Indian Air Force
Country of Origin – France, UK
Price – US$ 16m (1997)
Range – 1,000 nm
Cruise Speed – Mach 1.6

Mikoyan MIG 21 128

Operator – Indian Air Force
Country of Origin – USSR
Price – US$ 2m (1974)
Range – 360 nm
Cruise Speed – Mach 2.0

Mil Mi-17 223

Operator – Indian Air Force
Country of origin - Russia
Price – US$ 17.9m
Range – 250 nm
Cruise speed – 124 Knots

HAL Chetak 81

Operators
- Indian Air Force
- Indian Army
Country of origin – India, France
Price – US$ 2.9m
Range – 290 nm
Cruise speed – 112 Knots

HAL Dhruv 312

Operators
- Indian air Force
- Indian Army
- Indian Navy
Country of origin - India
Price – US$ 6.2m
Range – 346 nm
Cruise speed – 135 Knots

Helicopter

Surveillance

© Boeing India

© Indian Navy

Boeing P8 Poseidon 11

Operator - Indian Navy
Country of origin - USA
Price – US$ 83m
Range – 1200 nm
Cruise speed – M 0.80

Dornier Do-228 76

Operator - Indian Navy
Country of origin – Germany, India
Price – US$ 7 m
Range – 210 nm
Cruise speed – 220 Knots

Kamov Ka-31 14

Operator - Indian Navy
Country of origin - Russia
Price – US$ 29m
Range – 360 nm
Cruise speed – 110 Knots

© Aeroprints.com (Wikimedia Commons)

Transport

© Oleg V Belyakov (Wikimedia Commons)

© Nisarg Vyas (Wikimedia Commons)

Antonov An-32 103

Operator – Indian Air Force
Country of origin - Ukraine
Price - US$ 15m
Range – 1300 nm
Cruise speed – 250 Knots

Hawker Siddeley HS-748 57

Operator – Indian Air Force
Country of origin - UK
Price – US$ 1.6m (1972)
Range – 920 nm
Cruise speed – 240 Knots

Dornier DO-228 53

Operator – Indian Air Force
Country of origin – Germany, India
Price – US$ 7 m
Range – 210 nm
Cruise speed – 220 Knots

Trainers

©Abhishek Singh (Aviation Wall)

BAE Hawk-132 119

Operators
-Indian Air Force
- Indian Navy
Country of origin - UK
Price – US$ 24.7m (2003)
Range – 1360 nm
Cruise speed - M 0.84

HAL Kiran 98

Operators
-Indian Air Force
-Indian Navy
Country of origin - India
Price – Not Disclosed
Range – 330 nm
Cruise speed – 375 Knots

© James Cromwell (Wikimedia Commons)

© Indian Air Force

Pilatus PC-7 75

Operator- Indian Air Force
Country of origin - Switzerland
Price – US$ 3.9m
Range – 1630 nm
Cruise speed – 92 Knots

Tanker

Ilyushin IL-78 6

Operator-Indian Air Force
Country of origin - USSR
Price – 132 crores (2003)
Range – 3900 nm
Cruise speed – 460 Knots

CAE Gondia Integrated CPL

Become a pilot at CAE Gondia

Established in 2007, CAE Gondia, also known as National Flying Training Institute (NFTI) is a joint venture between CAE and the Airports Authority of India (AAI).

CAE Gondia's pilot training programs provide high quality and focused ab initio training to aspiring airline pilots. Our programs combine premier ground school courses with high quality flying instruction delivered in accordance with International Civil Aviation Organization (ICAO) and Directorate General of Civil Aviation (DGCA) standards. Upon successful completion of the program, cadet pilots obtain a Commercial Pilot License (CPL) with an Instrument Rating (IR) and a Multi-Engine Rating (ME).

Our training resources include a modern training fleet, advanced flight simulation training devices, well-equipped classrooms, extensive online training materials, and a highly experienced and dedicated instructional staff and academy management team. A complete and comprehensive infrastructure that caters for all the training needs. Residential accommodations, classrooms, cafeteria and administration facility are modern, recently renovated.

Apply now for the CAE Gondia Integrated CPL!

This 19 months programme is designed to prepare you to become a professional airline pilot. Upon successful completion, you will have obtained all appropriate ab-initio ratings including your Commercial Pilot License (CPL) with Instrument Rating (IR) and Multi-Engine Rating (ME)

Location

CAE Gondia

C/O Airport Authority of India Birsi Airport
P.O. Paraswada Gondia Maharashtra India

Apply now!

W - www.cae.com/becomeapilotgondia
E - contact.nfti@cae.com
T - +91 9545457558/ 6266 / 6143

CAE

Your worldwide training partner of choice

GAGAN LPV Approach Trial at Kannur Airport

Capt. Anoop Kachroo
Flight Inspection Unit,
Airports Authority of
India

It is an occasion of immense pride for myself, Flight Inspection Unit of Airports Authority of India, Ministry of Civil Aviation, DGCA and the entire GAGAN Team to announce that ON 4TH February 2022, we have successfully conducted the first flight validation using GAGAN (GPS aided GEO augmented navigation) based LPV (Localizer performance with vertical guidance) approach procedure at Kannur (VOKN) Airport. India is the first country in Asia Pacific Region to achieve this mile stone.

Naveen Dudi (Flight Validation Inspector)
Shamsher Singh Rana (Flight Validation Inspector)
Anoop Kachroo (Captain)
Shakti Singh (First Officer)

GAGAN

GAGAN is an Indian Satellite Based Augmentation System (SBAS) jointly developed by AAI and ISRO. It is a wide area augmentation system that provides augmented accuracy and integrity to a Global Navigation Satellite Systems (GNSS) navigation signal such as GPS. SBAS provides improved service availability and therefore a more reliable navigation service than GNSS alone. This system uses ground monitoring stations spread across a wide area and provides signals from satellites to support high availability operations from enroute to precision approach over a large geographic area. Certified signals of GAGAN are available continuously for RNP 0.1 operations over the Indian FIR and for APV I operations over more than 76% of Indian land mass on nominal days.

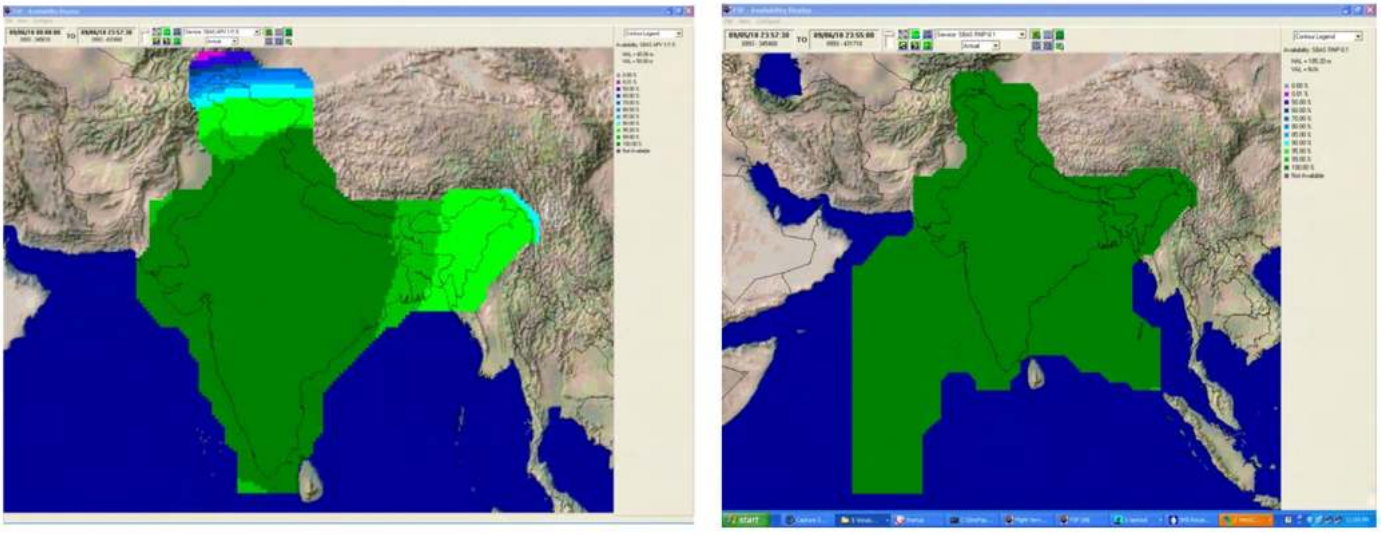
LPV

LPV is the most desired APV approach. It is similar to LNAV/VNAV except it is much more precise (40m lateral limit), enables descent as low as 200-250 feet above the runway and can only be flown with an approved SBAS Avionics receiver. LPV approaches are operationally equivalent to the legacy instrument landing systems (ILS), but are more economical because no navigation infrastructure is required at the runway, instead services are taken exclusively from GAGAN GEO Stationary Satellites GSAT-8, GSAT-10 and GSAT-15. LPV approaches will enable landings in bad weather at many regional Airports that are not equipped with instrument landing systems. Lowering the decision height up to 250 feet provides a substantial operational benefit in poor weather and low visibility conditions. Number of airports including airports under Regional Connectivity Scheme (RCS) are being surveyed for development of GAGAN based LPV instrument approach procedures so that Airlines and other operators can derive maximum benefit in terms of improved safety, reduction in fuel consumption, reduction in delays, diversions & cancellations.

Equipment required

A geo stationary satellite is used to transmit augmentation data to the end users on L1 Frequency, however a specific SBAS receiver is required to read the information. These receivers are referred to as ETSO (European technical standard order) 145C (integrated) or ETSO 146C (standalone). The Airports Authority of India Beech Craft 350, Aircraft VT - FIU has been installed with receivers TSO - C115b and TSO - C146c Class Delta 4.
DGCA has issued the mandate for all aircraft to be mandatorily GAGAN enabled from 30th June, 2020 before being registered in India.

Onboard Indication

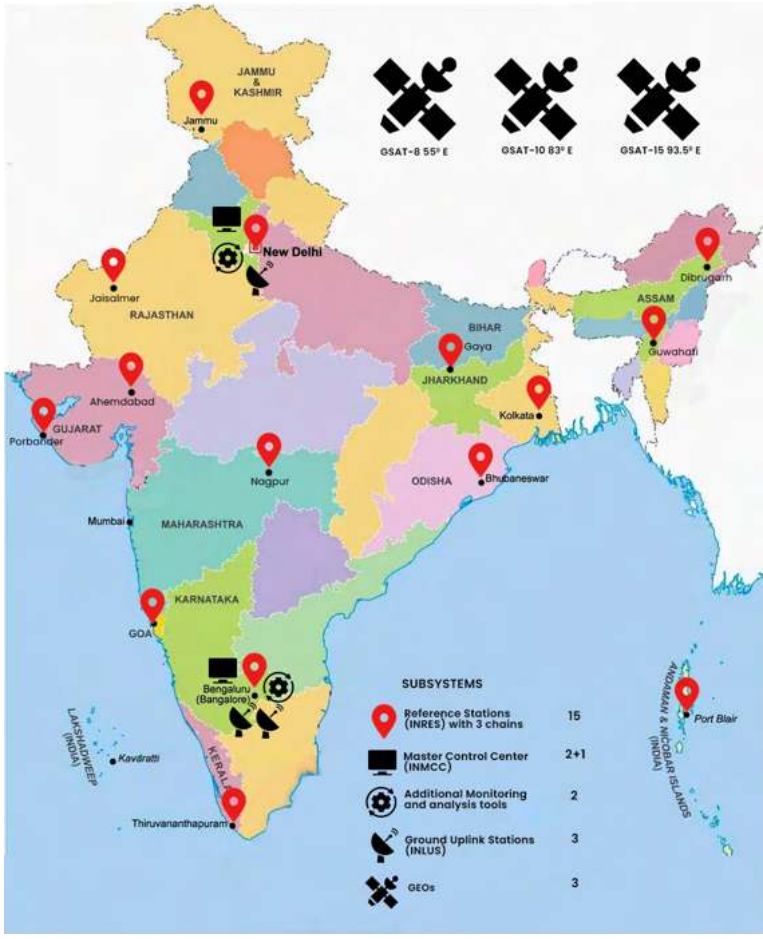


Typical Availability of GAGAN APV 1 and RNP 0.1

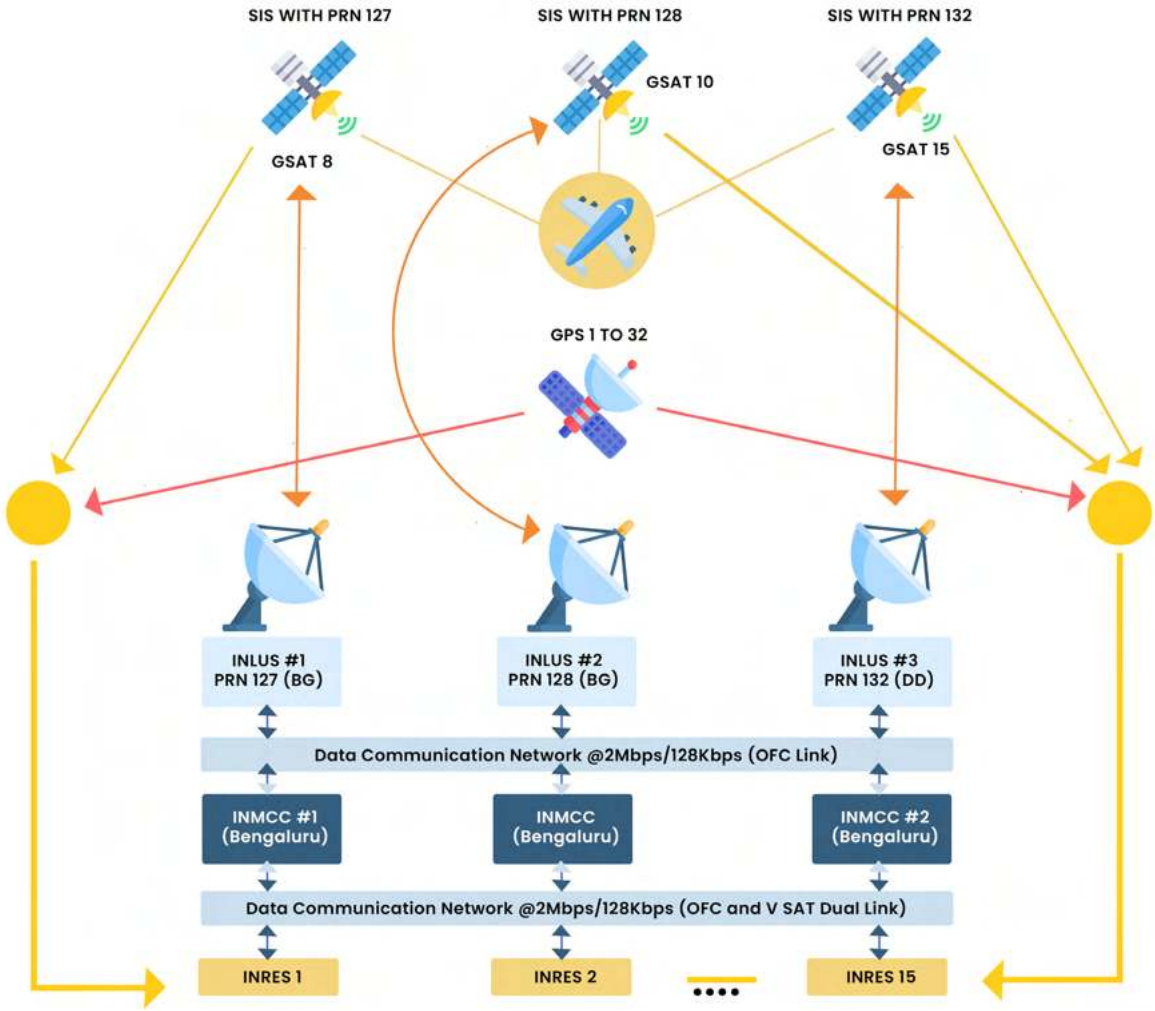
How does it work?

GAGAN LPV aim to improve performance of GNSS/GPS by Regional SBAS which improves the accuracy and reliability of GNSS information by correcting signal measurement error and by providing information about the accuracy, integrity, continuity and availability of its signals.

• Space born GPS signals with a series of 15 ground reference stations spread all over India that compare the GPS signals to geodetically known points.
• The stations then send corrections over a landline to a three-master control station/centers which retransmits unique corrected GPS signal forwarded to INMCC (Indian Master Control Center) either by terrestrial or satellite communication network.
• At INMCC GPS information is processed and augmented messages are generated, these correction (augmentation) messages are sent to INLUS (Indian Land Uplink Station)
• INLUS uplinks them to three geostationary satellites GSAT-8, GSAT-10, GSAT-15
• Satellites finally broadcast a corrected signal to GAGAN enabled GPS receivers.



Gagan present configuration with added redundancies and additional performance monitoring and analysis tools



Atmospheric Disturbances

India and Gulf regions are on equatorial anomaly region. Ionosphere Scintillation is most intense and most frequent in that equatorial region and It can severely affect the performance of SBAS. In order to meet the set objective of APV 1.0 (Precision approach) over the Indian land mass, India has developed an appropriate region-specific ionosphere model, ISRO-MLDF Ionospheric Algorithm (IGM-MLDF 1.4. This is designed to meet the ionospheric challenges posed in Indian sub-continent and other equatorial ionospheric anomaly regions.

Potential customers and Existing SBAS Worldwide

GAGAN GSAT 8/10/15 foot print extends from Africa to Australia including the Gulf countries. All countries in this bracket can take advantage of GAGAN infrastructure to implement the RNP 0.1 and APV 1 service in the respective states without having the full SBAS infrastructure in their country.

Existing SBAS

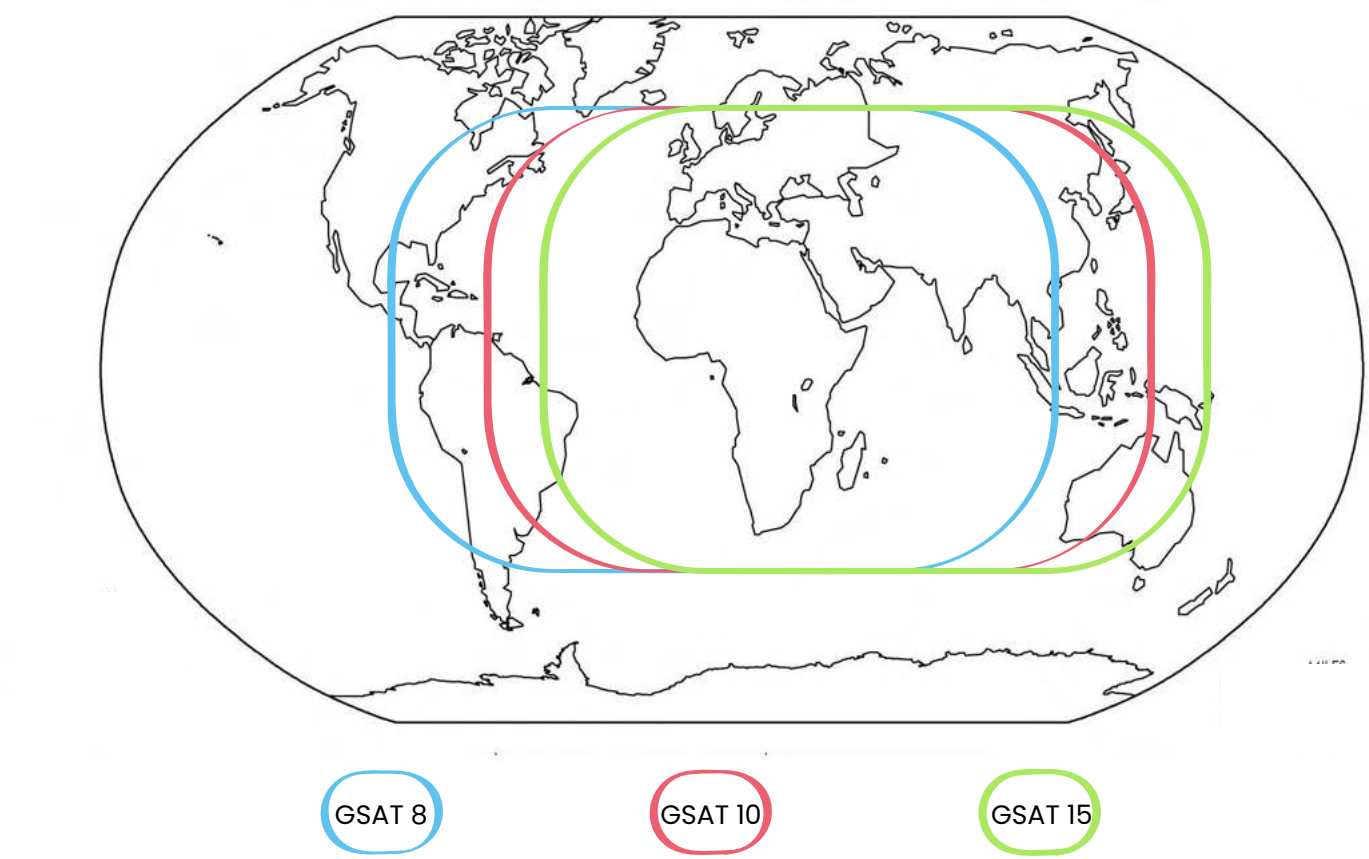
- USA - wide area augmentation system (WAAS)
- European Union - EGNOS
- Japan - Michibiki satellite augmentation system (MSAS)
- Australia & New Zealand - Southern positioning augmentation network (SPAN) (under development)
- Russia - System for Differential Corrections and Monitoring (SDCM) (under development)
- China - BDSBAS (under development)
- South Korea - Korea augmentation satellite system (KASS) (under development)

All of these systems comply with a common global standard and are therefore compatible and inter operable with each other.

About the Author

Capt. Anoop Kachroo senior pilot with Airports Authority of India as well as a DGCA TRE and ITRE. He is actively involved in the testing and design of GAGAN LPV approaches in India.

GAGAN GEO Satellites coverage

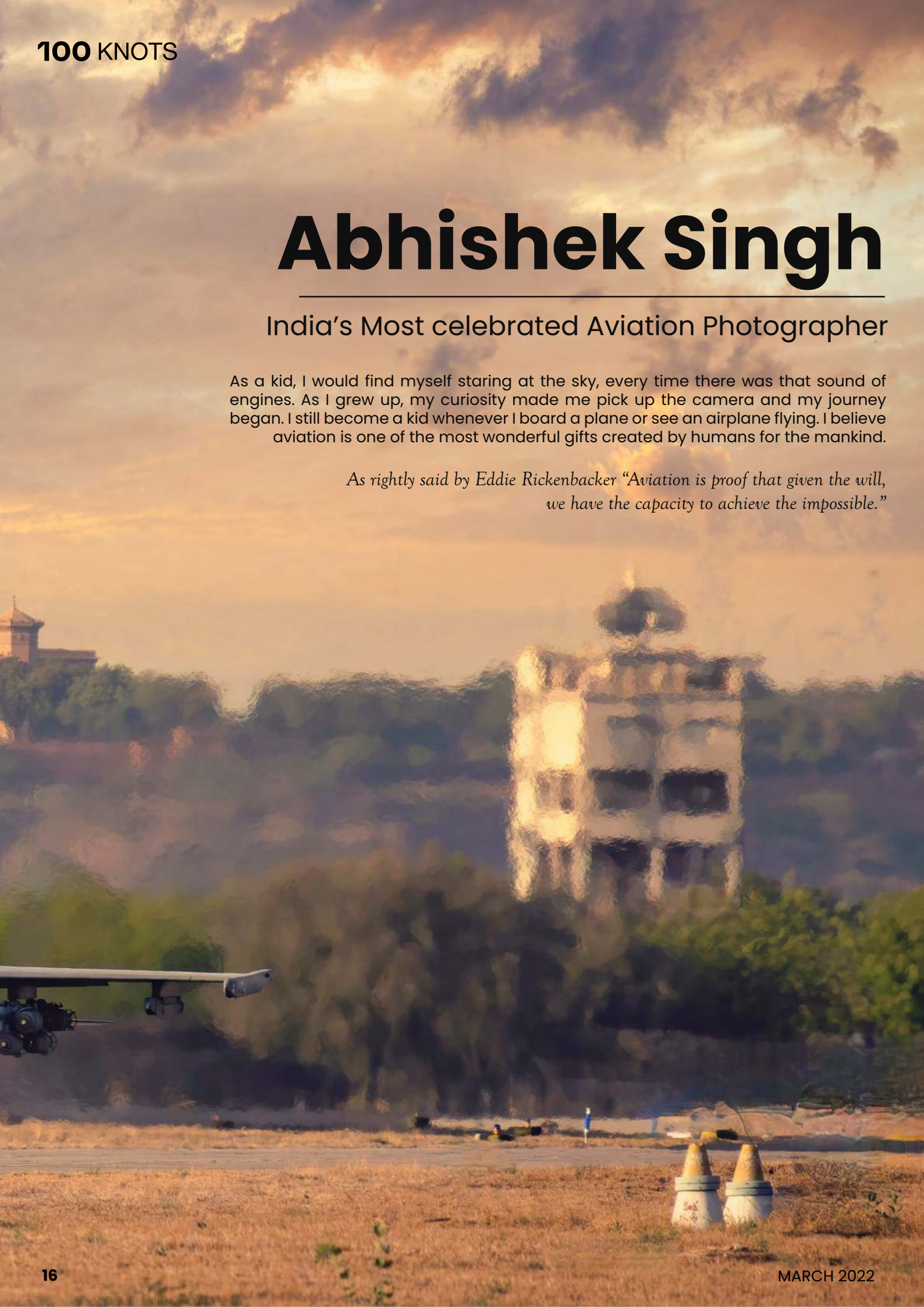


Abhishek Singh

India's Most celebrated Aviation Photographer

As a kid, I would find myself staring at the sky, every time there was that sound of engines. As I grew up, my curiosity made me pick up the camera and my journey began. I still become a kid whenever I board a plane or see an airplane flying. I believe aviation is one of the most wonderful gifts created by humans for the mankind.

As rightly said by Eddie Rickenbacker "Aviation is proof that given the will, we have the capacity to achieve the impossible."



A good Aviation Photo

Something that would make the other aviation photographers say, I wish I had shot that. Photograph portraying the capabilities of the aircraft shot in good lighting conditions always brings smile on any aviation enthusiast's face. If you get to hear "How you took it?" very often for a picture then that's a good shot.
Remember aviation spotting and aviation photography are two different things, I believe in the later and a good aviation picture is something that will give you goosebumps.

Photography; not Documenting

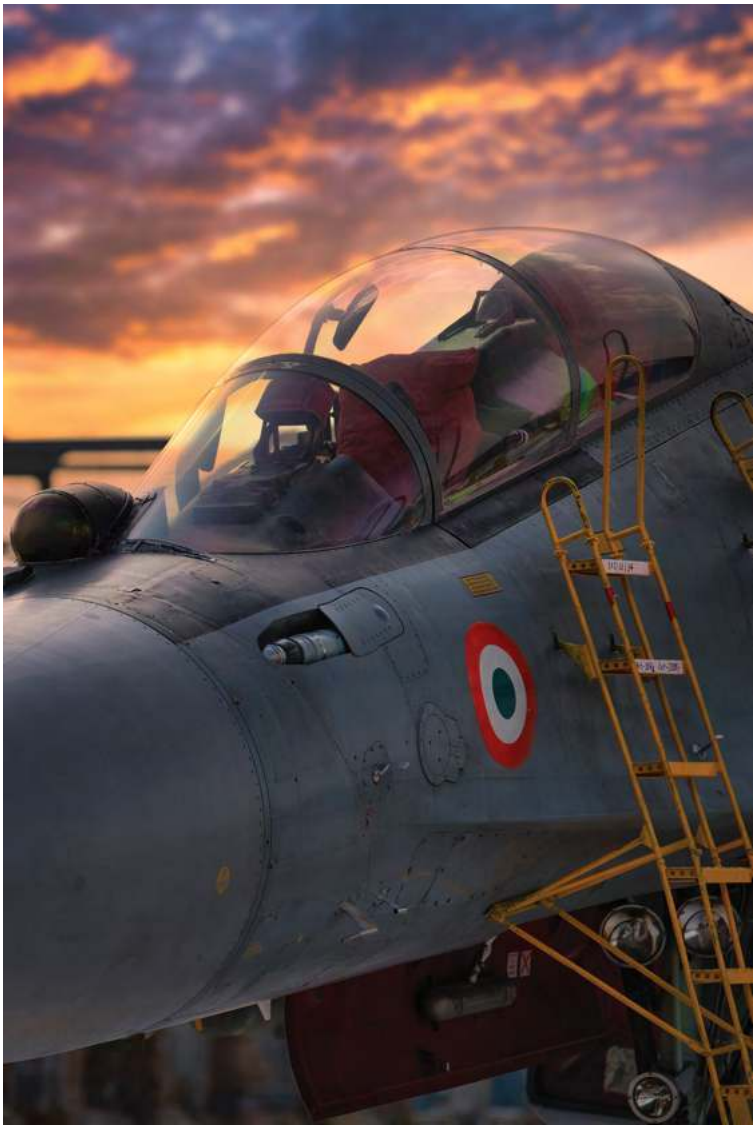
I try my best to keep my shots dynamic showcasing the capability of the aircraft in the best possible manner and add a bit of "Photography" i.e., some sort of Art in them. Flying is a serious profession and there is absolutely no room for error, similarly aviation photography is also one of the most disciplined genres of photography. Most of the time we are shooting in a dynamic environment and there won't be re-takes for a shot, this makes you more agile as well as vigilant. What I have learned over a period of years is being disciplined, not getting too excited so that I don't become a safety issue during any kind of operations, this goes both for India and rest of the world.

India is different

The process of security clearance is very rigorous and involves lot of documentation as well as checks and I believe that is imperative also considering the threats we have. Having said that, I would like to add that mention that Indian Armed forces, especially Indian Air Force is highly cooperative and gives lot of creative liberty when you are working for them. The one thing that makes shooting aviation in India bit different from the rest of the world is that one has to be very sensible in deciding what to shoot and what not to capture. I am very careful and disciplined while photographing in India and at the airports. In case of countries like Japan, Swizz, Germany I freely take out my camera and big lens because I am aware nothing is sensitive for them at least.

Challenges and Rewards

For an aviation enthusiast and a photographer every part is a masterpiece in itself. The favorite shot of an aviation photographer in case of a military jet is capturing a takeoff of a fully armed jet, which is not very common and can only be captures during military exercises. If you talk about civil aircraft like an A380 then I prefer those long exposure tarmac shots at night. The most difficult part or rather perspective I would say is to capture the top angle of the aircraft because you need to be positioned on an elevated platform or surface to take a picture of an aircraft from the top or it can only be done by photographing air to air, which is not that easy either.




FF
192 FW
←W W21

“DEY”

The most important thing what I learned is DEY. People are aware about “DIY” i.e. Do It Yourself, but in my case its DEYS “Do Everything Yourself”. The one reason I get work in this particular field is because I Conceptualize, shoot, edit and then deliver the final pictures/film to the client by myself, I mean no big team. Now this at times can be good, especially when client sees that you are one man army but sometimes it becomes challenging as you have to take care of every aspect from scratch till the final product is shared.

My Gear

Panasonic Lumix S1R for pictures
Panasonic CX350 Video Camera
Lumix GH5 with solid Manfrotto tripod 100mm

About the author

Abhishek is an independent Aviation Filmmaker, DOP & Photographer for more than 14 years. His work has been published from mainstream trade magazines to in-flight magazines. As a photography mentor, he has mentored and shared his knowledge in more than 320 photography workshops for Nikon India, He has been the most active minds behind the content development of Photography Tutorial Videos produced by Nikon India Pvt. Ltd. along with workshop content development. His love for Aviation gave birth to Asia's Top Most Aviation YouTube Channel "AVIATION WALL" producing original content in the field of Civil and Military Aviation. Abhishek has pioneered the art of creating story telling imagery and produced many viral films. He closely works with various Aviation OEMs, Airports as well as Air Forces creating dynamic social media & marketing content. He loves travelling and scouting new spots for photography.

How to reach me

Website: www.aviationwall.net

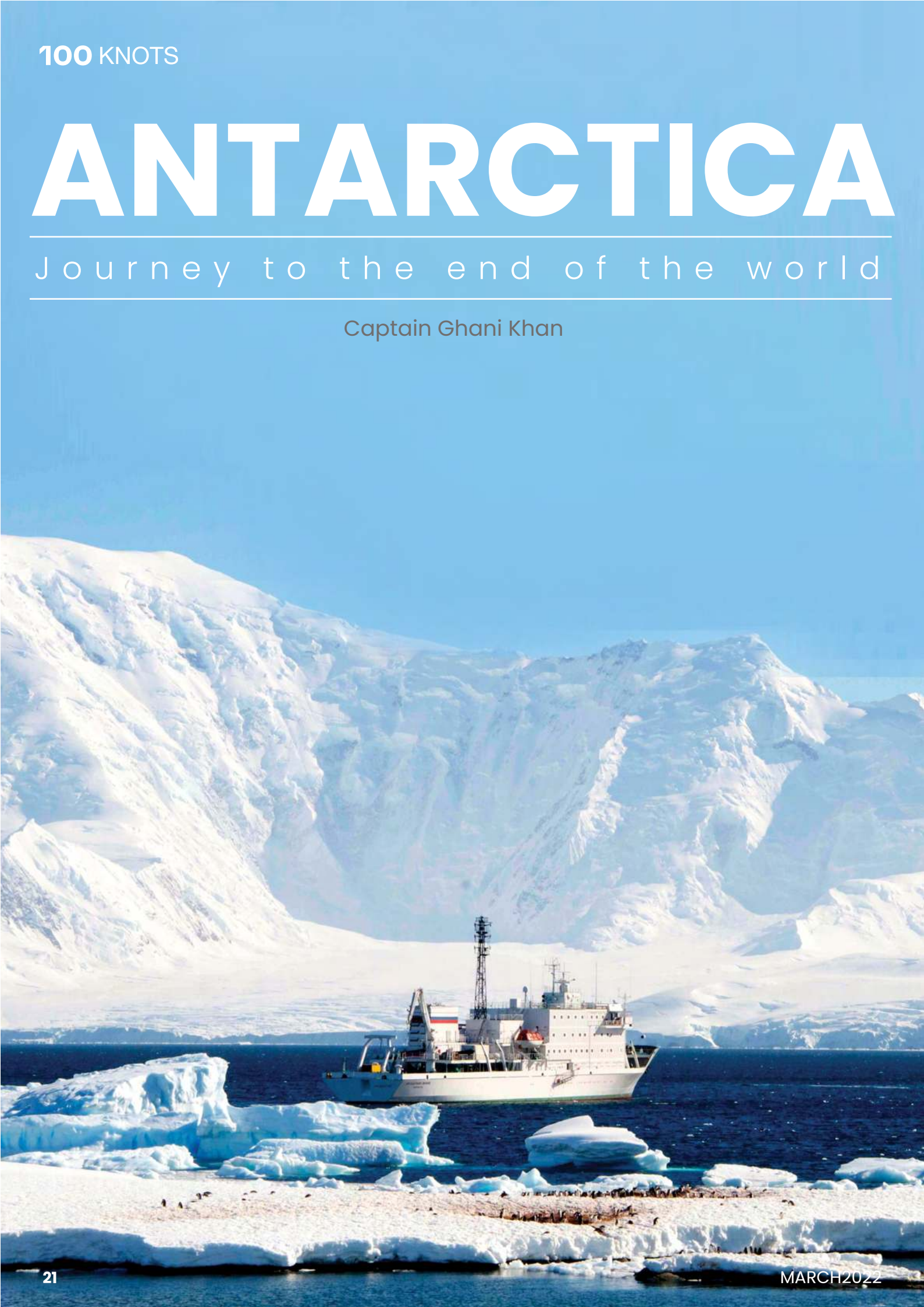
Instagram: @aviationwall

YouTube Channel: AviationWall

ANTARCTICA

Journey to the end of the world

Captain Ghani Khan



It's magical when you still the mind and make the body do the wandering. A better version of self is worth striving for. It's always you versus you.

"I am" is not a preferrable linguistic use in my perspective. A blend of upbringing, exposure and grit made me longing for a spectrum of life experiences. Since childhood due to my father's remote and varying paramilitary deployments I grew up in an environment of natural beauty and got tuned to a simple way of life. Flying a jetliner around the globe for almost two decades extrapolated the exposure to travel. An urge to capture all of it was natural. Amalgamation of profession and passion made two of my photographs feature in the Nat Geo website. It boosted my optic creativity.

Antarctic happened due to my passion for kayaking. It's this remote continent tucked away at the end of the earth which is the zenith of awe. No political boundaries define it. Scientific and travel expeditions often radiate its exquisite beauty to the world. It all played on me and made me commit to an offbeat polar adventure.

My trip lasted for 11 days from shore to shore but it shows up every day in me as zest and resilience. Yes, one does spend a handsome amount of money in these expeditions but they make you richer in a stranger way. So go Live it UP!

With a 22-hour sunlit day we crazy minded kayakers could paddle till heart's content in our dry suits. Spotting a minke whale while doing it is an experience no words can do justice to. Polar plunge at whaler's bay rewires a memory where I was shivering so intensely that I was unable to align my jacket's zipper. Camping in a bivouac bag with an inquisitive gentoo penguin around is a forever memory. Penguins zipping below us to catch fish was a usual phenomenon. A grouler with a 350 kgs leopard seal on it basking the polar sun was a rare sight. The ship was tailed by albatrosses throughout the drake passage as the huge propellors churn out zoo plankton up to the surface.

Getting there

Antarctica is accessible from the following places:

- Ushuaia in Argentina
- Punta Arenas in Chile
- Bluff in New Zealand
- Hobart in Australia

I chose to do the marathon flying time of 22 hours from Delhi to Frankfurt to Buenos Aires and finally to Ushuaia. From Ushuaia travelers can get in by plane as Antarctica has multiple landing strips but travel is often by military aircraft, as part of the cargo. I chose to sail in Russian ice strengthened ship "Akademik Ioffe" across the Drake passage. This passage can be done only between November to March, where the sea ice has melted enough to allow access.

When choosing a ship, there are certain points to consider:

• Smaller ships should be preferred as it can go where the big ships can't, getting you closer to Antarctica's nature and wildlife.

• Ships with more than 500 passengers' capacity are not allowed to land people on Antarctica.

• Look for ships that include naturalist guided hikes, zodiac excursions and sea kayaking.

• Most operators only allow 100 people on land at any given time, a requirement of IAATO agreement.

Tourism

International Association of Antarctica Tour Operators (IAATO), a voluntary organization of 80 tour operators regulates non-research travel to the region. Tourism to Antarctica can be in the form of commercial sea voyages with shore visits (by far the most popular), land expeditions, or sightseeing by air. Most ships typically offer excursions to the Antarctic peninsula and Antarctic islands (Deception Island, Aitcho Island).

Kayaking in Antarctica

The Kayak mornings in Antarctica would begin with snugging into neck and wrist sealed dry suits that would keep us safe from hypothermia in case of a capsize. A huge crane at the end of our ship would tower our kayaks into the sea. From there on, it would be us and the Antarctic wilderness. Water visibility while paddling in seldom still waters was exceptional, it was like floating on glass. Keeping a kayak's length distance from the icebergs was mandatory as they may tumble anytime on a sunny day. We were told to hit waves, head on or perpendicular as any angular exposure could lead to capsize.

Landfall

There are no hotels or lodges on the continent, and research bases will not generally house guests. For my case it was of course camping!.

All of us eagerly waited for the captain to make that famous announcement: “We have reached landfall”. Our pupils would dilate with excitement and why not, this is why we were all here, to finally set our foot on Antarctica, the seventh continent. With 22 hours of daylight and plenty of sun to set our camps, we were greeted by quite a few exquisite gentoo penguins. Bivouac bags would be our shelter as we sleep while enjoying the twilight night.

Interesting Facts

Antarctica doesn’t belong to any country, in fact it is governed by the 1958 Antarctic Treaty, which establishes the continent as a peaceful and cooperative international research zone.
There are about two dozen research stations with a total population ranging from 1000-4000 depending on the time of year, maintained for scientific purposes only.
There is little snowfall here, and even less rain so even with all the ice, Antarctica is technically an arid desert.
Temperatures at the South Pole are very harsh, with summer highs of around -15°C and winter lows of -80°C.

ABOUT THE AUTHOR

Air India captain Ghani khan is an adventure and fitness enthusiast at heart. When he is not commanding his Dreamliner, Ghani explores his passion as adventure seeker, traveler, photographer and triathlete. He has clocked north of 10,000 hours in his 18-year career as an Air India Pilot. He has also endured four triathlons and travelled to all seven continents with two of his pictures featured by National Geographic.
Ghani is presently based out of Gurugram where he resides with his wife Subuhi and two children Zayaan and Izna.

Connect with Ghani

Ghani has authored his book “Sight Thoughts". This book showcases a synchrony between photography and philosophy

Pictures published by National Geographic as ‘Picture of the Day'

THE ART

of Aircraft illustrations

Saurav Chordia

Saurav Chordia is a Delhi based 3D Graphics Designer and just like his industry counterparts, works 9-6 job at a local gaming company. But this doesn't stop here, there is something very interesting about him, a hidden talent and it was none other than the Indian Air Force who spotted it first. Studying just in his 12th standard, Saurav gets a call from the Indian Air Force MiG 21 unit with an offer. The rest is history.

Aviation is full of thrills and there are many unconventional ways to pursue it. Aircraft Illustration is one such way. It's a great way to get closer to the subject where you go with every bit and piece of a flying machine and obviously sky is limit.

An Indian Air Force Pilot aspirant, Saurav destiny had something else in mind. He is now a successful illustrator whose work moves around the IAF machines, be it the fast-moving fighter jets or the big transport aircraft. An AvGeek by birth, Saurav started illustrating aircraft from his school days making every sort of frictional aircraft and every aircraft to his was a MiG 21. He would follow many aviation artists like Tom Copper, Gill, etc. and fascinated by their art style, he decided to bring this culture to India.

The phone call from the Indian Air Force was a dream come true but at the same time, a task he can't get wrong. It took him 2 weeks to design the first MiG 21 illustration and it was loved by the unit. Soon the word spread and he was contacted by other units too.

Dassault Rafale EH

Profile by Saurav Chordia

How is it done?

Just Like any other project, illustrations also involve a process and before starting Saurav follows a SOP that he made for himself.

Study
Study the design developments, variants and breakthroughs. Studying such things helps you to make up your mind and connect with yourself more. Accuracy is the key thing and that's what any illustration demands from you.

Collect
Collect references of the aircraft like color schemes, weapon loads, accurate sizes of external points like the sensors, drop tanks, Pitot., etc. References help you to get things accurate in shape and bring the subject lively. He usually relies on Walkaround photos from google.

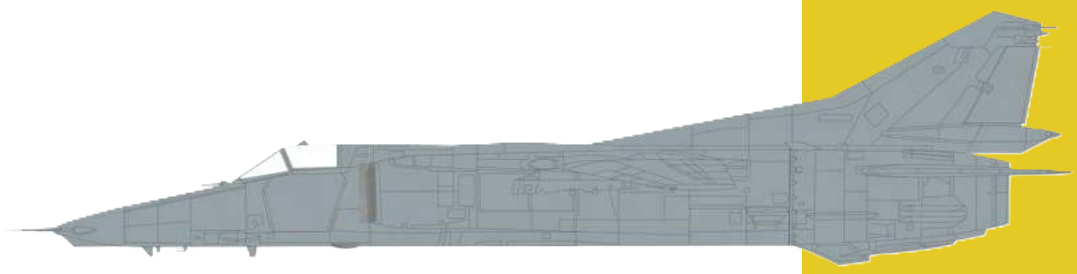
Artboard
Now comes the main game of getting things on the artboard. There are various tools one can use for illustrations like Photoshop, Illustrator, and Blender 3D. These tools are great in sync with each other and helps to get optimum results.

Size
Select the size and resolution in the artboard. I work on min 300 dpi in CMYK mode as this is the most preferred format for printing.
Ready to start
Start the artwork with the Line art and make every small detail. More Details better the output. (Here we will start with Mig-27 Flogger)

Ready to start
Start the artwork with the Line art and make every small detail. More Details better the output. (Here we will start with Mig-27 Flogger)

Reach

Loved it? Reach Saurav via his email id sauravflanker@gmail.com, check out his portfolio on https://sauravchordia.artstation.com and request for specific art or profiles that he would love to make.



First, get correct line drawings or you can draw on your own which is easy for you and also very important to get the base colors right in the first place.

Fill in other details and give them shadows so they pop out well from the base and give you a 3D feeling. Add in a darker shade in multiply mode and add some rough texture so that it gives a metallic look. Add specific roundels like Fin flash on the tail and roundels on the wing and front armor section. (For instance, I have added the engine exhaust which I picked from a real photo and then edited it to smoothen it out).

Now the fun part starts, Start adding shadows and reflection to the object. Like below the wing, it will have a darker section while the top will be shiny so in this way you get more of a realistic feeling. Also start adding the weapons like rocket pods, missiles, etc

We are now all set to give the final touch by adding the pilot and texturing the canopy at a much lower opacity.

You can further refine by adding more bombs and further detailing. So here is the final result.

HondaJet ELITE S

WWW.HONDAJET.COM

CONTINUOUS INNOVATION

IT'S IN OUR **DNA**

At **Honda Aircraft Company**, continuous innovation is fundamental to who we are and the spirit with which we were founded. It's the fulfillment of a dream and the transformation of a concept to reality, resulting in products which challenge expectations.

Born from this philosophy, the **HondaJet Elite S** expands operational capability, allowing owners and operators to deploy HondaJet's class leading efficiency to new destinations. Like its predecessor, the Elite S continues to set the standard for the world's most advanced light jet as the farthest, highest, and fastest flying aircraft in its class.

IATA Turbulence Aware program

Revolutionizing Turbulence Mitigation

Prashant Prabhakar
SME - 100 knots

Turbulence

Turbulence is a major safety concern in aviation worldwide. Depending on the severity, consequences can be range from passengers and cabin crew getting injured, to the aircraft having to divert in extreme cases. A 2017 report by Williams, highlighted a 149% increase in the frequency of severe turbulence.
While that entails additional costs to the airlines, it can be effectively avoided with correct procedures. This couldn't be more relevant now, especially in these pandemic times when airlines are already burning a hole in their pockets owing to disrupted operations

Traditional Turbulence Reporting

Existing turbulence reporting methods include pilot reports and mathematical models that derive shear rate from wind and temperature gradients. These methods however useful, have their limitations. For example, Pilot report of Moderate turbulence reported by a King Air C90 pilot is likely little to no turbulence to an Airbus A320. Similarly Moderate turbulence reported by an Airbus A380 could be severe turbulence for a Falcon 2000 business jet. Turbulence forecasts are issued over a long applicability period and long-haul pilots can often find them inaccurate and obsolete. Ground based weather radars can detect convective activity but not clear air turbulence (CAT).

IATA Turbulence Aware

Launched as a pilot program in December 2018, IATA's Turbulence Aware helps airlines mitigate the impact of turbulence by sharing automated EDR (Energy Dissipation Rates) turbulence reports in real time. The system collects real-time turbulence data from participating aircraft inflight and processes it to get the final product known as " Turbulence Data Points". The entire process is completed within a second and spontaneously made available for operational use via an array of vendor applications. Planners and Pilots can use this data to choose the most optimal routes for their flight mission, thereby slashing fuel burn, safety incidents and carbon emissions.

EDR

EDR is an official metric of the International Civil Aviation Organization (ICAO) and the World Meteorological Organization for measuring turbulence intensity. EDR is not a measure of the response of an individual aircraft, rather an official ICAO and WMO metric for measuring the state of the atmosphere around an aircraft in flight. The EDR is an aircraft-independent absolute value which requires no hardware for its calculation.

Working

Turbulence Aware revolves around an algorithm developed by the US National Centre for Atmospheric Research (NCAR). Interested airlines can approach IATA to install the NCAR software in their aircraft avionics system. After installation, the software collects sensor data and measures parameters like Changes in Angle of Attack (AoA) and True Airspeed (TAS) among others. This data is then continuously run on the algorithm to calculate EDR.
Every time the EDR value exceeds a pre-determined turbulence threshold, the software compiles the EDR value, aircraft position and time-stamp, altitude, wind and temperature. The compiled report is automatically sent as a text to the ground servers via the ACARS or broadband connection. System is designed to report the values every minute until the threshold reduces. The whole process, right from when the data is recorded by the aircraft, sent to the ground for processing and for the processed data to go all the way back to cockpit is done in a matter of seconds. The compiled reports can also be accessed directly in the cockpit of aircraft with broadband connection. Furthermore, a web-based "Turbulence Aware viewer tool" also designed by IATA, can be used by airline Operation Control Centre (OCC) to send turbulence reports to the aircraft.

Tactical Application

The EDR data can be evaluated to:
1. Secure the cabin and co-ordinate inflight service
2. Change level or route
3. Convection awareness
4. Update FMS
5. Smooth ride at optimum, Fuel at optimum.

Operational Advantages

1. Improved safety outcomes
2. Efficient fuel planning and optimum burn in-flight
3. Integration with in-house or third-party flight planning or in-flight weather tools – To speed up decision-making
4. Enhanced customer experience and brand image
5. Archived data can be used to continually improve flight operations
6. Optimal use of airspace leading to better overall airline economies
7. Fewer engineering inspections
8. Lower insurance premiums

Now we're using real time aircraft data and we're giving you the precise location and intensity of turbulence, which has never happened before. It's not just a product, it's a paradigm shift in how turbulence is managed. What started as an extended free access initially, now has over 1500 airlines participating and many others are encouraged to join onboard.

Participating Airlines

How to join
Email - iataturbulence@iata.org

Capt. Patrick Burns,
Vice President – Flight Operations & System
Chief Pilot Delta

For most of Delta's history the operation was dependent on manually-generated turbulence reports for determining the when and where of turbulence. We struggled to mitigate the threat due to sparse coverage and the subjective nature of turbulence reporting. However, over the past 15 years Delta has been successful in implementing automatic aircraft turbulence reporting on most of our fleet, in collaboration with the FAA, NCAR, Delta Meteorology and Delta Technical Operations. The technology enabled a paradigm shift from a legacy system of widely scattered, subjective reports to big data, but still provided incomplete coverage. IATA's Turbulence Aware platform enables open sharing of real time turbulence reports across the global airline industry, so we are no longer limited to turbulence reports generated only by Delta aircraft. By incorporating Turbulence Aware data into pilot, dispatcher and meteorologist tools, Delta has realized benefits to safety, customer comfort, schedule integrity and efficiency.

Qatar Airways has become the first airline from the Middle East to join the initiative. With safety and environmental sustainability as our top priority, we show our commitment towards responsible flying. We continue to innovate as one of the world's leading airlines by adopting this new solution that combines technology and big data for more efficient flight planning, not only to ensure a smooth journey but also to reduce fuel burn, in turn lowering our carbon emissions. The airline industry must come together and leverage such digital innovations to share turbulence data for more precise forecasting and thereby make flying safer and more sustainable.

Akbar Al Baker
Group Chief Executive - Qatar Airways

AVIATION NEWS

CODS

'Spatial disorientation' of the pilot led to crash that killed CDS, finds probe report

The chopper crash on December 8 that killed Chief of Defence Staff (CDS) General Bipin Rawat and 13 others was due to the 'spatial disorientation' of the pilot, the preliminary findings submitted by the tri-services court of inquiry has found. It ruled out 'mechanical failure, sabotage or negligence' as a cause of the Mi-17 V5 accident.


Women Fighter Pilots
(Tarun Khiwal)

Induction Of Women Fighter Pilots In Air Force Now Permanent: Minister of Defence

The Centre has decided to convert the 2015 "experimental scheme" of inducting women fighter pilots in the IAF into a permanent program. 2016 saw the first batch of women fighter pilots formally inducted at the Air Force Academy in Hyderabad. So far, at least 16 women fighter pilots have been commissioned in the air force.

Tejas (Indian Air Force))

Indian Air Force to showcase 'Made in India' fighter jets LCA Tejas at Singapore airshow

A 44-member contingent of the Indian Air Force (IAF) presents Tejas at the Singapore Air show. Tejas was the result of the Light Combat Aircraft (LCA) programme that began in the 1980s to replace IAF's ageing MiG-21 fighters.


Rafale marine (Daniel Bechennec)

India flight-tests Rafale-Marine for INS Vikrant pitted against the US-made Super Hornet

The marine version of the Rafale fighter jet has been successfully flight-tested at a shore facility in Goa where conditions similar to that on the aircraft carrier INS Vikrant were simulated. The Rafale-M is pitted against the US-made Super Hornet, both of which are being evaluated for a possible purchase by the Indian Navy for deployment INS Vikrant that is undergoing trials in the Arabian Sea and the Bay of Bengal for likely commissioning in August. It has been designed as a ski-jump launch ship, different from many other such carriers, which use a catapult launch for their jets.


Drone Import Ban

Imported Drones Banned To Promote Make in India, With Exceptions

The government banned the import of foreign drones with certain exceptions as part of efforts to promote the domestic manufacturing of drones in the country. The import of drones for R&D, defence and security purposes have been exempted from the ban but such imports will require due clearances.unch for their jets.


Newspace

Ministry of Defense teams up with Bengaluru startup NewSpace, to develop pseudo satellite

The ministry of defence has signed up a design and development contract with a Bengaluru-based company to develop a High Altitude Pseudo-Satellite (HAPS) which will be able to conduct surveillance operations and support communications by staying airborne for months at a stretch. Mentored under the ministry's Innovations for Defence Excellence (iDEX) initiative, the program has been supported by the armed forces and will see Hindustan Aeronautics Limited (HAL) as the lead prototype development partner. NewSpace Research & Technologies signed the contract with the defence ministry plans in place to develop the prototype for tests within the next four years.


Rafale India

IAF Receives 3 Rafale With India-Specific Enhancements, deliveries on schedule

The Indian Air Force (IAF) received 3 of the last 4 Rafale fighter jets. They were handed over by France at the Istres-Le Tube airbase of Rafale manufacturer Dassault Aviation which is situated northwest of Marseille. They'll fly back to India by February 16. When the jets will fly out of France, They will receive mid-air refuelling by the air force of India's close ally, the United Arab Emirates, using Airbus multi-role transport tankers. They are fully equipped with India specific enhancements, which will give them extra teeth to fight any regional adversary.

Tata Fighter WIngs

Tata, Lockheed Martin JV gears up to supply fighter aircraft wings soon

U.S. aerospace and defence major Lockheed Martin has formally recognised Tata-Lockheed Martin Aerostructures Ltd (TLMAL) as a potential future co-producer of fighter wings. This move allows a joint venture between Tata Advanced Systems and Lockheed Martin for building the prototype here. Vice-president of Lockheed Martin Integrated Fighter Group, Aimee Burnett said Lockheed Martin has partnered with TLMAL to build one of the most technologically complex aerostructures, a fuel-carrying 9G, 12,000 hours, interchangeable/ replaceable fighter wing.


Defence Budget 2022

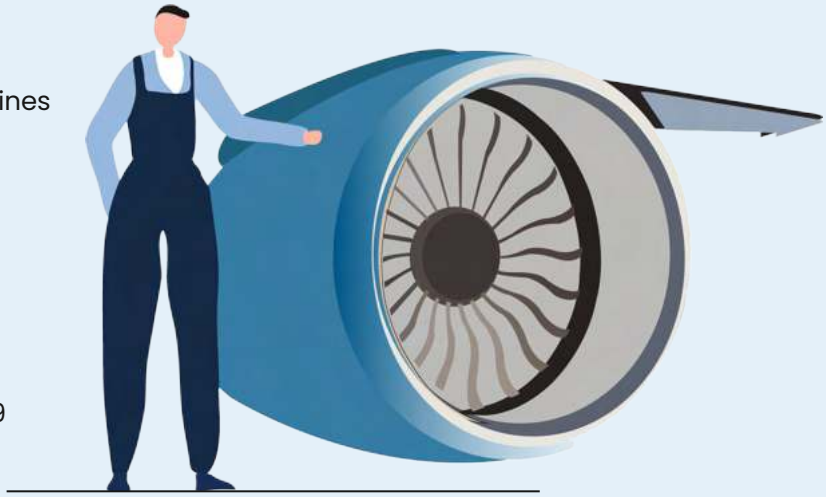
Defence allocation sees moderate rise, IAF gets the largest capital boost

Indian Government has raised defence allocations for the financial year 2022-23 by almost 10%, now reaching INR 4.78 trillion.
The amount allocated to the various branches of MoD is - Indian Air Force (IAF) - INR 55,587 crore; Indian Army - INR 32,015 crore; Indian Navy - INR 47,591 crore; Defence Research & Development Organisation (DRDO) - INR 11,982 crore; The pension allocations - INR 1.19 trillion; Border Roads Organisation (BRO) - INR 3,500 crore; Indian Coast Guard, Border Roads Organisation (BRO) and Directorate General Defence Estates - INR 8,050 crore.

Crossword

Across

3. Kingfisher airlines first international destination
8. Largest foreign airline operating in India
9. Air India crashed here twice killing all
10. Call sign of Singapore based scoot
12. HQ of the first Indian low cost career
15. Second largest global airline alliance
16. World's first all jet airline
17. Right to operate internal flights with its own airlines
19. Only airport of Sikkim
20. First private airline post deregulation



Down

1. Safest Airline with no fatalities yet
2. Device used for navigation
4. Upcoming water areodrome in Andaman
5. White lines that planes leave in the sky
6. World's fastest air-breathing manned airplane
7. Indian non-scheduled operator with airbus A319
11. Used in identifying an aircraft or station
13. World's highest helipad
14. ICAO's regional office for Asia
18. Colour of light data recorders-black boxes

The lucky winner gets the opportunity to feature in our next edition + surprise gift!

Hurry! Mail your answers to editor@100knots.com

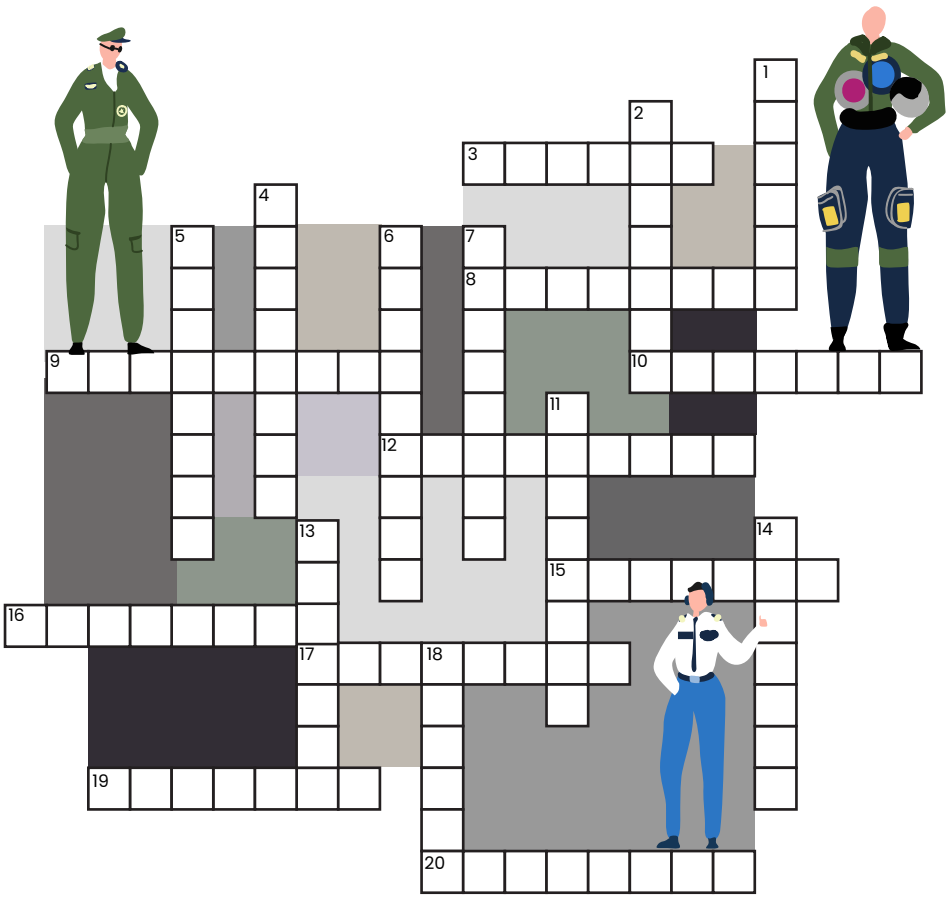


Photo by Vincent Genevay on Unsplash

100 KNOTS

For Advestising, Queries and Suggestions
Mail: editor@100knots.com