November 2023

100 KNOTS

India's Aviation Ecosystem

October Fleet Report

Safety
Heed The Human Factors

Air Traffic Management
Keeping Airspaces Open During Conflict

Ground Operations
Aircraft Damage on Ground

Vishok Mansingh
CEO, Vman
Demystifying Aircraft Leasing

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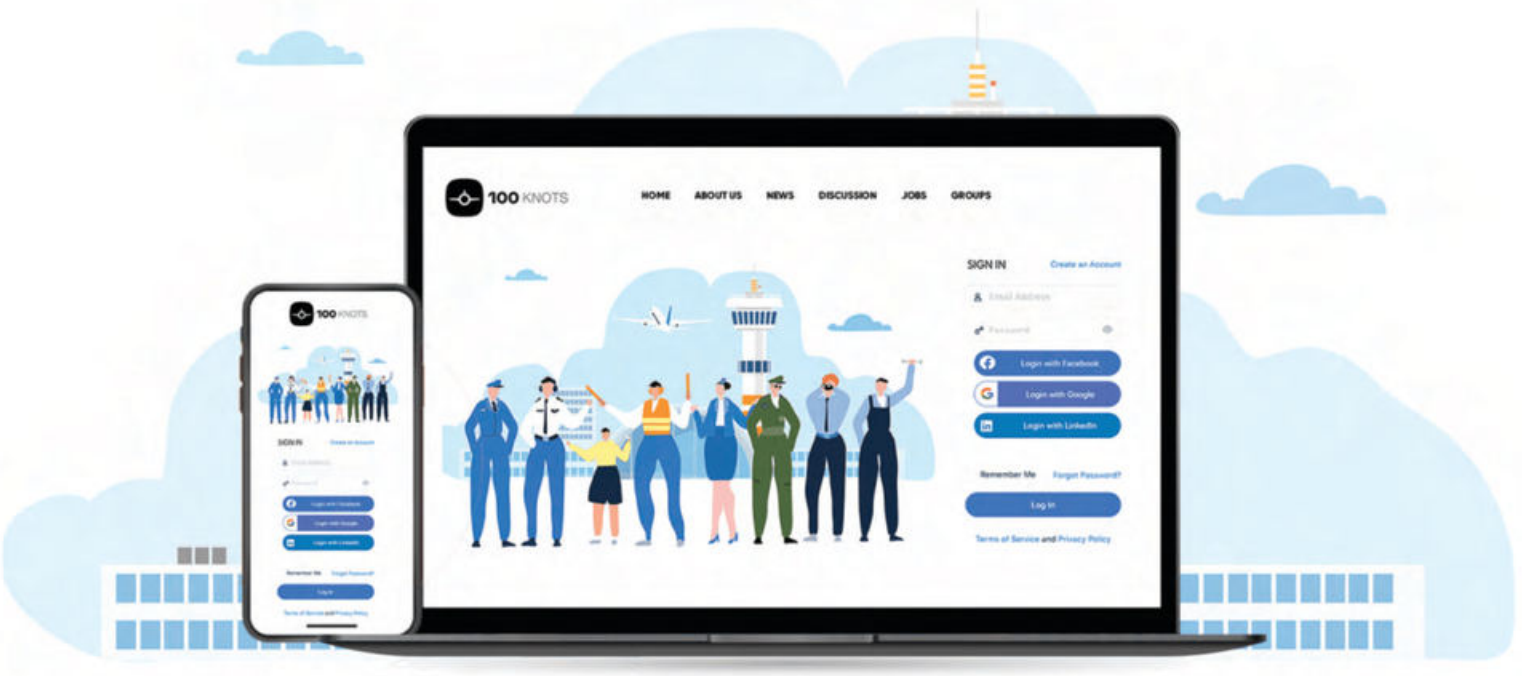

EDITOR'S LETTER

Radhika Bansal
Assistant Editor

Dear Colleagues,

Welcome to the November 2023 issue of the 100 Knots Magazine.

As we all know, Aircraft leasing has emerged as a pivotal strategy in the aviation industry, allowing airlines and other operators to expand their fleets without the burden of heavy capital investment. In this edition, CEO of Vman, Vishok Mansingh discusses the aircraft leasing ecosystem and explains how local leasing companies can offer several strategic advantages and enhance local aviation infrastructure and expertise.

Air Traffic Controller, Justin Jude Francis discusses unprecedented challenges faced by air traffic controllers during wartime. He explains how ATC, Flight deck members and operators can mitigate potential threats by better preparation, good awareness and strictly following the laid down procedures.

Group Captain Sushi, Bhatia (retd) uses his experience to show how Human Factors refer affect human decisions, and eventually aviation safety.

Bharat Mehta, talks about ways we can improve safety during ground operations.

As always, Contributions, comments, and feedback are always welcome. All papers are received with a high degree of enthusiasm and will find a home in future issues.

Our sincere thanks to all the contributors for their support and interest.

We hope to hear from you soon!

Happy Reading!

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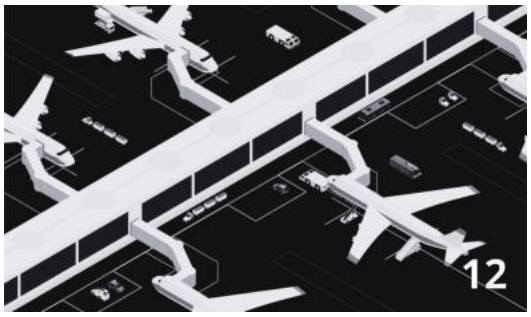

October Fleet Report

Deliveries

Scheduled Operations

AIR INDIA express		VT-ATJ	01-Oct	Airbus A320 NEO	Air India Express
SpiceJet		9H-TJC	08-Oct	Boeing B737-800	SpiceJet
SpiceJet		9H-CXG	08-Oct	Boeing B737-800	SpiceJet
AIR INDIA express		VT-RTF	11-Oct	Airbus A320 NEO	Air India Express
IndiGo		VT-IRK	12-Oct	ATR 72-600	IndiGo
IndiGo		VT-ICO	12-Oct	Airbus A321 NEO	IndiGo
IndiGo		VT-IQH	13-Oct	Airbus A320 NEO	IndiGo
IndiGo		YL-LDD	24-Oct	Airbus A320-200	IndiGo
IndiGo		VT-IKY	25-Oct	Airbus A321-P2F	IndiGo
AIR INDIA express		VT-BXG	25-Oct	Boeing B737-800 MAX	Air India Express
IndiGo		YL-LDE	29-Oct	Airbus A320-200	IndiGo
IndiGo		VT-IQI	30-Oct	Airbus A320 NEO	IndiGo
SpiceJet		9H-CXA	30-Oct	Boeing B737-800	SpiceJet
SpiceJet		VT-SXE	31-Oct	Boeing B737-800	SpiceJet

AIR INDIA

A319-100	A320-200	A320 NEO	A321-200	A321 NEO	B777-200	B777-300ER	B787-800	Total
18	9	29	14	4	8	15	27	124

AIR INDIA express

B737-800	A320-200	A320 NEO	B737 MAX 8	Total
25	23	6	3	57

vistara

A320 NEO	A321 NEO	B787-900	Total
48	10	5	63

IndiGo

A321 NEO	A321 P2F	A320 200	A320 NEO	ATR 72	B777-300ER	Total
94	3	23	178	42	2	324

SpiceJet

A340-300	B737-700	B737-800	B737-900ER	B737 MAX 8	DHC-8	Total
1	8	17	3	10	23	62

Akasa Air

B737 MAX 8	Total
20	20

A320-200	A320 NEO	Total
5	49	54

ATR 42	ATR 72	Total
2	18	20

ERJ 145	ERJ 175	Total
5	2	7

BLUE DART

B737-800	B757-200	Total
2	6	8

flybig

ATR 72	DHC-6	Total
3	1	4

(Data as of 31-Oct-2023)

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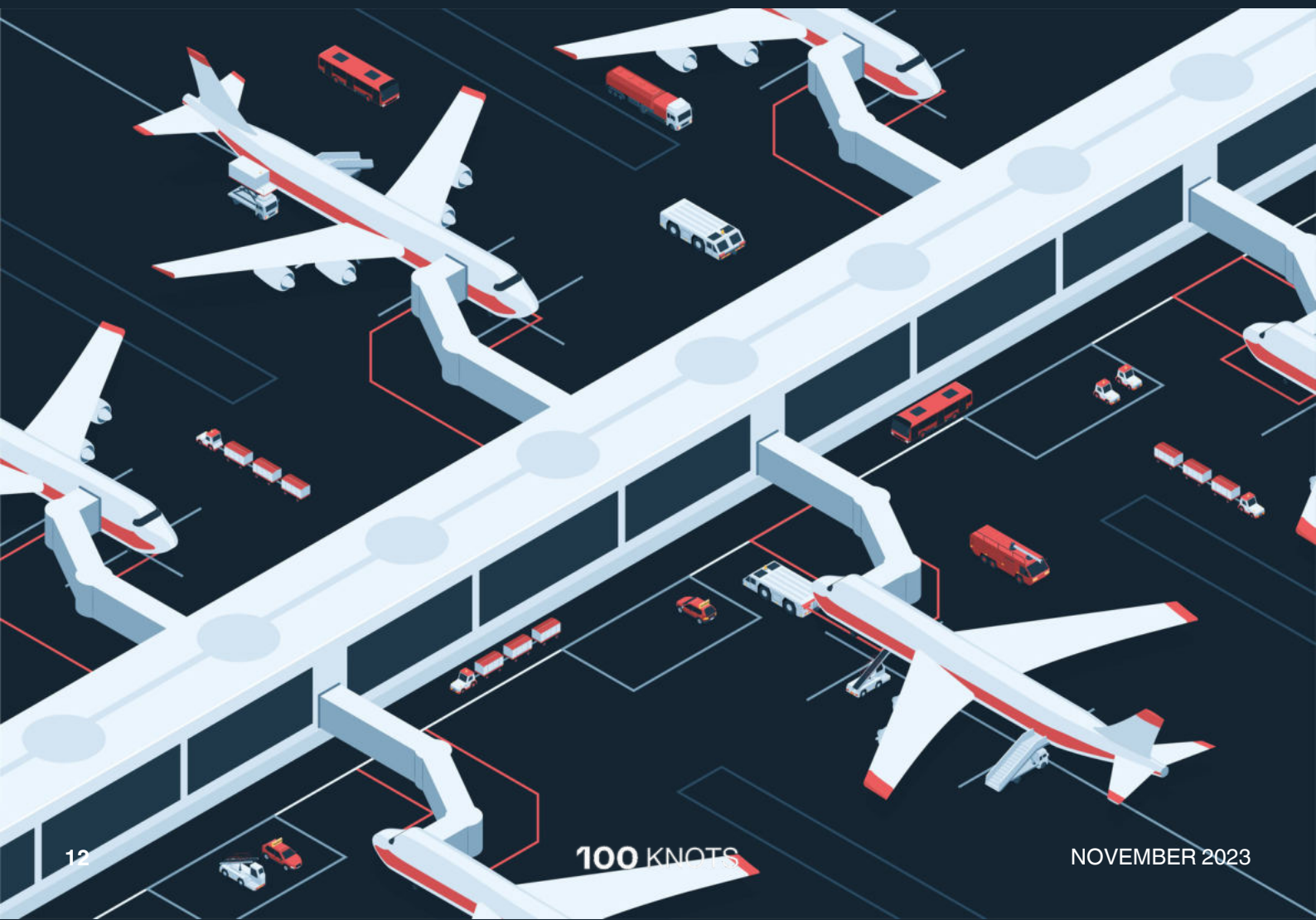
Demystifying Aircraft Leasing

Vishok Mansingh
CEO, Vman



Aircraft leasing has become one of the most talked about subjects in Indian Aviation. Aircraft leasing played a very critical role in the success of the Indian commercial aviation market, which has become the third-largest domestic market in the world. An efficient aircraft lease structuring also helped the success of India's most sustainable and profitable airline.

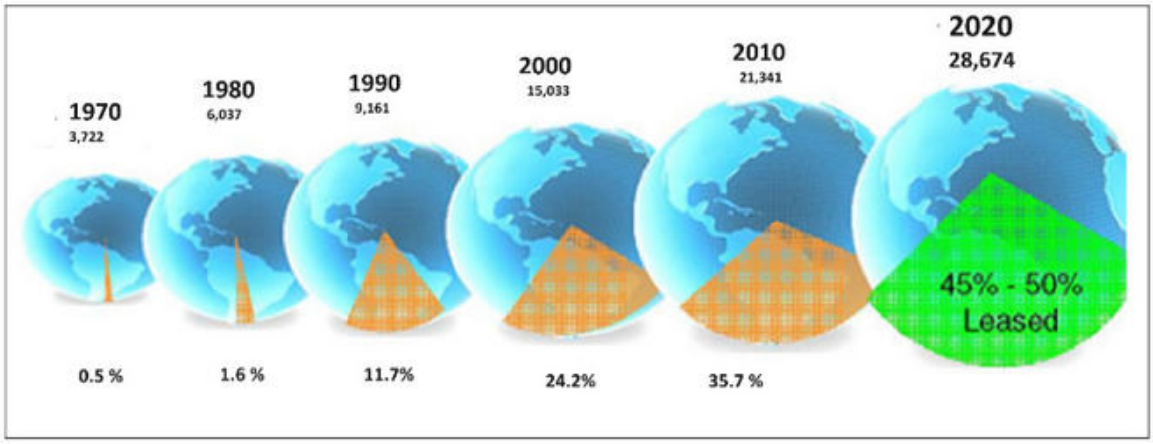
History of the Aircraft Leasing

The history of Aircraft leasing can be traced to USA aircraft Manufacturer McDonnell Douglas Corporation. McConnell Douglas established a wholly-owned subsidiary, McDonnell Douglas Finance Corporation (MDFC), in 1968 to support the airline in financing new or preowned Douglas aircraft. MDFC started the business by leasing two DC9 Aircraft to Air West and three DC8s to Flying Tiger. Initial leasing was more focused on a finance than an operating lease. The real operating lease started with the established mint of the International Lease Finance Corporation (ILFS) by Steve Udvar Hazy in 1973 in the USA. Europe followed the same in 1975 with Guinness Peat Aviation (GPA) in Ireland, which was established by Tonny Ryan (famous for Ryan Air).

ILFC started being traded over the counter in 1983 and was later acquired by American International Group, Inc. (AIG) in 1990 for $1.26 billion. At Udvar-Hazy's retirement from ILFC in February 2010, the company had an owned fleet of 933 with managed aircraft, pushing over 1,000 aircraft in total with a net book value of $38.5 billion. He subsequently co-founded Air Lease Corporation, which went public on the NYSE in 2011. In 1992, GPA tried to go public, but IP O failed; at this time, GPA had more than 700 Aircraft on its order book worth USD 17 Billion. GPA was restructured, and a large part of the assets and employees were transferred to GE Capital under the company name GE Aviation Capital Services (GECAS), which became one of the largest Aircraft lessors along with ILFS. Subsequently, in 1998, Texas Pacific Group (TPG) acquired GPA and renamed it Amerigroup PLC. In 2000, AerFin was acquired by Debis Airfinance (owned by Daimler Chrysler AG). In 2005, Debis Finance was acquired by Cerberus Capital, and the Company was renamed AerCap.

Subsequently, AerCap Acquired ILFS and GECAS and became the largest Lessor with more than 1700 Aircraft, 1000 Engines,300 Helicopters and an order book of 400 Aircraft.
Many GPA employees have spread throughout the industry and helped the establishment and growth of a large number of leasing companies like GECAS, CIT, AerCap, Pembroke Capital, SMBC Aviation Capital, Air Castle, and BBAM.

Availability of experienced Leasing professional manpower, a relatively low corporate tax environment, an extensive network of support services and a favourable Double Taxation Avoidance Agreement (DTAA) have made Ireland the world's largest leasing centre and still dominate the industry. As the centre of gravity for aviation moves from the USA / Europe to Asia due to huge growth in aviation, a new leasing Center in China, Singapore and India is being developed.



Role of the Leasing in Development of Aviation

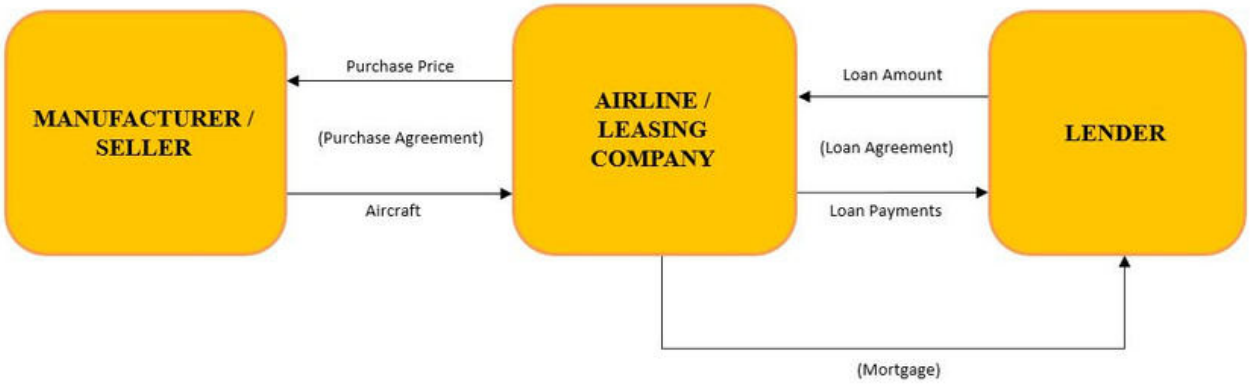
Leasing plays a pivotal role in the development of the aviation industry. It enables airlines and operators to access aircraft without the massive upfront capital investment required for outright purchase. This, in turn, fosters fleet expansion, route network growth and increased passenger capacity. Leasing arrangement provides flexibility, allowing carriers to adapt to market functions and technological advancements more swiftly. Additionally, leasing can facilitate the acquisition of newer, more fuel-efficient, and environmentally friendly aircraft, contributing to reducing operational cost costs and a smaller carbon footprint. The strategic approach to aircraft acquisition has been instrumental in enabling emerging markets and low-cost carriers to enter the aviation sectors, spurring competition and broadening accessibility to air travel. In essence, leasing acts as a catalyst for the sustained growth and innovation of the aviation Industry.

Type of the Leasing Structure

Aircraft Leasing is a sophisticated, complex finance structure spread over multiple financial and legal jurisdictions. These structures are set up based on investor, lessor, airline requirement, tax regime and legal protection and enforcement. There are various types of leasing structures.

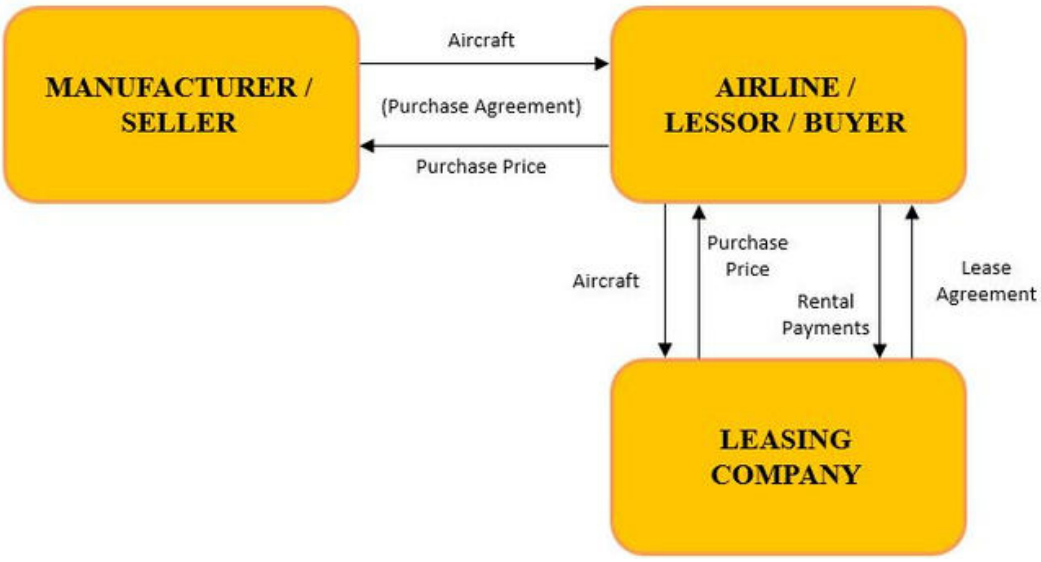
Secured Loan

In a basic secured loan structure, a lender makes a loan to an airline or leasing company to purchase an aircraft from a manufacturer (if new) or seller (if used). The loan is secured by a mortgage or other security interest over the aircraft. The airline or leasing company owns the aircraft from the outset. The airline or leasing company may operate or lease the aircraft to another party.



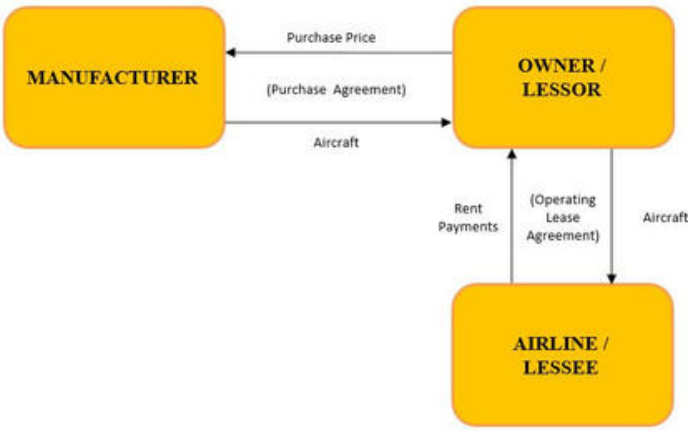
Aircraft sale and lease back

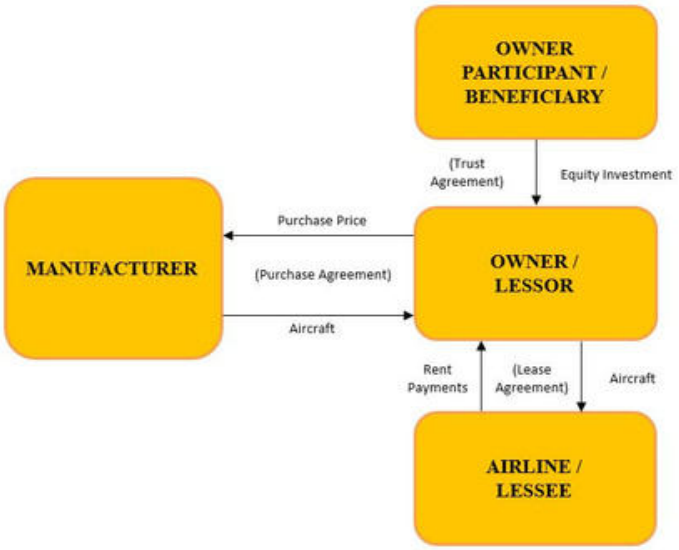
In a sale-leaseback transaction, an airline sells either a used aircraft or its right to purchase a new aircraft from a manufacturer to either a leasing company or an SPV lessor. The airline then leases the aircraft back from that entity. Sale leasebacks are often used when an airline desires flexibility to manage its fleet (which shorter-term leases can provide, unlike ownership of the aircraft) needs to raise capital.



Operating Lease

In an operating or true lease structure, an owner or lessor Acquires or owns aircraft that it leases to an airline or other lessee, Retains substantially all the risks and rewards incident to the ownership of the aircraft, regains possession of the aircraft at the end of the lease term Re-leases or sells the aircraft once it is returned by the previous lessee. The owner or lessor is frequently an owner trust owned by an equity investor, a leasing company or another airline.



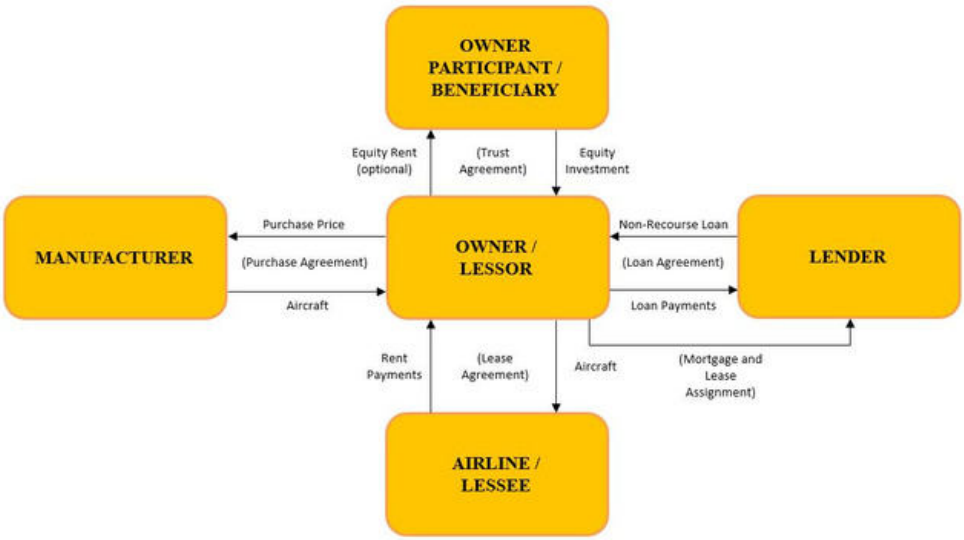


Finance Lease

In a finance or capital lease structure, an owner or lessor Buys an aircraft from a manufacturer, which it leases to an airline or other lessee and Provides the aircraft's purchase price. Structures the lease so that rent payments return all or substantially all of the purchase price, and the lessee is required (or at least expected) to purchase aircraft at the end of the term. The owner or lessor in these transactions is typically an owner trust established by an equity investor and through which it makes the investment needed to acquire the aircraft.

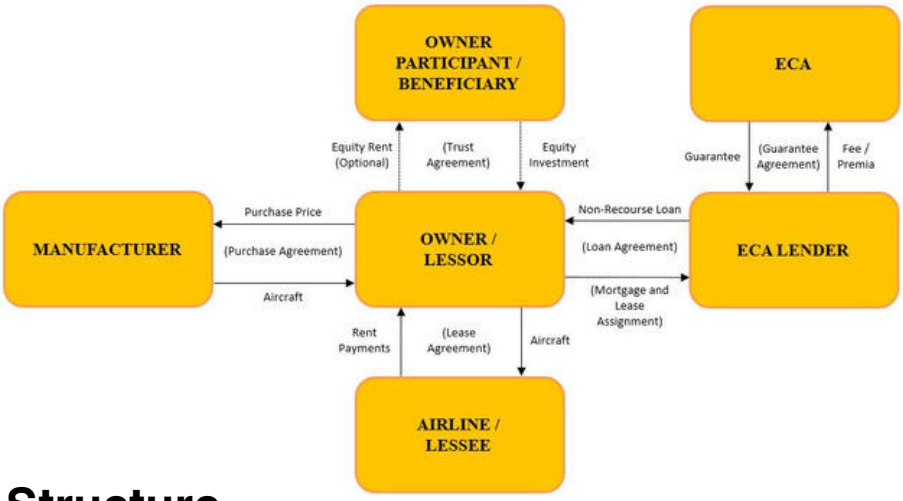
Leverage Lease Structure

A leveraged lease is similar to a finance lease except that in these transactions, lenders provide the owner or lessor (typically an owner trust owned by equity investors, also known as owner participants) with loans to cover a portion (typically 70% to 85%) of the acquisition cost of the aircraft being purchased from the manufacturer. The balance of the aircraft's acquisition cost is provided by the owner participants. The owner trustee uses the lease payments it receives to repay the loans. The obligations of the owner or the lessor under the loan agreement are secured by a first priority lien on the aircraft and related assets. Its rights to receive payment from the lessee under the lease.



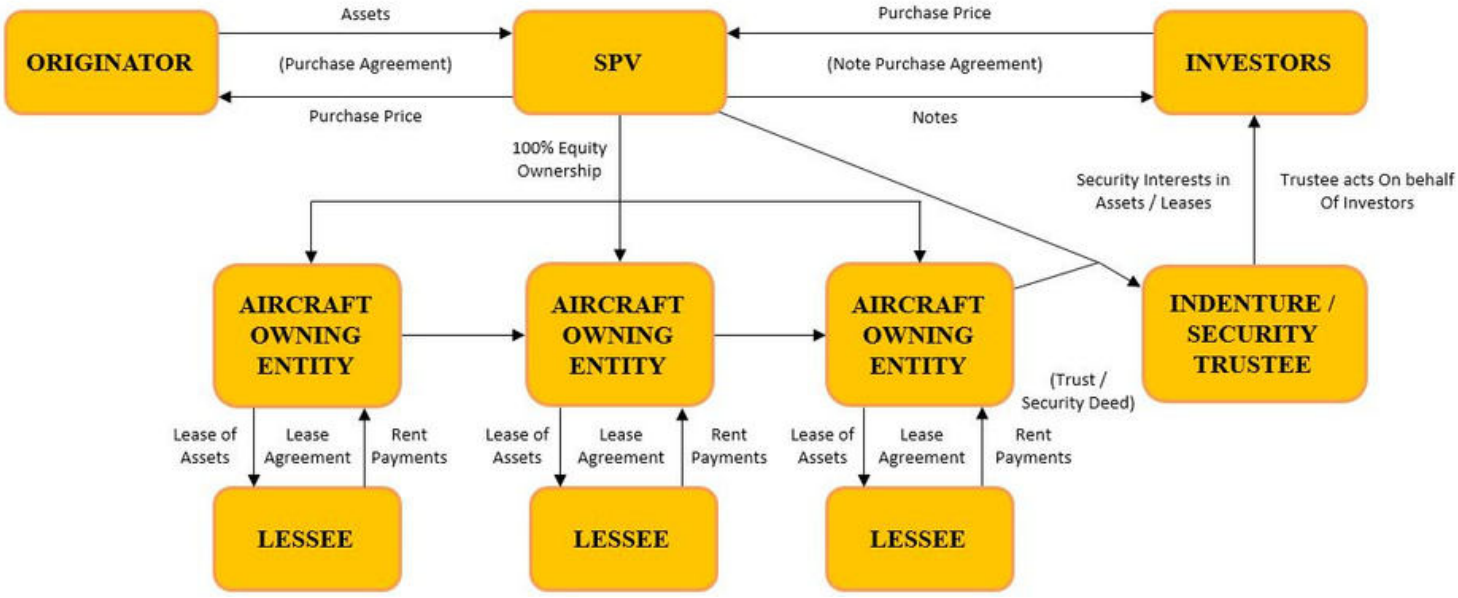
Export Credit Agency (ECA) Loan Structure

ECAs promote the export of aircraft by directly financing or guaranteeing the purchase of aircraft by foreign buyers. In an ECA financing transaction, the ECA can either make direct loans or guarantee loans made by other lenders (ECA lenders) to an owner or lessor to finance the purchase by that owner or lessor of one or more aircraft from a manufacturer under their jurisdictional purview.



Asset-based Security Structure

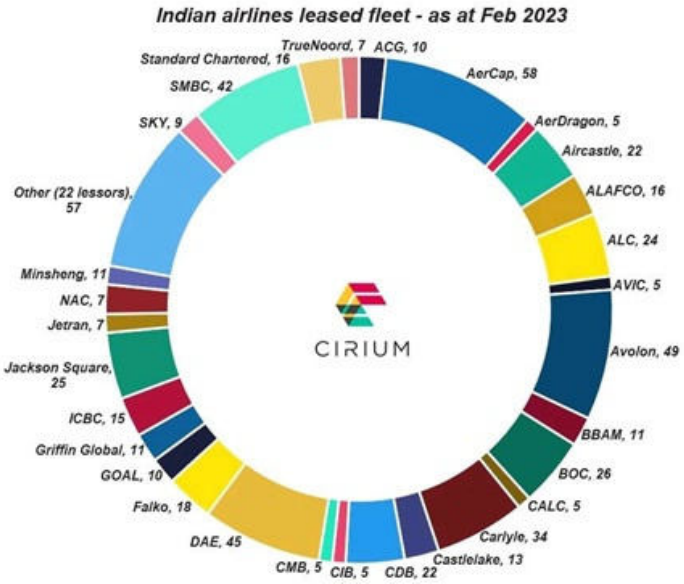
Asset-backed securities (ABS) are debt securities under which payments of principal and interest are made to the holders from revenue generated by an underlying pool of assets, such as mortgages, credit card receivables, commercial loans, or other loans. In an aircraft ABS transaction, an SPV purchases income earning assets, such as aircraft or engines, with the proceeds of the issuance of asset-backed securities to investors the SPV typically holds these assets in wholly owned subsidiaries, which in turn enter into operating leases for those assets with lessees the investors are repaid from the revenue generated by those assets (namely, rent payments under the leases). The equity interests in the SPV are sometimes retained by the originating sponsor or its affiliates or may be sold to one or more third-party investors. The credit risk in an ABS transaction, unlike in an EETC transaction, is spread among all the different lessees and is not limited to one counterparty.



Indian Aviation Industry - Role of Aircraft Leasing

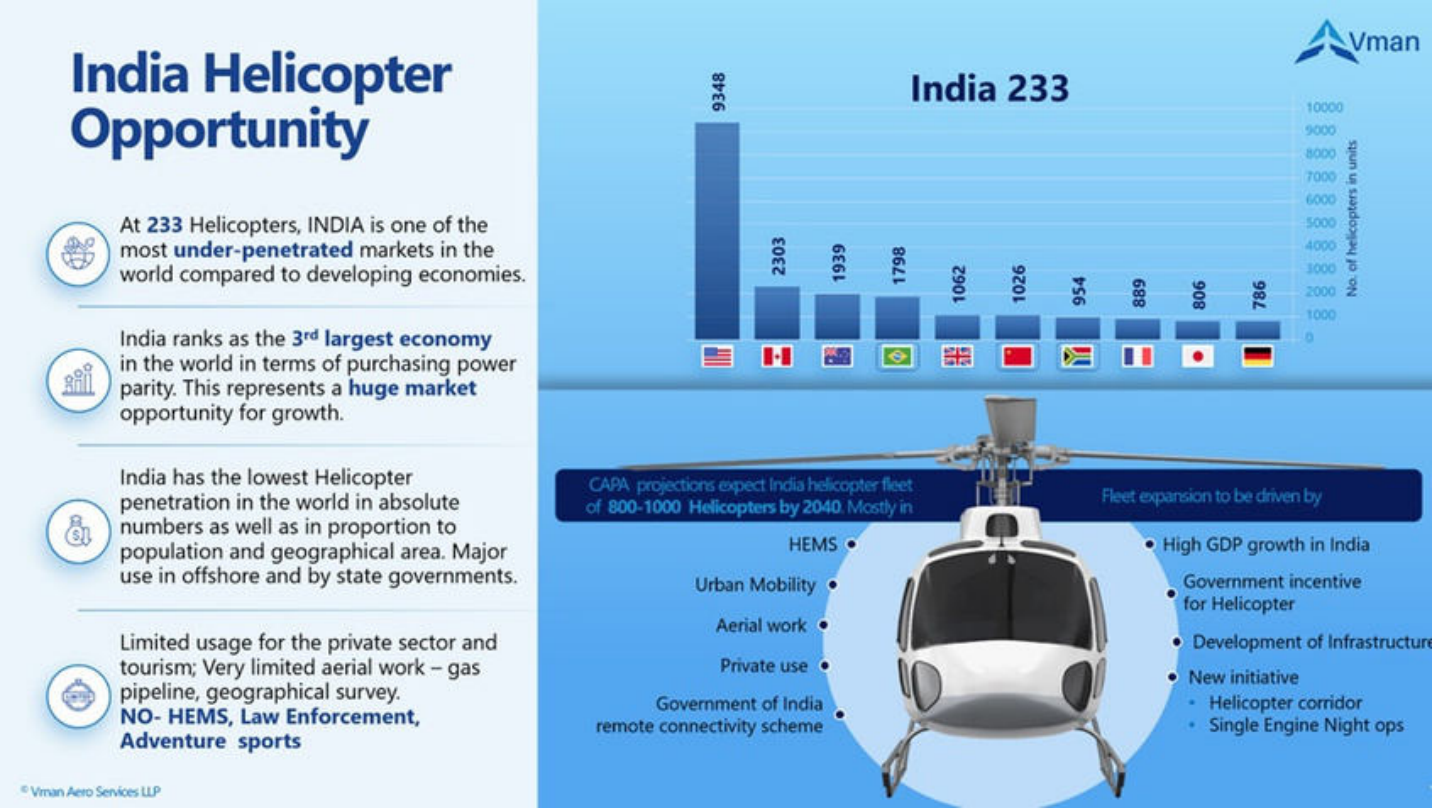
The commercial aircraft Industry was De-regulated in 1993 with permission to operate an Air taxi operation, which was subsequently amended to allow schedule airline operations first domestic and then international. Helicopter, Commuter and general aviation aircraft operated under a Non-Schedule Operation permit and Training aircraft under Flying Training school. There is tremendous growth in commercial aviation in India, and Helicopter, Commuter, and training aircraft remain stagnated. Today, the Commercial Aircraft fleet is 700 + Aircraft with more than 1000+ aircraft on order, whereas the Helicopter fleet is less than 240 with less than 20 on order, 3 Commuter aircraft with 10 aircraft on order and 200 Training aircraft with less than 100 on order. Aircraft leasing has played a very important role in the growth of different aircraft categories, which is very clear from the following chart.

Growth of the first decade of aviation development in all sectors was the same, and the availability of commercial aircraft on lease has resulted in double-digit growth in the commercial aircraft sector, but other sectors remain stagnated. More than 85 % of the commercial aircraft fleet is leased in India, where less than 10 % of helicopters and less than 5 % of Training aircraft are leased in India. All major commercial aircraft lessors are present in India; less than five are in helicopters and commuter aircraft in India.



Courtesy CIRIUM

Helicopter Leasing Opportunity in India



Training Aircraft Leasing Opportunity in India

Due to the non-availability of leased assets, the Regional, Commuter, Helicopter and Training aircraft segment of Aviation has stagnated in India. It needs Leasing support to expand this sector with the same growth rate as commercial Aviation.

Leasing Initiative in India – IFSCA GIFT City

With India's rapid growth in Aviation, the National Aviation policy has taken a holistic approach to developing a complete aviation echo system covering but not limited to airport infrastructure, airspace management, MRO, Flying Training, Aircraft leasing, Helicopter operation, etc. It also focuses on bringing services to the Indian shore under the Aatmnirbhar Bharat initiative.

The government of India has approved Aircraft Leasing as an approved activity under the International Financial Services Centres Authority (IFSCA) at Gift City Gujrat. There are several measures like regulation, tax benefits, tax structure and other initiatives to make GIFT City business competitiveness on par or better than current aviation centres worldwide. GIFT City will not only support leases to the Indian aviation market but also across the world with a very competitive cost structure. GIFT City will also help to lease Indian designed and manufactured aviation products.

At Present

25+ Aircraft lessors registered with IFSCA. 15 Aircraft, 50+ engines, 40+ Ground Support Equipments leased out of GIFT IFSC, as of July 2023
• Leasing transactions executed for Wide Body Commercial Jet, Regional Turboprop, Helicopter, Engine, Training aircraft and Business Jet.

Vman

Vman has been established with a visionary approach to harnessing aviation as a catalyst for enhancing the socio-economic landscape of its regions. With a strategic focus on Asia and Africa, which house vast populations, the efficient advancement of aviation holds the potential to uplift communities on a significant scale. Vman's comprehensive approach covers diverse aspects of aviation, including consultancy, asset management, leasing, medical emergency response, last-mile connectivity and urban mobility. Aspiring to be the premier choice in aviation infrastructure development, Vman aims to play a pivotal role in propelling prosperity and progress across diverse geographical regions, particularly in Asia and Africa.

Vman leasing division Vman Aviation Services IFSC Pvt Ltd is India's first aircraft leasing company established in GIFT City, India. Vman is focused on leasing Helicopter, commuter and Training aircraft, which are critical elements in developing last-mile connectivity, medical emergency services, aerial work, urban mobility and pilot training infrastructure. Vman also supports leasing Indian-manufactured Helicopters and Training aircraft, which aligns with the Aatnirbhar Bharat initiative of the government of India.

First delivery of the Helicopter to GIFT City based Leasing company

Vman has leased One Helicopter, which is extensively used in surveys, charters and other aerial works. Two ATR 72-600 have been leased to one regional airline that operates these aircraft in the critical Northeast region under UDAN and is able to connect more than twelve airports that were not operational due to the availability of the Aircraft on lease. Ten Aircraft are leased to the Flying Training Organization (FTO), which will provide commercial pilot training within the country, which is also the government of India focused area.

Vman also signed an MOU to purchase an Indian-designed LUH Helicopter and Hansa Trainer aircraft, which boosts locally designed aviation products and enables leasing of Indian-designed and manufactured aircraft in India or abroad. Currently, Vman order book has more than 43 aircraft and Helicopter firms and options valued at over USD ninety million.

Vman leasing will enable many small or new operators to access Helicopters, Commuter aircraft, and Training aircraft on lease, which was not possible earlier as foreign leasing companies were reluctant to lease these aircraft categories in India.

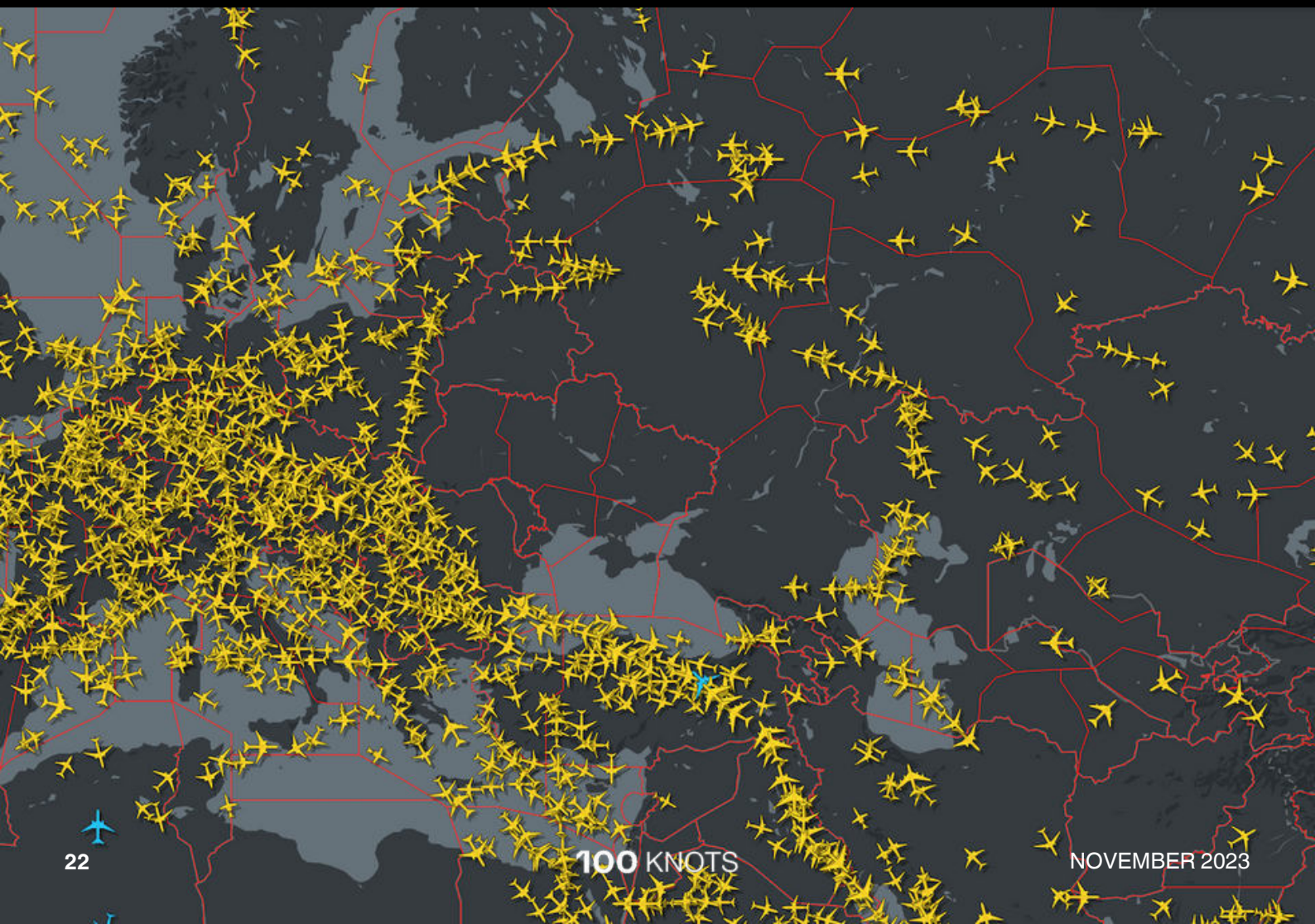
About the Author

An electrical engineer with a specialization in Materials Management, Vishok has over thirty-five years of multi-faceted experience in the aviation industry across several geographies. His experience encompasses aerospace defense manufacturing, national and international airlines, helicopter operations, aviation asset management, aviation consultancy, Airline turnaround and aircraft leasing, amongst other aspects.

He was engaged in the establishment of India's first - cargo Airline, the technical operation of Helicopters Medical Emergency Services, Aircraft leasing company. He also successfully managed a regional airline in UDAN to make all routes operational and consistent service within one year of the allocation for which MCOA has given a citation. He is actively involved with all stakeholders in Government and Industry for the development of Last-mile connectivity, HEMS and Fractional ownership.

Keeping Airspaces Open During Conflict

Justin Jude Francis
Air Traffic Controller
Mumbai Oceanic and Tower Control



The recent Israel Hamas conflict has forced this often overlooked aspect of civil aviation to the centre stage. The risk comes from a multitude of factors from operating in a conflict zone: misidentification, debris from air defences, GPS spoofing, false EGPWS alerts, and reduced route and diversion options in the event of an aircraft emergency. The primary risk is not just the threat of missiles or anti-aircraft weaponry, but also complacency (or a false sense of security). For decades, we have seen sporadic conflict in different parts of the world – even in quieter periods, rocket attacks on countries like Israel are common. As such, operations have continued, and operators have become used to raised threat levels in Israel.

Airspace is a vital conduit for men, materials, and other support necessary to keep a country running. Countries will go to war, conflict is a clear and ever present hazard, so it doesn't make sense to shut shop and close down an entire nation every time a conflict erupts. It is vital for governments, aircraft operators and other airspace users, like air navigation service providers (ANSPs), to collaborate and exchange current conflict risk information to ensure civilian flight safety.

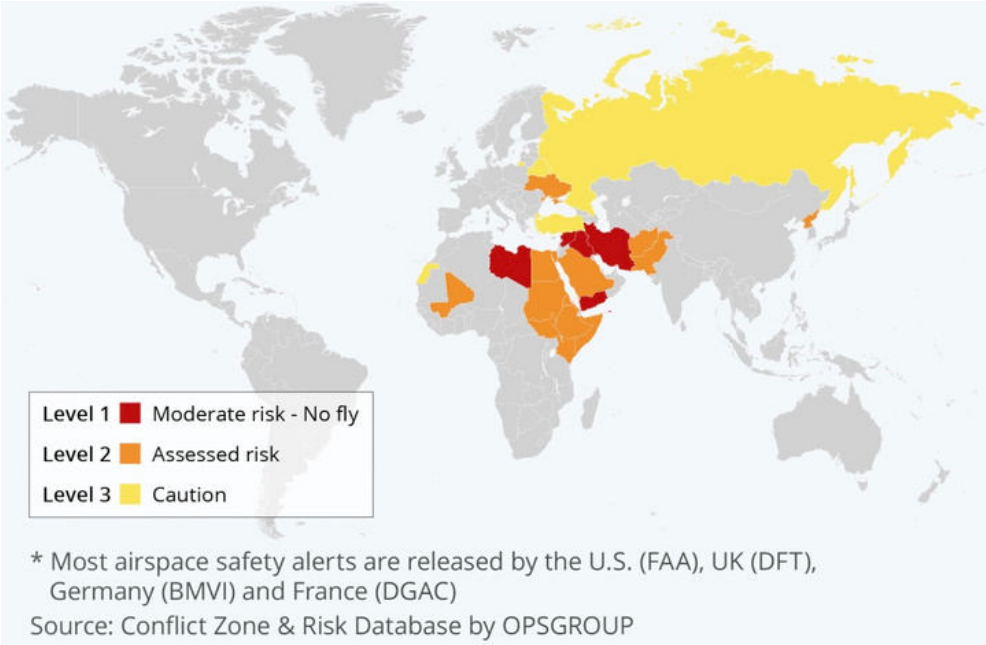
International standards require the sharing of information about local and potentially risky ground situations. The Chicago Treaty establishing the ICAO mandates member states to promptly communicate potential aviation risks in their airspace. This is accomplished through the Aviation Security Point of Contact (POC) Network or regional contingency measures. The ICAO's document 10084 details the procedures for sharing information between states and operators and guides airline risk assessments. Furthermore, airline operators also conduct their own assessments of conflict zone risks, sometimes with third party security monitoring providers, to ensure safe route and operational planning based on the latest information.

Let's take a look at how various stakeholders collaborate to ensure that civil skies are kept as safe as possible in the face of conflict.

Planning

Avoid Conflict Zones

Operators must consider ground conditions, no fly zones, and avoid airspace within range of a possible attack. Furthermore, dynamic tactical changes are incorporated considering the orientation of the airport with reference to the conflict zone and where the fighting is moving. Considering the direction of the conflict, and how frequently and how deep into a nation airstrikes are launched, flight paths are changed to avoid danger zones.



Tactical Manoeuvring

In case the descent or climb profile takes an aircraft dangerously close to a conflict zone, tactical measures such as alternate vectors can be issued by ATC to ensure safety of aircraft into and out of the affected aerodrome.

The routes in and out of Israel are shifted further north than normal to shield from the area of conflict. Israeli Air Traffic Controllers have about 90 seconds to manoeuvre the aircraft after a missile alarm is sounded.

Importance of NOTAMs

Updates essential to flight safety, like conflicts or missile launches, are conveyed to pilots through NOTAMs (Notice to Airmen) issued by government agencies and airport operators for flight operations personnel. Caution is advised to all aircraft using the airspace. Continuous safety assessments need to be carried out to ensure that well informed decisions are taken.

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!FDC 3/2603 ZZZ SECURITY..SPECIAL SECURITY NOTICE..
ISRAEL..POTENTIALLY HAZARDOUS SITUATION -- ISRAEL AIRSPACE DUE TO THE ONGOING CONFLICT
SITUATION BETWEEN ISRAEL AND GAZA, OPERATORS ARE ADVISED TO USE CAUTION WHEN OPERATING
WITHIN THE TEL-AVIV FLIGHT INFORMATION REGION FIR LLLL. CURRENTLY THERE ARE NO
RESTRICTIONS ON UNITED STATES CERTIFICATED AIRMEN OR OPERATORS TO OPERATE INTO OR OUT
OF ISRAEL. OPERATORS SHOULD CLOSELY MONITOR AIRSPACE DEVELOPMENTS IN THE REGION AND
FOLLOW ALL AERONAUTICAL PUBLICATIONS AND ATC INSTRUCTIONS ISSUED BY ISRAELI STATE
AUTHORITIES. THE CIVIL AVIATION AUTHORITY OF ISRAEL IS ACTIVELY MANAGING THE RISK TO
CIVIL AVIATION THROUGH DYNAMIC AIRSPACE CHANGES AS APPROPRIATE. EILAT RAMON AIRPORT
(LLER) IS OPEN AND AVAILABLE 24/7 AS AN ALTERNATE AERODROME OR AS A PRIMARY
DESTINATION. FOR ADDITIONAL INFORMATION CONTACT FAA CITE WATCH AT 202-267-3203 OR EMAIL
FAA-WATCH@FAA.GOV.
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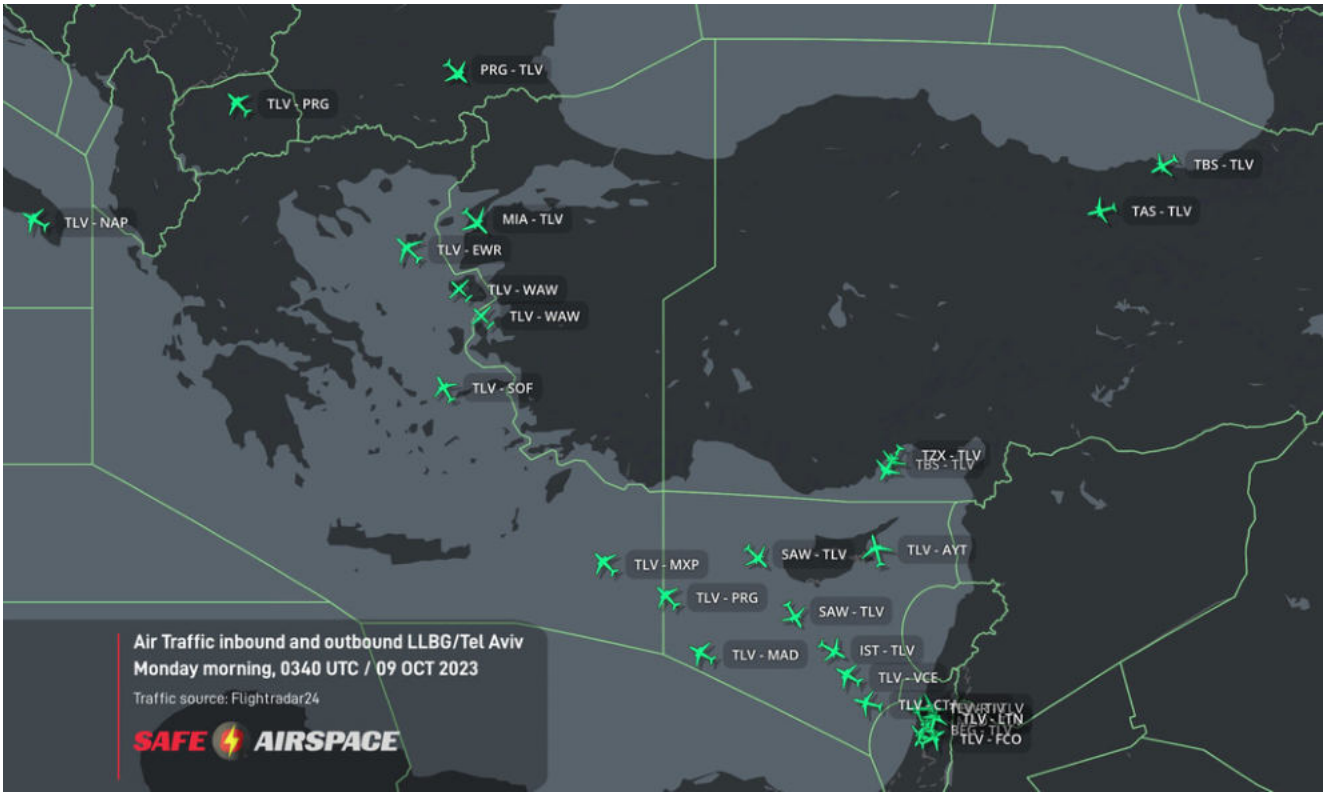
Trade-offs between potential risks and real time scenarios

Even if advisories are in place to avoid conflict zones, whenever an airline operator deems fit, they may still choose to take a conscious decision to fly over these airspaces while practicing due diligence like flight planning at higher altitudes. It does not make sense to penalise an aircraft by compelling them to fly longer routes if there is reasonable assurance that a safe flight is possible considering certain safety measures.

“The fact that Israel has issued and is maintaining NOTAMs regarding its airspace and its main airports demonstrates that the Civil Aviation Authority of the state of Israel is actively managing the risk to civil aviation. At present, there are no indications that these mitigation measures are not efficient or inadequate”- EASA



Prior coordination and dual ATC contact

In conflict zones, pilots must communicate with air traffic controllers from both sides, as well as monitor TIBA to maintain situational awareness for nearby aircraft.

With reference to Israel's air defence, all aircraft must obtain entry approval from Israeli ATC roughly 180 miles before entering their airspace, or risk interception by Israeli fighter jets for identification and justification.

On Ground, Limit the Number of Aircraft Loaded with Passengers

To ensure flight safety on the ground, it is essential to restrict the presence of aircraft fully loaded with passengers and fuel.

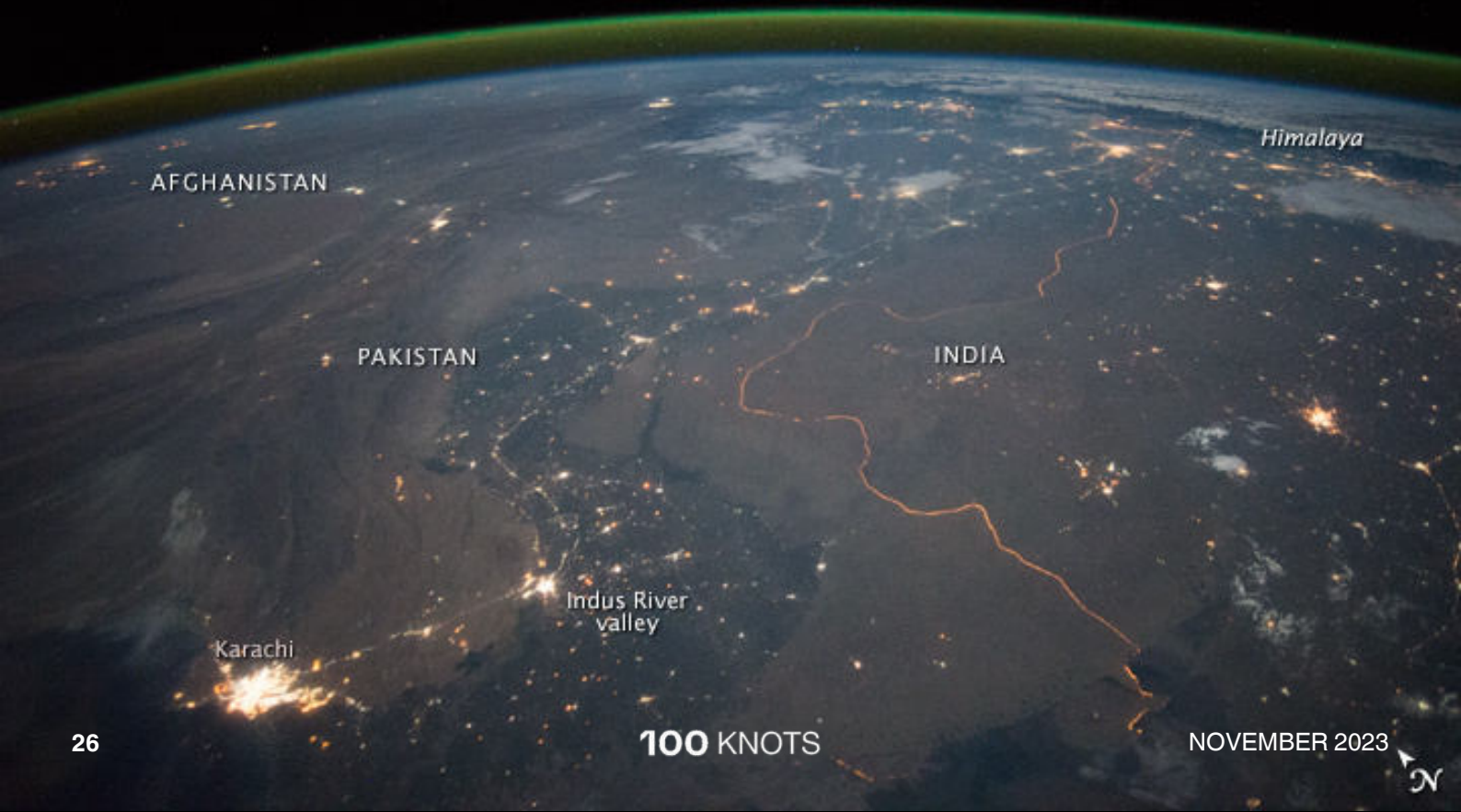
Close collaboration between civil and defence ATC

To enhance the safety of civil aircraft, it is imperative to establish a strong and seamless partnership between civilian and military Air Traffic Control (ATC). This collaboration involves the development of standardized communication protocols, joint training exercises, and the integration of advanced technologies to minimize potential threats and risks to civil aviation. Reduce the risk of misidentifying civilian aircraft as defence aircraft by urging them to follow civil airways as much as practicable.

Improved civil-military coordination, weapon command and control and airspace deconfliction between India and Pakistan has reduced the inadvertent risk to civil aviation operations.

Takeoff Without Delay

Aircraft should refrain from lingering on the runway. Prompt take offs should be initiated without undue delay at designated holding points.



Flight Deck Procedures

What altitude is 'safe enough' to overfly a Conflict Zone?

There is no safe altitude from a large Unit Surface to Air Missile (SAM). However, there have been no documented cases of an intentional SAM attack to deliberately shoot down a civilian aircraft. There have been four documented occurrences " where the destruction of civilian aircraft has been attributed to SAM, and according to open-source data reports, three of the known events occurred during periods of military conflict or high tension (MH 17 being one of them); the fourth event appears to have occurred during a military training exercise.

MANPADS, on the other hand, represent a greater threat to aircraft in 2017. These shoulder-launched systems are very portable, and far more likely to fall into the wrong hands. Common ranges are in the 10,000 – 15,000 ft range. The most dangerous is the FIM-92 Stinger, which has an operational ceiling of 26,000 ft (Hence most conflict zones have a minimum flight level of FL260).

Stay on Course

Once en-route, and deviate only if safe flight is hampered. Ensure the controlling ATC is aware and coordinate as necessary with adjoining airspaces.

Malaysian Airline B777 flight MH17, from Amsterdam to Kuala Lumpur was shot down by pro-Russian militia in July 2014. As per reports, Weather caused this aircraft to deviate from its flight path. This led the rebel group to interpret it as not a civilian airliner as it was not flying on a civilian airliner route.

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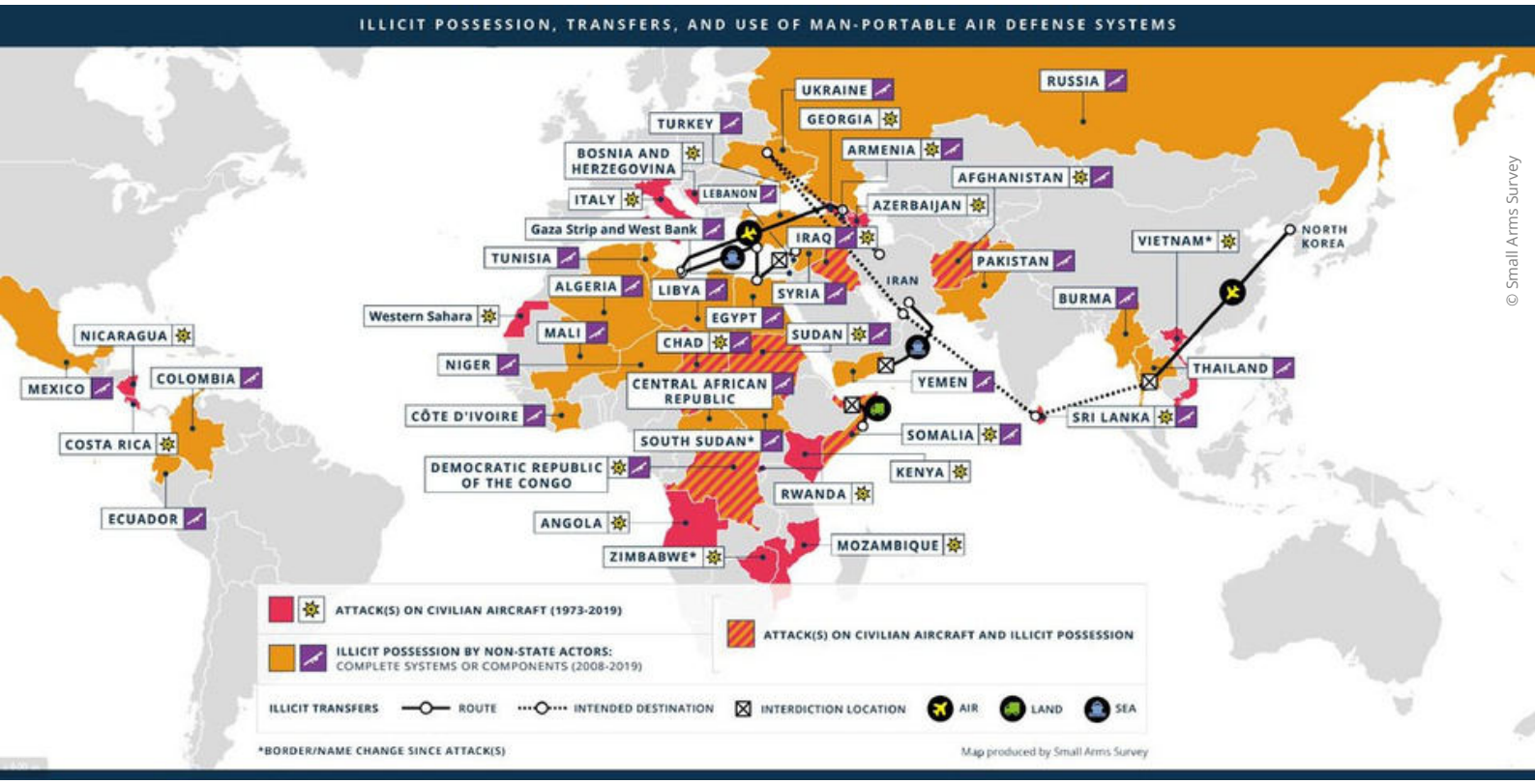

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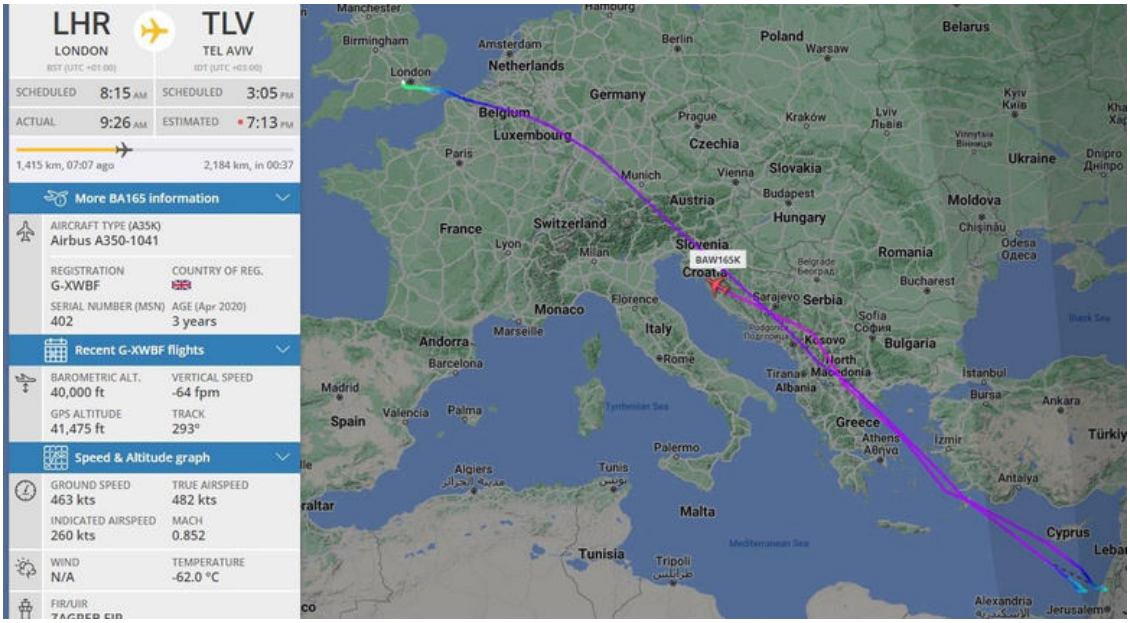
Carry Sufficient Contingency Fuel

Airspaces with active conflict can quickly spiral into neighbouring areas, making a huge number of airports unfit for diversion.



Light Up, Squawk, Transmit

Let everyone know you are a civilian, unarmed, passenger or cargo carrying aircraft – not a spy plane. Fly with as many lights as your aircraft permits without performance limitations. Squawk the appropriate ATC code. Clearly annunciate your call sign to make it clear you are a civilian aircraft.

Familiarize with Intercept Procedures

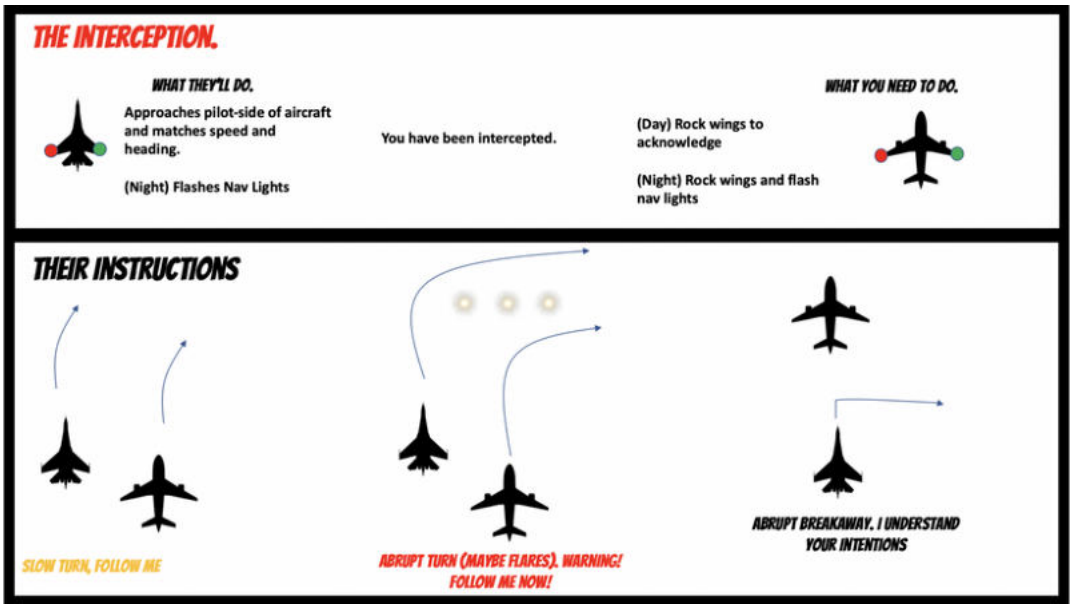
Each interception is potentially hazardous which is why ICAO publish rules and procedures (Annex 2) that both military and civilian aircraft should be following to minimise the risk.

The primary way they will want to talk to you will be in plain English on 121.5. If they can't raise you on that, they will use visual signals which is why they need to get so close to you. There are ICAO standard signals used across most member states (including the US) that you need to know (or at least know how to find quickly).

Always Monitor Guard

ICAO mandates to monitor a guard frequency. An interceptor, is taught to try that frequency first. It is a good idea to monitor guard frequency anywhere in the world where there is even the slightest chance you might be intercepted.

121.5 MHz – this frequency is 'guarded' by many ATC stations and many military aircraft, in some countries it can be given other names, such as the "Distress and Diversion" frequency.



Final Words

Drawing lessons from historical experiences, it is essential to thoroughly examine trends and adopt best practices from other conflict zones. Studying how these regions managed to maintain operational airspaces during conflicts can provide valuable insights and strategies for ensuring aviation safety and continuity in similar situations.

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The Wal Street Journal - While Missiles Fly, Flights Land: How Israel's Airport Stays Open

Risks posed to civil aviation operations over or near conflict zones

How Airlines Navigate Over And Around Conflict Zones

https://ops.group/blog/what-altitude-is-safe-enough-to-overfly-a-conflict-zone/

About the Author

Justin has more than 10 years of ATC experience and hold current Aerodrome and Oceanic control ratings at Mumbai. In addition to regular ATC procedures, he is also trained in CPDLC and HIRO operations at CSMIA, Mumbai.

Justin is graduate with Bachelor of Technology in Electronics and Communication Engineering. When off duty, he enjoys backpacking and exploring unconventional destinations. He also likes reading fiction and classic rock music.

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Aircraft Damage on Ground

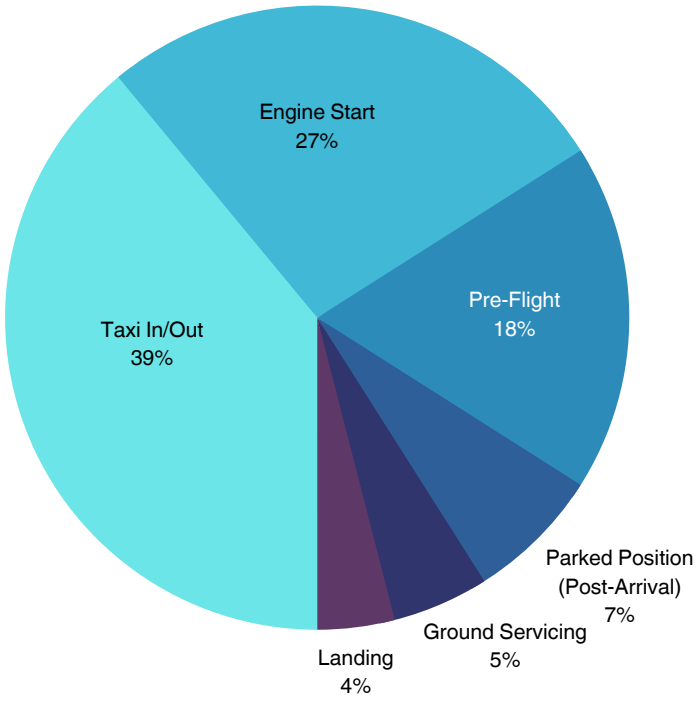
Bharat Lakshay Mehta
Manager Learning and
Talent Development
Air India SATS (AISATS)

When aircraft are taxiing to or from an active runway, they must successfully navigate through designated paths, following and respecting the instructions and using the signs and markings. Complex regulations, processes, and procedures are put in place by regulators and airport operators to ensure no obstacles or threats pose a risk to aircraft movements.

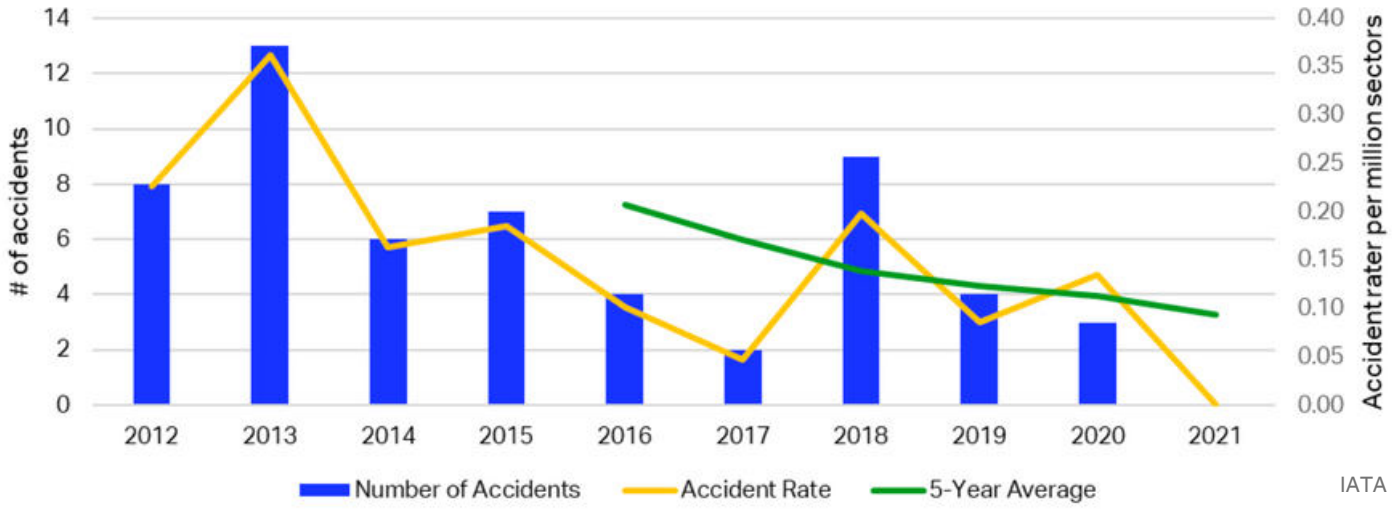
While on the ramp, aircraft are surrounded by various equipment, ground vehicles, and ground personnel (including ground handling, cargo, maintenance, and security crews, among others), all of which are always on the move and follow precise procedures and timelines to ensure safe and on-time operations. If this choreography of movements is managed correctly, they can protect safe operations.

In the last decade, ground damage accidents followed an excellent downward trend until 2018, when the accident rate reached 0.20 per million sectors, well above the average five-year (2014-2018) accident rate of 0.14. In 2020, we saw another increase in the accident rate, which reached 0.14 per million sectors (above the average five-year (2016-2020) accident rate of 0.11 per million sectors).

Although there were no ground damage accidents reported in 2021, ground damage accounts for 9% (56) of total accidents reported in the IATA ADX from 2012-2021.



Ground Damage Accidents, Categorized by Phase of Flight



What is Ground Damage?

This includes accidents that cause damage to aircraft while on the ground due to ground movements, such as taxiing to or from an active runway or because of ground handling operations when parked on the ramp.

- Occurrences during (or as a result of) ground-handling operations
- Damage while taxiing to or from a runway in use
- Foreign Object Damage (FOD) not on the runway in use
- Fire/smoke/fumes while on the ground

Other events related to Ground Damage:

- Contact with another aircraft, person, ground vehicle, obstacle, building, structure, etc., while on a surface other than the runway in use.
- Damage while servicing, boarding, loading, or deplaning the aircraft.
- Deficiencies or issues related to snow, frost, and/or ice removal from the aircraft.
- Pushback/powerback/towing events.
- Jet blast downwash ground handling occurrences.
- Damage while in parking areas (ramp, gate, tie-downs).
- Pre-flight procedural or configuration errors leading to subsequent events (e.g., improper loading/servicing/secured doors and latches).

"Based on data developed by the International Air Transport Association (IATA), the Foundation estimates that 27,000 ramp accidents and incidents — one per 1,000 departures — occur worldwide yearly. About 243,000 people are injured yearly in these accidents and incidents; the injury rate is 9 per 1,000 departures."

"Ramp accidents cost major airlines worldwide at least US$10 billion a year, the data indicates. These accidents affect airport operations, result in personnel injuries, and damage aircraft, facilities, and ground-support equipment." (Flight Safety Foundation)

How to Mitigate Ground Damage Risk?

Proper Training

- Develop joint training programs that involve both airline and airport staff. This ensures that everyone involved in ground operations is on the same page regarding safety procedures and protocols.
- Ensure flight crew are familiar with the airport maneuvering areas and procedures, especially during construction and unusual circumstances.
- Implement combined training, including regulations, industry standards, best practices, and SMS.
- Train ground personnel on CRM and competencies such as leadership, teamwork, decision-making, and problem-solving.
- Focus training on real exercises in situ with abnormal situation simulations rather than on theory.

Compliance Monitoring

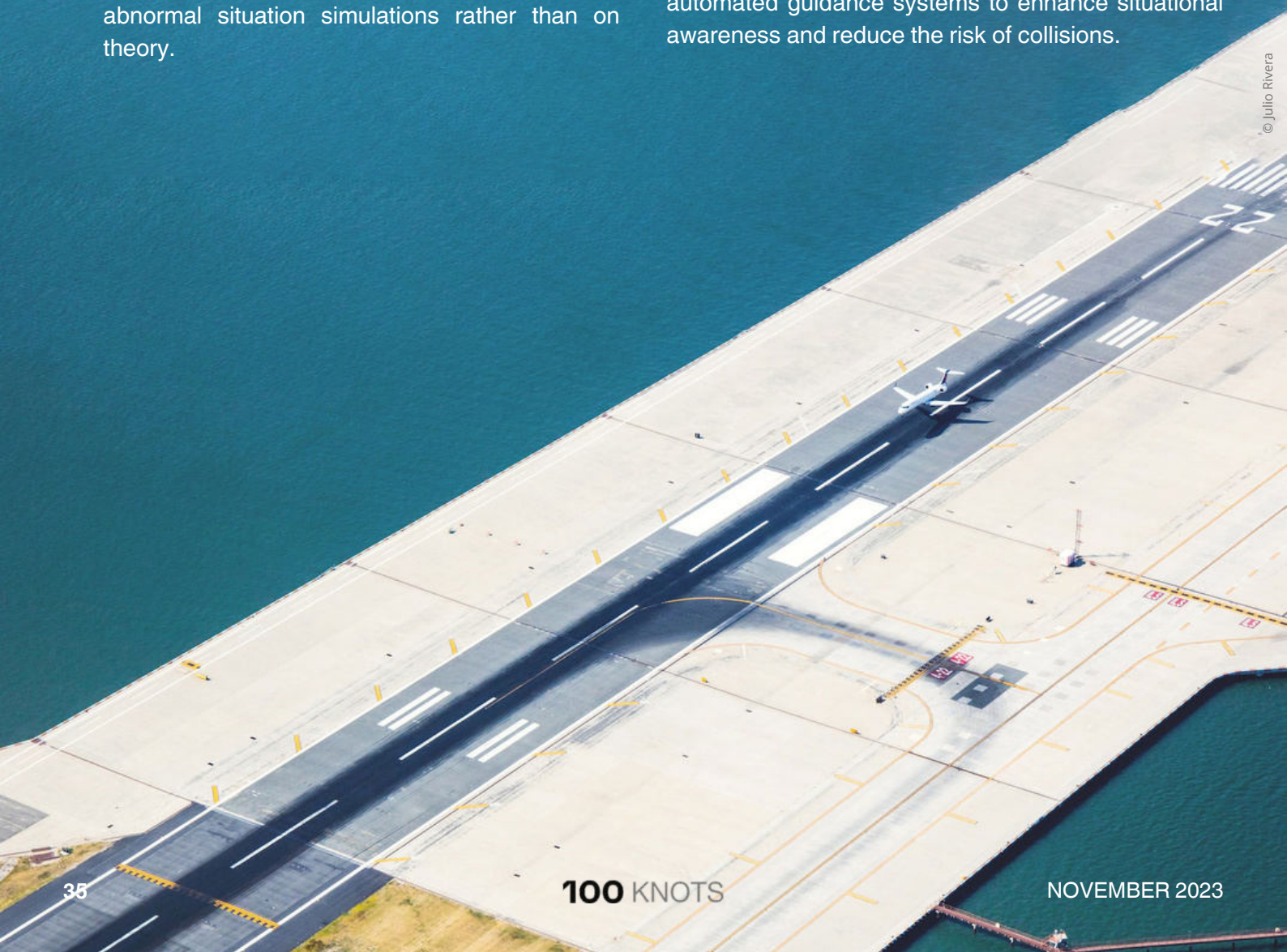
Conduct regular joint safety audits involving representatives from both service providers and airport management. This helps identify potential hazards and areas for improvement in ground operations. Improve quality via a common audit program that could meet targets from GSPs and airlines.

Reporting System

Establish a robust incident reporting system that encourages both service providers and airport staff to report any accidents, near-misses, or safety concerns. Analyzing this data can lead to proactive safety measures.

Technology

Explore the use of advanced technologies such as improved lighting systems, ground radar, and automated guidance systems to enhance situational awareness and reduce the risk of collisions.



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SOPs

Follow aircraft ground handling procedures set by international organizations like the IATA Ground Operations Manual (IGOM), IATA Safety Audit for Ground Operations (ISAGO), and IATA Airport Handling Manual (AHM). Pilots should observe posted speed limits on taxiways to maintain control of the aircraft and have sufficient time to react to any unexpected obstacles.

Maintenance

Complete obstruction-free clearance, including FOD on runways, taxiways, and aprons. Perform required requirements and procedures for regular inspection to detect and remove FOD.

Performance Tracking

Develop a package of Safety Performance Indicators (SPIs) and Safety Performance Targets (SPTs) to manifest and measure ground safety performance. Develop a package of SPIs and SPTs to focus on collisions on the ground that are directly related to ground handling activities.

Communication

Enhance the ground communication between flight crew, ATC personnel, and vehicle drivers during aircraft and vehicle operations in the maneuvering areas of airports to ensure greater situational awareness.

Disruption Management

Pay special attention to keeping NOTAMs updated and with clear text.

Engagement

Hold detailed discussions with the risk and safety department regarding introducing improved safety procedures to examine lessons learned.

Markings and Lights

Ensure airport signs, ground vehicles have appropriate markings and lights to enhance visibility, especially during low-light conditions.

Conclusion

Good ground handling practices are essential to ensure smooth aircraft operations without interruption and without incurring additional operating costs. Attention needs to be focused on the fact that 'bad habits create big burdens.

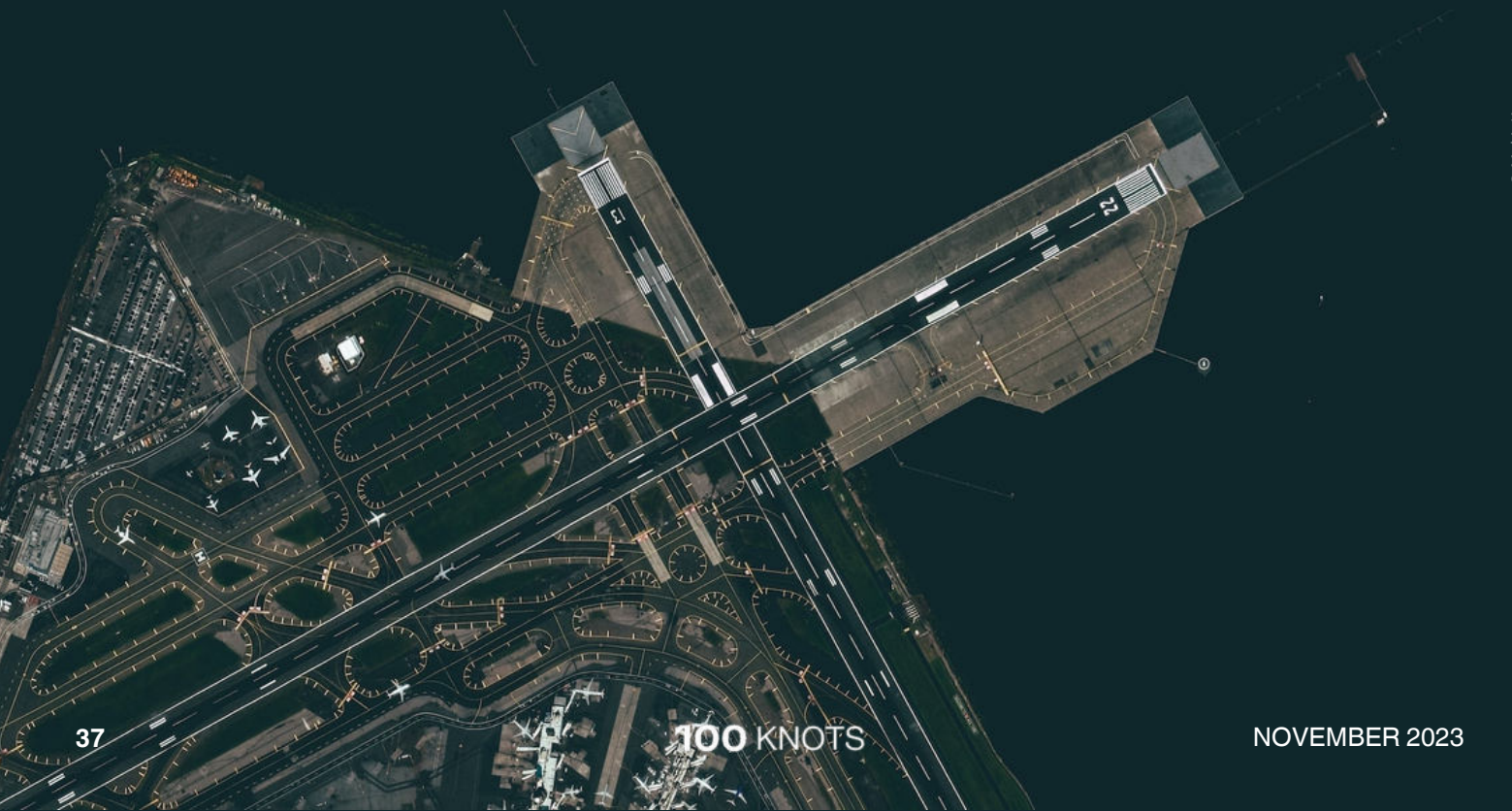
Over the last 20 years, turnaround time has become a strategic challenge in operations due to increasing competition between airlines and due to airport congestion; less time on the ground means more time generating income, and subsequently greater profitability of the airlines.

The risk in the race to reduce turnaround time is that corners may be cut, correct procedures not respected, and consequences may actually be time-consuming and expensive to fix. The most spectacular examples are collisions with Ground Support Equipment (GSE) such as stairs, catering trucks and cargo loaders.

Isolated minor mishandling procedures do not appear particularly serious, and yet when repeated cycle after cycle, they create fatigue and eventually damage the aircraft. A better knowledge of the precise areas most commonly damaged by non-respected ground handling procedures will help to alleviate these costly repairs.

About the Author

An Aviation Professional with over 17 years of experience in the same domain, Bharat started his career in 2006 by following his passion for flying aircraft as a commercial pilot with Pan Am International Flight Academy in the United States. Adept in aviation & airport operations with a continuous passion for cultivating talent and driving organizational growth, working with Air India SATS Airport Services Pvt. Ltd. as Manager of Learning and Talent Development for the last 13 years now. Possess a proven track record in implementing effective learning and development programs which helps in fostering a culture of continuous improvement. Successfully led cross-functional teams, developed and executed strategic training initiatives, along with establishing robust talent management frameworks. Completely believes in "The more that you read, the more things you will know. The more that you learn, the more places you'll go".



Heed

The Human Factors

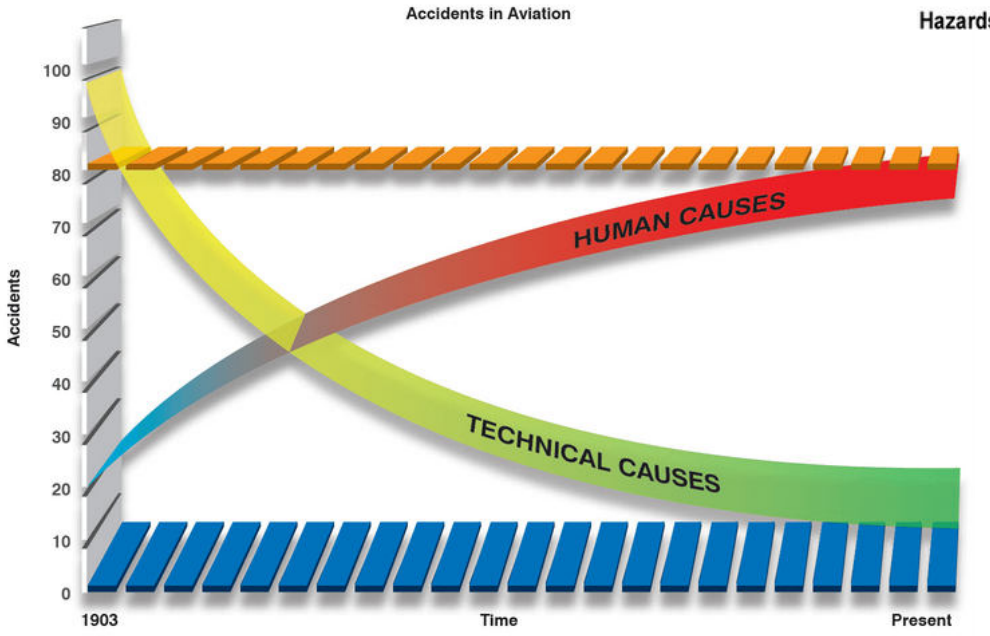
Group Captain
Sushil Bhatia (retd)

Well, I have been with the aircraft since the time I was employed. My first and longest job was as an aerospace engineer with the elite Indian Air Force (1981-2007). And after that, I have been in civil aviation in various capacities. Looking back, I can remember so many accidents, incidents, and near misses, with Human Factors as one of the causal factors. (Remember Heinrich's model, which says that behind one accident, there are about 30 incidents and nearly 300 near misses, which might not have been reported)! And that is true.

Human Factors refer to those conditions, like stress, fatigue, complacency, etc., that affect human decisions, which can adversely impact aviation safety. These factors can influence people to make errors or impact their performance. Aviation history is replete with accidents and incidents caused by Human Factors. In fact, right from the time we have taken to the air, and as we have progressed in technology, the number of accidents due to technical causes has been going down, as against those due to Human factors, which have shown an increasing trend.

I still remember the 'fauji days' when you were supposed to be on duty 24/7. But HFs do apply there, too. It was in Bagdogra, where we were servicing a fighter jet planned to participate in exercise the next day. I had an excellent technician, Mr. Pandey, who was allotted the task of changing an Engine Speed Indicator Generator towards late evening after a whole day of a hectic job. Pandey was too tired and hesitant to do the job, but I insisted.

The job was done; we packed up to come early the following day. When we moved the aircraft from the hangar to the apron the next morning, I noticed a small pool of engine oil below the plane. That triggered me, thankfully, to investigate. We found that since the technician had been stretched beyond working hours, he missed out on fitting the seal on the ESI Generator. Had the aircraft gone for flying in that condition, the oil would have leaked out, leading to engine seizure.



Harnesses have a role to play

It was a beautiful morning when 6 fighter aircraft were to go for an exercise. One of the pilots came late and asked permission to taxi out without putting on the leg harness (the pilot announced he would put on the harness while taxying out). But that was not allowed. The ground crew insisted that he put the harnesses before taxying out, which he ultimately did, to his annoyance.

As luck would have it, that pilot had to eject over the RW at about 1000 ft AGL due to fuel pump failure. He escaped with minor injuries. Imagine what could have happened had he not put the harnesses.

The things are no different in civil aviation

I was sent to a layover station in one of the airlines for a surprise check. (As expected, no Human factors were considered in my case also. I landed in the night, tried to sleep in the Ops room with a swarm of mosquitoes, and requested somebody for a vehicle at the apron. Remember? It was a surprise check!). Imagine three B-737s lined up, ready for push-back, and the layover schedules were not signed. Reason: Only one AME allotted to 3 ac, with various scopes of jobs. On top of that, six other types of AC were parked 3 km away, and the station had only one Nitrogen trolley for charging the wheels. It is a perfect recipe for an error to occur.

This is where the supervisors have to play a crucial role

Most of the time, we try to reach the error committed and stop. However, we must understand that error is a consequence, not a cause. And all this can be included in the ERROR MANAGEMENT (EM) term. EM has two components: (a) error reduction and (b) error containment.

Error reduction looks at the measures meant to reduce the error occurrences (In the context of the Risk Index matrix, reducing the probability), and Error Containment looks at the ways to limit the outcome of the errors once committed (Reducing the severity, if we talk of Risk Index matrix).

For example, if you look at the process sheets to carry out work on the components or aircraft, there are these CAUTIONS and WARNINGS. These are included to aid in Error Reduction. But, let us ask ourselves how many times we sincerely go through these while performing work.

Error Management also includes things like measures to reduce error vulnerability of particular task packages or operations, steps to report and investigate error-producing circumstances, factors, etc., methods to enhance error detection (like by ways of independent inspection, duplicate inspections, etc.), measures to report and investigate latent conditions (it is here, of other places, that Hazard reporting can play a vital role), etc.

Error is a Consequence

Mr Pandey errored in not putting the seal while fitting the ESI Generator. Had it resulted in an event, would the error have been a cause of the accident? Yes. But the error itself was the consequence of something! If we analyze further, the error was the consequence of over-stretching human limitations.

So, the error is not an explanation; it needs explaining. As per the statistical studies, three significant factors, amongst others, give rise to general errors in aviation. These are:

1. Procedures
2. Incompatible Goals
3. Communication

Procedures

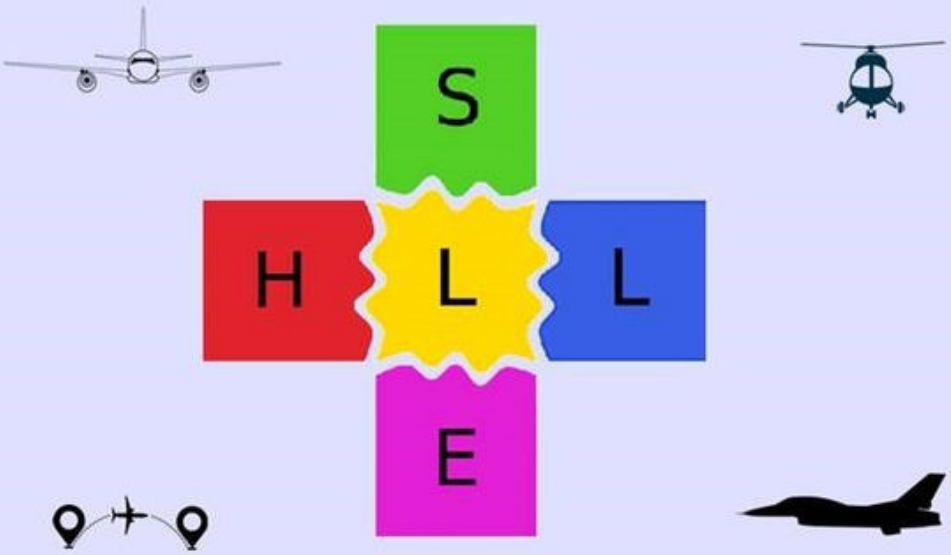
Procedures, checklists, company SoPs, etc., are the most common software (remember the SHELL model?) that interacts with Liveware. Non-compliance to standard procedures is one of the most critical factors that cause incidents or events in the maintenance domain. In a few cases, the procedures may not be available at all or are inadequate. In such cases, the issue must be raised to the OEM level to plug the gaps.

Sometimes, the maintenance crew believes that things can be done their way, even if the documented procedures are considered adequate. They may find specific steps as 'unnecessary'. Other reasons for not following guidelines may be complacency or norms. In some MROs, I have also noticed that to meet the production, Process sheets are signed by the certifying staff, who happened to be on leave that day.

In 2003, an Air Midwest Beechcraft 1900D experienced loss of control on take-off, killing all 21 on board. One of the causes was incorrect rigging, as the technician found the steps superfluous, combined with inadequate procedures; there was no requirement to conduct a functional check, which subsequently was made a requirement.

Please note that if the OEM maintenance instructions are not taken seriously, then the whole concept of having a CMM kept next to the work area is of no use. An effective way to counter this drift at organizational levels is through safety reporting, performance monitoring, event investigations, etc. But the fact is that this 'non-compliance' mostly happens in the dark, secretly.

Another method is to make the crew aware of the consequences of cutting corners by way of teaching in Human Factors classes, as, at times, such deviations occur with no malefic intentions.

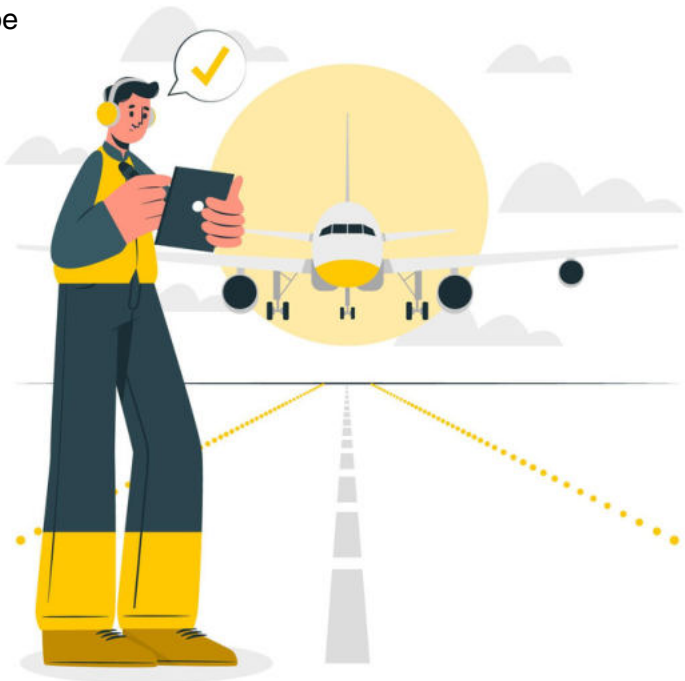


Incompatible, Conflicting Goals

Incompatible goals can lead to conflicts, dilemmas, and challenges for decision-makers and workers. Take for example, reducing the time between the turnarounds of the aircraft from, say 20 min to 15 min, by the top management, without going into the details of various activities that take place, and whether they can be crashed to the extent as desired. Whereas the reduced OTP period may add to customer satisfaction, if the decision is unilateral, it might entail risking the safety aspects.

So, I remember a case that fits in here. An MRO reported multiple dents near L2 door on an aircraft which had gone for major repairs. The Root Cause Analysis revealed that due to pressures to meet OTP, in the process of aligning the Pax ladder, it used to hit the skin, and over some time, the skin got dented at several places, beyond allowable limits, thus causing avoidable expenditure to the airlines.

At times, the airlines have to cut costs, but at the same time have to maintain safety records and customer satisfaction. Management has to do a tightrope, walking between production and protection (as is the saying in aviation, in the case of cost-cutting, the training and safety are the first to be sacrificed).



Communications

Mis-communication amongst the maintenance crew can be a source of significant errors, especially when teamwork is required to undertake the jobs. Things can become more complicated when more than one shift is involved in undertaking the jobs, which generally happens regularly in the aviation industry. Lack of coordination among team members can make things complicated and prone to accidents.

The communications start from the Aircraft Maintenance Manuals, Component Maintenance Manuals, Service Bulletins, Process sheets, Job cards, ADs etc. The audience is the technicians, AMEs, certifying staff, etc. In the whole scenario, the functioning of the Technical Publications department is of critical importance.

It is essential to follow all steps in accomplishing the task and maintain the currency of the Task Package by monitoring the issuance of Maintenance Manuals by OEMs, their access, and interpretation, and then transforming them into usable process sheets, Job cards, etc. In case of a revision, procedures require adding or changing tools, training, techniques, facilities, etc. It is of utmost importance that the workers be informed and trained on the revised procedures. (AND MAINTAIN RECORDS OF SUCH TRAININGS for the perusal of audit teams). I remember working in the MiG 23/27 fleet, a Russian-origin aircraft. The manuals used to be supplied in Russian, which then used to be translated into English by translators who were generally non-technical people. This used to lead to lots of confusion in terminologies.

Moral of the Story

We must understand the importance of Human Factors when planning and undertaking any task. Remember, L (Liveware, the human being) is the most inconsistent among the various aspects of the SHELL model. A good supervisor should be able to analyze the weak points where the crew is likely to make errors and plan to reduce the probability of occurrence of a mistake, and if made, on measures to contain the consequences.

About the Author

Group Captain Sushil, Bhatia (retd) is an M Tech from IIT, Madras, who served the elite Indian Air Force during 1981-2007 and has participated in many Operations during service. He has been the Lead Auditor for ISO 9001 and is a global Trainer and Assessor for Aerospace Standards AS 9100. He has been an IATA trainer for their international clients. He has served many international airlines and MROs and is a subject matter expert in Aerospace Quality and Safety.

A best-selling author, he has been a TEDx speaker and certified Life Purpose Coach. He is a freelancer, and is currently working on a book regarding Aviation Safety.

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