

November 2022

# 100 KNOTS

India's Aviation Ecosystem

## Flight Safety

Excellence Through  
Safety Education

## Aircraft Finance

Gujurat GIFT City

## Health

Drug Abuse in Aviation

## Training

Virtual Augmented  
Extended Reality

## Operation Ganga

Two River Sutra



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A Kerospace Solutions Company

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# EDITORIAL DESK



**Preet Palash**  
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Dear Colleagues,

Welcome to the November issue of the 100 KNOTS Magazine.

This month, Capt. Vijay McMilton Devadas explores the excitement surrounding Virtual reality (VR), Augmented reality (AR), Extended Reality (ER) and how they are revolutionizing the aviation industry and future of aviation training as immersive technologies. The futuristic vision for learning and training in the airline industry is to move from singular or multiple sensory learning processes to immersing the entire body into a learning experience. VR AR ER is the window through which we can explore learning from a newer perspective.

Mr. Ajay Kumar from KLA Legal, talks about Gujarat GIFT City, and how this a significant step towards making India an aircraft leasing and financing hub. Dr. Sanjay Bhargava talks about Drug abuse in Aviation and how DGCA is tackling it and much more.

As always Contributions, comment and feedback are always welcome. All papers are received with a high degree of enthusiasm and they 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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## **Aviation Safety**

Through Safety Education

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# Virtual Augmented Extended Reality

*Future of Pilot Training*



**Capt. Vijay Devadas**  
A320 Captain



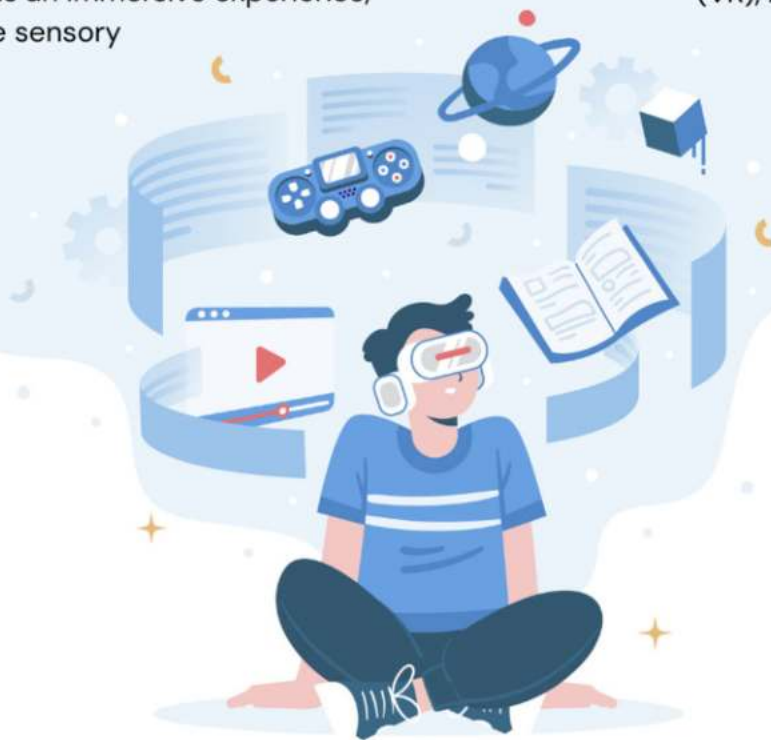


In the Airline industry, a pilot commences training through textbooks, lectures, and later with simulated devices and hands-on learning experience. Many training methods are a good learning curve; however, most of these have many limitations—the learning mediums with 2D textbooks and audio lecture lectures with expectations to understand the 3D world. There is an increase in cognitive or mental load (Oh et al., 2021) as the brain must process the conversion of 2D into 3D information. Furthermore, due to hardware limitations, budgets, and training time, even the most sophisticated flight simulation devices have a limited visual and sensory immersive experience. The in-line training reduces safety margins since the trainee interacts in a live environment such as aircraft, customers, and other equipment; subsequently, the errors and failures have higher chances of an incident or accident leading to organizational-level consequences. In trying to achieve the training objectives with the existing methods, the training time could be much longer, and incomplete lessons pass on to further training phases, increasing resource utilization.

There is a shift in learning from the analog to the digital world, such as books, to personal electronic devices and classrooms to online sessions, with considerable achievement thus far. However, the training concept still engages only a single or a few multiple sensory receptors, such as visual, auditory, and tactile. Interestingly, humans learn with the whole body and mind as an immersive experience, not with a few selective sensory

receptors. There is a gap between the training aid and the learning process, and a proposed solution is through virtual, augmented, and extended reality. The virtual reality concept has the capability of a complete body immersion in the learning process, just like it would feel in the real world with various sensations through the entire bodily receptors. In the virtual world, we can experience immersive visual, audio, tactile, temperature, depth, and other rare experiences such as fear, empathy, and belonging in the created environment through various body hardware and external equipment. In addition, to virtual reality, augmented reality could further enhance real-world elements by superimposing additional information, thereby influencing its perception in multiple layers (Fussell & Truong, 2020).

The soon-to-be baby boomers are getting closer to retirement, and there will be significant recruitment and training demands at a much higher rate in Millennials and Generation alpha (Farrell, 2018). On the other hand, this replacement generation has had consistent exposure to the digital and virtual worlds early in school learning and interactive online gaming. In addition, there is a synergy of interacting in a cloud-based environment, where multiple young adults interact from various corners of the world. As a result, there is a considerable shift in how millennials perceive, learn, game, and apply them in the world. So let us walk this journey together in exploring Virtual reality (VR), Augmented reality (AR), and Extended reality (ER).



## What Is Virtual, Augmented, and Extended Reality?

VR is a created, independent, digital worlds, such as a 3D movie, video game, or computer game, separated from the real world (Greengard, 2019). The user immerses in various senses, such as vision, audio, temperature, and vibration, through human-computer interactive (HMI) components such as displays, speakers, and haptic body wear. AR is altering the perception and experience of an object in the real world by superimposing or projecting additional layers of information over it. For example, scanning an aircraft engine through a wearable google lens gives us overlaying information about the machine, such as its type, make, life cycle, maintenance log, and much more. Extended reality is the synergy of both the virtual and augmented worlds that could take us to a new place in developing highly immersive sensory worlds where only imagination is the limit; for example, in the Microsoft HoloLens, one can have holograms (3- dimensional objects) viewed in a virtual world. In addition, they could superimpose the additional information of the things alongside other real-world objects (Taylor, 2016). The hardware comprises wearable glasses, head-mounted devices, motion chairs, treadmills, and whole-body haptic feedback devices, which the user wears and gets connected with various sensory receptors through the body and mind.



© Wired

## Why Do We Need VR, AR, Or ER In Airline Training?

The learning process is moving from the unknown to the known. Humans have evolved to use various sensory receptors like sight, touch, sounds, temperature, smell, and taste to collect information. Further, we process and perceive our past experiences, knowledge, and psychological effects of joy, sadness, pain, and fear. Furthermore, we store necessary parts in our brains as a learning experience (Goldstein, 2018). For example, we use vision to read a text, audio in hearing a lecture, and touch to feel and perceive the shape of an object. As mentioned earlier, we store information in our brains three-dimensionally, replicating the experience of the real world. Consequently, learning from a two-dimensional environment increases the information processing load (IPL) (Palmiero et al., 2019).



People generally remember...  
(learning activities)

People are able to...  
(learning outcomes)



An increase in IPL means the brain must work much harder by increasing its cognitive loading for converting this information into 3D, or there could be a loss in the meaning and, thereby, learning objective. We can mitigate Most of these challenges through on-the-job training, supervised line training, and simulation devices. Still, it has a severe trade-off in "safety margins" and "immersive experience." VR can make a user experience learning directly by immersing the entire body into the learning experience; for example, a pilot in the simulator could wear a VR head-mounted device where the experience is a higher field of view in a three-dimensional world and more degrees of freedom. Subsequently, the pilot has better depth perception in learning the take-off and landings with a natural immersive feel of developing various

sensory learning points (Farrell, 2018).

VR also provides an immersive experience in training for various emergencies; the trainee can perceive and acknowledge various sensory changes such as fear, anxiety, stress, and startle effects (Keat). Furthermore, VR provides both the first-person (trainee's eye) view and third-person view (instructor's eye); the trainees can trial-run their actions and refine them by giving feedback on their performance through a third-person perspective.

Likewise, Instructors can immerse themselves in the trainee's situation to better understand how and why a trainee would have perceived a problem, with its subsequent decisions and actions, through different points of view in understanding the feasibility of the situation. Subsequently, it aids us in foreseeing the prediction of phenomena or trends which are immediately not perceivable only through an isolated perspective (Brown, C. et al., 2021).

Similarly, for cabin crew training in fire handling, VR could create a realistic feel with a deeper focus on the learning points with layered augmented reality (Jones). As a result, even the instructor is less distracted because there is no fire hazard and hence can focus on observing the trainee's behavioral markers for gauging the learning progress.



Likewise, for engineers, VR can eliminate the risk of damaging expensive aircraft parts such as engines and complicated circuit boards in the learning stage by training in immersive virtual worlds to explore the aircraft components in detail. In addition, AR could add further value to the work environment as it would ease identifying different features by projecting information about the part in the field of view.

With the voice-activated command, the AR device project in the field of view the operating instructions for handling the component without the need for head-down time, thereby increasing attention on the attended task and trapping errors (Brown et al., 2021).

Let us look at VR and AR applications in training customer service agents, commercial staff, and other ground support teams. VR can incorporate virtual customers as avatars, and the trainees can interact in various scenarios such as check-in, baggage handling, boarding, and customers with special needs (Osterlund & Lawrence, 2012). In the case of the security department, AR can add additional layers of information to identify potential threats. For example, the security personnel can view baggage or a customer through the VR

glasses and have superimposed information of the records with other archived information. Subsequently, access to various levels of threats or alerts enhances situational awareness (Safi et al., 2019)

Besides training, VR AR and ER have various other applications providing more evidence to commit in this direction, such as the flight safety department; VR can simulate incidents and accidents through immersive experiences. It helps analyze an occurrence not merely as statistical data but as immersive information where the investigators feel and perceive their entire body into what the person in the situation would have perceived. Subsequently, it enables gathering information with much human factor detail.

The business leaders in the airline industry could benefit immensely from the ER interface; the birth of holographic microsimulation can bring to life a three-dimensional bird's eye view of the entire functioning of an airline in a real-time connected view (Brown, Lori, FRAeS, MSc, HFAvn, ). The decision maker with a systems view of the airlines could pan in and out the areas of alert levels requiring attention, which could be remotely done through any location, enabling faster, more appropriate decisions.



## What Else Do We See in The Future With VR, AR, And ER?

As I mentioned earlier, VR, AR, or ER could adapt to the various pillars of the airline industry. However, we could go a step further by bringing them together in a live interconnected training environment, just like having a parallel live virtual world is synonymous with the real world. The Internet has changed how we view ourselves and our interaction with others, how we play networked online games, view office meetings and even attend university lectures. The parallel universe, such as the metaverse, appears to be making its strong foundation in how people would be comfortable having this similar living co-exist with the real world. So, what does this mean? Imagine a setup where all the department's training is through VR, AR, and ER, and they meet in a virtual world. Here, pilots training in a VR simulator interacting with virtual cabin crew members and engineers who are also under training; similarly, the ATC or the other aircraft in the virtual worlds could be training sessions from various airlines in different parts of the world. Well, this could extend to customer service agents who could interact with virtual passengers and, as they work along, interact with virtual gate agents and the security department in their training realm.

To add further value, the training department could be an active player in these virtual worlds by constantly revisiting them in monitoring the progress and comparing its goals in alignment with the airline management's requirements.

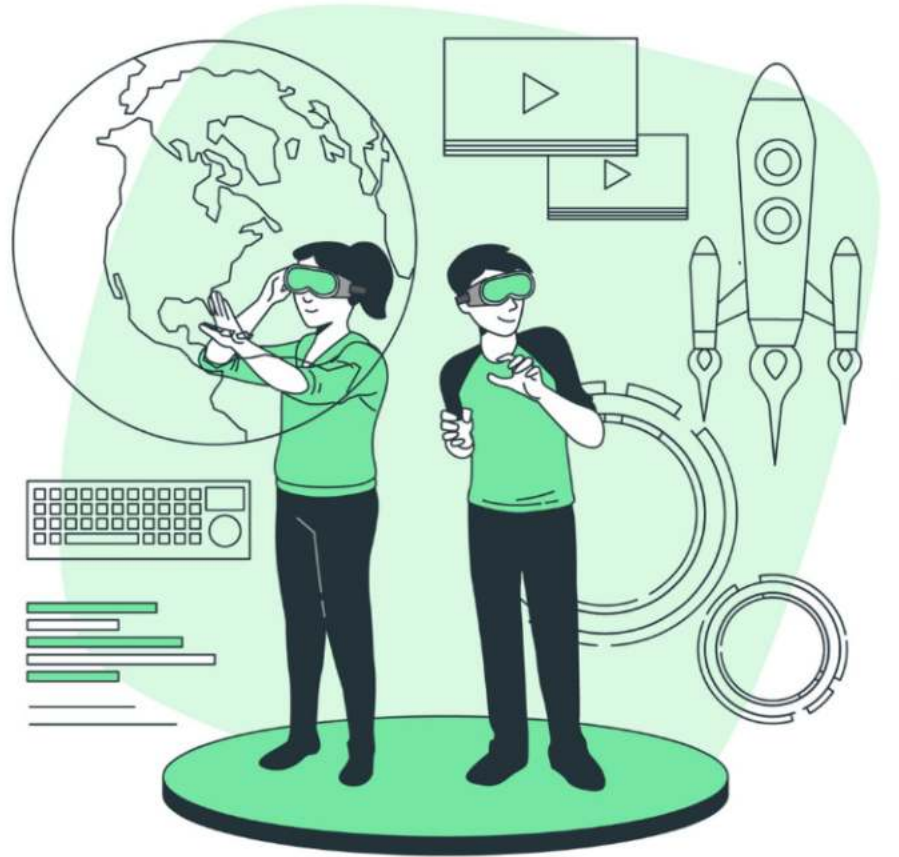
## How Do We Achieve This Change?

We must change how we think about learning. First, we must create awareness by sharing highly credible research-backed data and introducing these technologies into low- order training. Further, move up and across various departments. Statistically, the future projected growth rate in the aviation sector is massive (Augmented Reality and Virtual Reality in Aviation market set to grow to \$4.6 Billion by 2030: Visiongain Research Inc.2021), which means we must train at an efficient and faster pace. This change would require committed, bolder and synergic investments to affect a mammoth shift in the aviation industry. In addition, Researchers, manufacturers, business leaders, regulators, and governments must come together to develop a shared sense of goals. Consequently, such investments and collaboration could support developing the technology and training plan for existing and future workforce. We must even discover techniques to adapt existing equipment to futuristic models.



# Conclusion

The futuristic vision for learning and training in the airline industry is to move from singular or multiple sensory learning processes to immersing the entire body into a learning experience. Moreover, VR AR ER is the window through which we can explore learning from a newer perspective. Further, it would change what we have learned, yet who knows? Imagination is only to its limits of thinking; maybe we would discover and unlock what we cannot see in today's perspective.



## About the Author

Vijay Macmilton Devadas is a line training captain and an Airbus procedural trainer with an airline in India. He also works with the CRM team as a pilot and cabin crew facilitator. He has formerly worked with various airlines, including Indian Airlines, Air India, and Emirates flying A320, A380, and B787. In his educational background, he has a bachelor's in Mechanical engineering and Post Graduate Diploma in Business Administration, and currently a student with Embry Riddle Aeronautical University in the Master of Science – Human Factors.

His motivation is to understand "why we think the way we think" and apply them to the commercial aviation environment of human psychology and bring awareness to the industry and public.

In his personal life, he mostly enjoys reading various disciplines of science, philosophy, and psychology. His hobbies include motorcycle riding and bodybuilding. Vijay is a coffee lover and enjoys having different coffee as a beverage, that helps him think with insight and penning down his thoughts.



# GIFT City

Aircraft Leasing and Financing Revolution in India



**Ajay Kumar**  
Aviation Lawyer | Aircraft Lease Expert  
KLA Legal



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India is currently the third largest aviation market and also one of the fastest growing in aviation sector behind U.S.A. and China. Indian commercial airlines have a fleet of more than 710 aircraft and more than 80 percent of them are on lease with most of them leased from Dublin or Singapore. In order to keep pace with this development in the aviation industry and to fulfil the self-reliant India motive, the Ministry of Civil Aviation, Government of India in 2018 constituted a Working Group on Development of Avenues for Aircraft Financing and Leasing Activities comprising of number of stakeholders, regulatory bodies, academicians, law firms and various financial institutions.

In December 2019, IFSC Authority Act, 2019 was passed in the Indian Parliament to establish an IFSC Authority in GIFT City to achieve the objectives in terms of making India an aircraft leasing and financing hub. IFSC Authority from time to time has issued various regulations and guidelines to achieve the objectives. In February 2021, certain tax incentives were announced by the Ministry of Finance in order to promote local aircraft leasing and financing. Ministry of Civil Aviation held certain conferences, webinars to promote the local aircraft leasing and financing activities.

The Ministry of Finance by a notification dated October 16, 2020 notified aircraft lease, including operating leases, financial leases, and hybrid of operating and financial leases of aircraft, helicopters or engines or any other parts as 'financial product' under the IFSC Act. The inclusion of aircraft leases as financial products created an opportunity for establishment of a viable aircraft leasing market in India, especially in GIFT City. For setting up of units at IFSC, GIFT City, for aircraft leasing, IFSC Authority issued operational guidelines titled as 'Framework for Aircraft Operating Lease'. At present, there are 11 leasing companies which have already established their offices in the GIFT-City. Vman Aviation became the first lessor which concluded a helicopter lease transaction from the IFSC GIFT-City.

Before we did further, let's try to understand what are multiple ways of aircraft financing.

## Business Highlights: GIFT IFSC

### \$11.8 Bn

**Stock Exchanges** Avg. daily turnover\* in March 2022 compared to \$ 3.4 Bn in Sept. 2020

### \$6.3 Bn

Total amount committed by **Alternative Investment Funds (AIFs)** till April 2022

### \$ 30.7 Bn

**Total Banking Asset** Size in March 2022 compared to \$ 14 Bn in Sept. 2020

### \$176 Bn

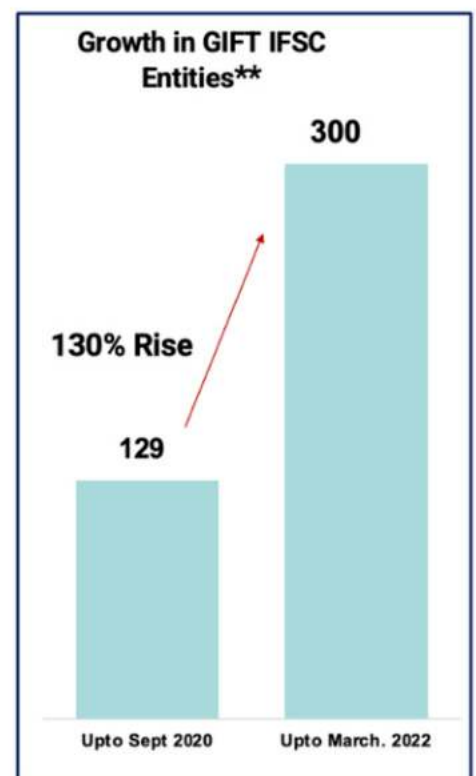
**Cumulative Banking transactions** till March 2022 compared to \$ 45 Bn in Sept. 2020

### \$229 Bn

**Cumulative Derivative transactions** by Banks till March 2022 compared to \$ 22 Bn in Sept. 2020

### 4500+

**Employment in GIFT SEZ** in March 2022 compared to 2500 + employment in Sept. 2020



\*Notional Turnover Value \*\*Including entities who have either applied to IFSCA or obtained SEZ IFSC approval

## What is Aircraft Leasing?

Aircraft leasing is a contractual arrangement whereby the Lessor (Leasing Company) conveys to the Lessee (Airlines) in return for continued periodical payments, the right to use an asset (aircraft or aircraft engines). This arrangement allows the Lessor to continue to hold the property in the aircraft while placing complete operational control and responsibility of holding the asset along with the obligation to meet insurance, legal, regulatory and maintenance compliances with the Lessee (operator).

There are different types of leases depending on the accounting standards, commercial and tax laws of different countries. The two main categories of the leases are: Finance lease and Operating lease.

A finance lease substantially transfers all risks and rewards incidental to ownership of an asset, and while it does provide an option to purchase, it may not always result in a transfer of title to the Lessee at the end of the lease term.

A lease is classified as an operating lease if it does not substantially transfer all the risks and rewards incidental to ownership. An operating lease can either be a dry lease or a wet lease. Most leases under which the scheduled passenger aircraft are operated in the country, are dry leases, whereby the Lessor, provides the aircraft to the Lessee for a fixed period of time, and the Lessee is required to operate the aircraft in accordance with the AOP/AOC and also to maintain and remain current with insurance with respect to the aircraft. A wet lease is a type of operating lease, whereby the Lessor provides an aircraft with the entire crew to the Lessee for a specified period or an agreed number of flight hours.

## Pros and Cons of Aircraft Leasing

### Pros

#### No capital investment

Airlines need not to put anything up front, they can just start making lease rental payments. They have fixed monthly payments. They know their budget for the term of the lease agreement or the ownership period of the airplane.

#### No residual value risks

The residual value risk is born by the Lessor. Airline has some degree of flexibility. This is because airline can write into the lease deal financial lease or operating lease. This can be favorable to airline if the market does better than what the leasing company anticipated.

### Cons

#### Tax benefits are assumed by the Lessor

In operating lease, which is the most popular mode of leasing in India, Lessors enjoy the tax benefit and claim the depreciation benefit. The tax treatment in case of finance leases is of course different.

#### Volatile market

In certain cases, the Lessees may find it difficult to induct new aircraft in their fleet as they have to redeliver the previously leased equipment within a fixed timeframe.

#### Continued obligation to pay

Most leases have hell or high-water clause and the Lessees are required to pay the lease rentals and other costs irrespective of the fact whether or not the aircraft is grounded. This becomes more relevant in a pandemic situation which the world just witnessed.



## How is Aircraft Financing Different?

It is a type of asset finance for the purchase and operation of the aircraft. Usually, financing is structured as secured lending, or finance leasing. In an operating lease transaction also an aircraft can be financed where the Owner/Lessor will borrow to purchase the aircraft and lease the same to a Lessee on an operating lease basis. Financing can involve direct loan, manufacturer finance, export credit agency assistance or other tax and accounting-based structures. The structures are often chosen depending on how the aircraft will be used and the financial position of the owner.

Secured lending could be by way of a loan extended by a bank to the airline or a syndicate of several banks which share the risk. The banks will take security over the aircraft in the form of a mortgage. Banks will normally lend up to 85% of the purchase price of the aircraft of the equipment. Once the loan has been repaid, the mortgage and other securities are released.

## Why do Airlines Lease Instead of Buying?

The cost of purchasing an aircraft is substantially high and can curtail the fleet expansion plan of the airlines, particularly the startups. It is economical for airlines, especially the low-cost carriers to lease aircraft as the cost gets spread across the lease period making it possible for the operator or carrier to fly at competitive rates. Leasing is an efficient means to fulfill short-term capacity requirements without burdening the balance sheet of the airlines.

Another benefit is that airlines can keep their fleet young and lease newer aircraft more frequently. Since leases are for a fixed term, airlines are free to return them to the Lessor at the stated period and lease a newer plane instead.

## Pros and Cons of Aircraft Financing

### Pros

#### Save more money

When financing through a bank, airline will save the money from a net present value cost. Aircraft financing is the less expensive option over the life cycle of the equipment.

#### Tax advantages

Airline can accelerate the depreciation of the aircraft which will reap considerable tax benefits.

#### Flexibility to resell

There are no restrictions on how you use the aircraft and airline be able to sell the aircraft more easily, without lease penalties.

### Cons

Airlines capital is tied up. Let's say an airline pay 10% for a US\$10 m aircraft. That means they are going to put US\$1 m down, and they cannot use that for other business needs the way they could if they were leasing the airplane. Airline assumes the residual value risk as well. Airlines profit and loss might be impacted negatively as they will be spending bulk amount in the year of the transaction.



## Aircraft Financing Legislation in India

There is no specific legislation which governs aviation finance transaction in India. Various statutes may apply to aircraft finance and leasing transactions, such as the Indian Contract Act 1872, the Aircraft Act 1934 and the Aircraft Rules 1937.

Since most aviation finance transactions involve foreign exchange, the Foreign Exchange Management Act, 1999 and the rules and regulations thereunder, along with the Reserve Bank of India ("RBI") rules, regulations, circulars and notifications also become applicable. Indian banks usually stay away from aircraft financing and the borrower therefore has to rely on the foreign banks/ financial institutions under the External Commercial Borrowing ("ECB") route.

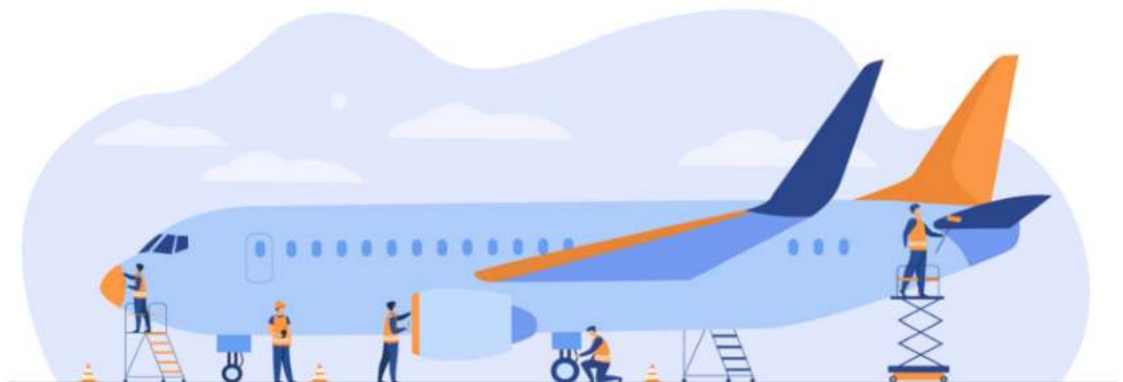
As there is no specific legislation which allows Indian financial institutions to undertake aircraft financing activities, a working group was constituted to prepare a detailed report recommending steps as to how aircraft leasing and financing activities can be undertaken from International Financial Services Centre ("IFSC"), GIFT-City, Gandhinagar, Gujarat. The working group submitted a report known as 'Project Rupee Raftaar' in January 2019 and the author of this article served as the panel member of this project. The report submitted various recommendations including, amendments to the Banking Regulation Act, 1945, International Banking Unit circular, RBI Circulars, SEBI regulations on Alternative Investment Funds (AIF), NBFC regulations et al so that Banks, AIFs, NBFC, insurance companies, pensions funds, Employees Provident Fund Organization etc. can undertake aircraft financing activities.

## Project Rupee Raftaar

Indian civil aviation market is mostly dependent on the cross-border leasing mainly through Ireland. Financing is also undertaken under ECB route as interest rates for local financing seems quite high. However, recently, India's first IFSC has been made operational and Indian Govt. is trying to develop aircraft leasing and financing hub through IFSC, GIFT City which will compete with the global IFSC through which leasing and financing activities are taking place.

The Working Group in its report of 'Project Rupee Raftaar' has analyzed that aircraft leasing and financing can become backbone of the aviation sector and the benefits are as under:

"The immediate and direct benefits to India would include developing this business in India and retain foreign currency in the country and at the same time develop options for rupee funding through various structures, besides generating additional revenues through collection of taxes from ancillary industries and eventually through aircraft financing. Significantly, a new line of business would be developed which by its nature would create additional high-end job opportunities in India. It would mean substantial additional business for Indian banks, insurers, NBFCs and other ancillary business (law firms, accounting firms etc.) through an estimated 100 aircraft to be acquired each year over the next decade entailing financing requirement of about USD 5 billion annually."



Benchmark	Enablers at IFSC	Comparison with Ireland
Business Income	Tax holiday for any consecutive 10 years out of first 15 years of operations  Tax holiday at each operating company level	Corporate tax rate in Ireland: 12.5% (Group Consolidation allowed)  No need for group consolidation at IFSC
Capital Gains Tax	Capital Gains arising from a transfer of aircraft or aircraft engine is eligible for a 100% deduction, if the company establishes before 2024	Capital Gain on Disposal of aircraft is taxable as business income (upto original cost; excess gains taxable as capital gains)
MAT	NIL Minimum Alternate Tax (MAT) where IFSC company opts for lower tax regime of 22%	IFSC based lessor at par with Irish lessor
Withholding tax on lease rentals paid by Indian lessee to IFSC based lessor	May 16, 2022: Indian lessee don't have to pay WHT on lease rentals paid to the IFSC based lessor	IFSC based lessor are now at par with Irish lessor
Withholding tax on lease rental or royalty paid by IFSC unit to non-residents	NIL WHT on Aircraft Lease payments paid to non-residents by units in the IFSC (commencing before 31 March 2024)  No WHT on interest paid to non-residents	IFSC based lessor can raise debt from global investors at a competitive rate  IFSC lessors at par with Irish lessors
Stamp Duty	Aircraft Leasing entities granted waiver from stamp duty on all activities related to setting up of units in the IFSC and acquisition of any movable property (including aircraft) or immovable property for a period of 10 years	Considering large value transactions, stamp duty waiver will significantly benefit lessors  IFSC lessor at par with Irish lessors
Indirect Taxes	Leasing of aircraft by a unit in IFSC to an Indian operator is subject to IGST on forward charge mechanism on the lease rental. For Irish leases, airlines pay IGST on RCM	IFSC based lessor will be better positioned to manage asset quality and asset utilization
Finance lease & Operating lease	IFSC Unit can execute both operating lease as well as financial lease	IFSC unit at par with Ireland
INR Lease	IFSC based lessor can structure INR denominated lease for Indian lessee such that same is settled in freely convertible foreign currency at IFSC Unit	IFSC based lessor can structure customized lease for Indian lessee
GST on lease rental	5% for IFSC based lessor	5% for Ireland based lessor



## Ukraine–Russia War and Market Outlook

The struggle to bounce back from the COVID disruption has been compounded by the Russia–Ukraine war which has resulted in various sanctions and air space restrictions. Since the invasion of Ukraine, Canada, EU, UK, US and various other countries have banned Russian aircraft from their airspace. Russia has retaliated by banning around 36 countries from flying through its skies.

The mutual sanctions and air restrictions have shaken up the aviation sector, leading to the cancellation or rerouting of flights, increased air ticket prices and higher fuel costs. The Russian invasion has also affected oil prices. This will have a severe impact on the aviation sector, with fuel prices being hugely important for airline companies when it comes to operating costs.

## Covid – 19

Aircraft leasing companies are the backbone of modern commercial aviation. Lessors now account for an estimated 60 percent of new passenger jet deliveries. Lessors have demonstrated flexibility throughout the pandemic. A number of Lessors agreed deferred aircraft lease rentals with their airline customers. Repossession is the last resort. Reduced demand during the pandemic (particularly for wide-body aircraft) has encouraged Lessors to work with troubled airlines rather than repossessing their equipment.

The pandemic created an environment where enforcing one's security (either as a Lessor or a banker) was a zero-sum game. Lessors largely chose to stay with the Lessees as there was no new customer available to them due to large scale grounding of the aircraft worldwide.

Also, despite the alarming market conditions, the aviation sector has shown remarkable resilience and in India the domestic passenger traffic has now returned to the pre-COVID level.

The pandemic however has shown the vulnerability of the sector which always operates on a thin margin. Also, in this globally connected world, pandemic situation in one part of the world may have the potential to cause disruption in the other parts as well. There are also question marks over the usage of big size aircraft as international traffic continues to be unsteady.



## Conclusion

Leasing an aircraft comes with its own set of advantages and disadvantages. Since there is no capital investment in buying an aircraft, the freed-up capital helps in ensuring a better cash flow for the airline. Leasing also provides an option to the airlines to increase or decrease its capacity on a short notice, and to offer a price advantage to the customers via the available capital. Being a highly attractive financing avenue for the banks, airlines looking to lease aircraft always have cost effective financing offers at their disposal.

The aircraft lessor business model has proved to be quite resilient over the last many decades with several years of placement visibility and swift repossession from a financially-strained airline and redeployment elsewhere in the world. It is a macro driven sector designed to deal with pockets of volatility. Fleets are large, and they are diversified by aircraft type, customer, geography, and lease term, which insulates cash flows during a downturn as long as liabilities are well-managed. Even during the global financial crisis, aircraft lessors' fleet utilization was reasonably high.

The Indian government has taken substantial steps in the right direction to bring the Indian leasing sector at par with its global competitors. The regulatory overhaul of the existing regime will be helpful in filling confidence in the stakeholders and shall make India a highly attractive destination for leasing businesses. However, the government must bring in more clarity with respect to issues such as the repossessing mechanism of the aircraft in case the Lessee defaults, governing law of domestic leases, etc. As and when these issues are resolved, the GIFT City shall prove to be a highly sought-after business center.

## About the Author

Ajay Kumar is the Managing Partner of the Law Firm, KLA Legal. He advises on leasing, financing and structuring of various cross border aviation matters. His clients include major manufacturers, lessors and leading banks across the globe.

Over the years, he has worked closely with the Ministry of Civil Aviation to bring about amendments to the Aircraft Rules in line with India's commitments under the Cape Town Convention. He is also majorly involved with the ambitious GIFT City project of the Government of India.

Ajay is also the Conference Quality Officer of the Aviation Law Committee at the International Bar Association and a member of the Legal Advisory Panel of the Aviation Working Group



# DRUG ABUSE IN AVIATION

DGCA Policy and Prevention



**Dr. Sanjay Bhargava MD**  
Consultant Aerospace  
Medicine Specialist



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Humans have made use of psychoactive medications since the Neolithic period. Various ailments may be associated with their use, whether taken for recreational purposes or medically defined. Their use causes behavioural, cognitive, and physiological changes. They can be used harmfully, causing physical and mental damage, major health-related issues, impaired judgement, adverse effects on performance, dependence syndrome, withdrawal states and schizophrenia-resembling symptoms. Acute intoxication may be influenced by alcohol, opioids, cannabinoids, anodynes and soporifics, cocaine, stimulants (including caffeine), hallucinogens, tobacco, and certain solvents.

The worldwide spread of use of psychoactive substances, their general availability and the ever-increasing number of addicted users is a serious concern to aviation safety. A total of four pilots failed random drug test, since DGCA mandated drug testing aviation personnel in January this year. A Delhi based Air Traffic Controller was also found positive making him the first such case under DGCA's new drug testing policy.

## Which Drugs fall under Drug testing Requirements?

- Amphetamine
- Methamphptamine
- Cannabis
- Cocaine
- Opioids
- Barbiturates
- Benzodizipine
- MDMA or Ecstasy



## Substance Abuse in India

Ministry of Social Justice and Empowerment, Government of India has carried out a study of this disorder amongst general Indian population and published a report in Feb 2019. The report reveals the following facts:

- After Alcohol, Cannabis and Opioids are the next commonly used psychoactive substances in India. About 2.8% of the population had used any cannabis product within the previous year.
- About 0.25% (one in eleven Cannabis users) suffer from Cannabis dependence.
- About 2.1% of the country's population use opioids which includes Opium and its various variants, Heroin (or its impure form smack or brown sugar) and a variety of pharmaceutical opioids.
- Nationally, the most common opioid used is Heroin (1.14%) followed by pharmaceutical opioids (0.96%) and Opium (0.52%). About 0.70% of Indians are estimated to need help for their opioid use problems.

This statistic shows that the Indian aviator population is likely to be affected by this dependence too. This has been authenticated with the recent grounding of 4 crew who tested positive for substances by DGCA.

## Regulations

While India has some of the strictest rules on alcohol abuse, the mechanism to fight drug abuse was missing. Alarmed over the multiplying use of psychoactive substances and the impact it could have on the aviation industry, DGCA has introduced a new policy.

The new policy mandates all scheduled commercial aircraft operators and Air navigation service providers to carry out random drug testing for flight crew members and Air traffic controllers employed by them independently. This programme shall ensure that at least 5% of the employees of an organization are covered in a year. In addition, the Organizations shall ensure that Flight Crew Member, Air Traffic Control Officers, Aircraft Maintenance Engineers/ certifying staff, trainee pilots and Instructors/examiners in their employment are tested for detection of drug abuse on the following occasions:

- Before employing a person
- Before admitting a trainee pilot in a FTO
- Follow-Up testing of confirmed cases.
- At first available opportunity, in case an aviation personnel has refused drug test to a foreign regulator during flight operation to that country/duty in that country.

Organizations should also encourage their employees for self-declaration regarding use of psychoactive substance. Such employees shall be subjected to rehabilitation process by the organization before return to the active duty. Number of such cases shall be reported to DGCA on six months basis.



## How are the Tests Conducted?

The tests can be carried out post flight/post shift or anytime during the duty period and only with consent of the person. DGCA prohibits testing an employee when he/she is on leave or on a rest period. Urine samples are collected each in two bottles labelled specimen A and B. In case sample A is positive, then sample B is forwarded to the laboratory for Confirmatory Test.

If a person refuses to undergo the examination, such a person shall be removed from the safety sensitive duties until such a person clears drug testing profile.

DGCA mandates all the positive cases to be reported by the organization within 24 hours.

In case the screening test is positive, the employee shall be immediately removed from the safety sensitive duty till a confirmatory report is received.

In case of positive confirmatory test for the first time, the employee shall be referred by the organization to a de-addiction center. Employee can return to active duties after again having undergone the tests for the consumption of the psychoactive substance with a negative test report. In addition clearance by treating Psychiatrist and the certification by the Medical In Charge of the concerned organization will also be required.

In case a person who has returned to safety sensitive duties after having been tested positive is again found positive in the confirmatory test i.e. the second occasion, license of such person shall be suspended for period of three years

In case a person is positive for third occasion, the license will be cancelled permanently.

## What Happens if Tests are Positive?



# Prevention

While there's no one guaranteed way to prevent someone from abusing psychoactive substances, there are efforts that all of us can make to avoid substance abuse. Some of these ways are as follows:

## Understand

Drug abuse develops, Using additive medicines for fun or abusing traditional drug need to be entirely avoided.

## Learn to start saying NO

Avoid temptation and peer pressure; Avoids friends and family who force you to use similar substances.

## Examine the Threat Factors

The more you're alive of your natural, environmental, and physical threat factors, the more likely you're to overcome them.

## Ask for Help

Seeking help for mental sickness, mental illness and substance abuse frequently go hand in hand. However, for depression and post-traumatic stress disorder, you should seek professional help from a certified therapist or counselor, If you're dealing with a mental illness such as anxiety. A professional will give you healthy managing skills to allay your symptoms without turning to drugs and alcohol.

## Well balanced life

People frequently turn to drugs and alcohol when something in their life is missing or not working. Exercising stress management skills can help you overcome these life stressors and help you live a balanced and healthy life. Develop objectives and dreams for your future. These will facilitate your focus on what you want and help you realize that drugs and alcohol will get in the way and hamper you from achieving your objectives.



# About the Author

Sanjay Bhargava is a consultant Aerospace medicine specialist and renowned Class 1 medical examiner impaneled with DGCA. He is an alumnus of Armed Forces Medical College Pune. After completing his post-graduate in Aerospace medicine at the Institute of Aerospace medicine Bangalore, Dr. Sanjay worked as a specialist in Aerospace medicine with the Indian Air Force. He is a DGCA Class 1 examiner with extensive experience at AFCME, Delhi, AFS Tambaram, and served as President of MEC (EAST), Jorhat. He has been responsible for finalizing various policies at DGCA. He was the lead doctor for starting civil medical centers for class 1 medicals for DGCA. Over a while, he has assisted aspiring pilots and solved their DGCA-related medical issues through his website <http://dgcamedical.in>. He has a large following on social media and is respected for his advice given to pilots for the last 3 decades. Dr. Sanjay can be reached at:

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# Two River Sutra

Operation Ganga



**Capt. Vikas Nautiyal**  
Deputy Chief Pilot  
Air India Express



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This is a story that connects two rivers, not via geography, but by pure circumstance. It is neither an official account of 'Operation Ganga', nor an attempt to comfort your unsung-self about glories not bestowed and commemoration medals not pinned on your shoulders. Then, you may be asking; What is it about?... Well, let's start at the beginning (which is generally a good place to start anything).

This is the story of a Hangry pilot flying to Hungary to rescue the Hapless and the Helpless and how Hopeless the story came out on social media. What should make news in this world never does, and, the opposite is also equally true. In reality, 'Operation Ganga' was just a regular mission to get back Indian students who had found themselves suddenly trapped in a country where they did not belong; in a war in which they had no sides to take. What they had thought was their gateway to a better life, turned into a trap of their own making. Medical students stuck in the midst of a Geo-political war; it was an out-of-syllabus situation for them.

The fact that you were tasked to fly one of the flights was a matter of quiet personal pride. After all, you were an expert at repatriation missions. Having actively participated in planning and executing a similar (unpaid and unrecognized) one for the last two years that rendered you penniless and nearly took your life, 'Operation Vande Bharat' had been more dangerous than even fighting the Kargil War. It had broken you on all fronts; empirically, ethically, morally, financially, professionally, socially, physically, medically, historically; basically, on all fronts. You only wished and hoped that 'Operation Ganga' would not get you similar rewards, like a 40% salary cut, a life-threatening infection, an empty bank account, fear, anger, hunger.



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So, one late Sunday night, the decree was received that the political skirmish between Russia and Ukraine had fast-tracked into a full-blown war and Indian students had to be rescued immediately (many against their wishes, you would only find out later). Consequently, repatriation flights had to be planned by first-light to Bucharest, and Budapest, and Warsaw, and Kiev and Debrecen and some other unknown and unpronounceable places. That was the simple plan. It made you reach out immediately for Google Maps. European Geography had never been one of your strong subjects in school. Soon, your Roster (Roaster!) proclaimed that you were to operate an evacuation flight from Budapest to Mumbai. Your association with Budapest had a sliver of memory attached to it from the days of yore. This was not the first time you would be in Budapest. Many decades back, a vacation brought you here, when you were still carefree and young and smiling. Now, you would return for a mission, harassed and old and frowning. You were not sure whether as the years rolled on, life had made you any bolder or wiser. One look in the mirror told you that it had definitely made you balder, not bolder and also wider, not wiser.

Budapest was a twin city – with the 'Buda' Hills in the West and the 'Pest' Plains in the East; like Yin and Yang; like Yak and Yeti back in Doon; like Thompson and Thompson in the comics; like Alpha and Omega; like This and That; in short, like Beginning and End. It was also a city divided geographically, bifurcated by the winding Danube. On your first visit, Budapest had seemed magical to your young impressionable mind. It was not only the capital of Hungary, it was a city made of dreams: the East's exuberant vision of the West, the West's uneasy hallucination of the East. It was a dreamed-up city; a city almost completely faked; a city invented out of other cities, out of Paris by way of Vienna – the imitation of an imitation. You remembered leisurely strolling the cobbled streets, along the magnificent chain bridge over the Danube that connected the two sides, breathing in the senses and smells of Geography and History, walking past the Pubs and Museums and road-side musicians and hookers and painters. It was a Buda-full city, split by a brooding river that had been witness to much bloodshed and violence and carnage and sacrifice and wars and revolutions and uprisings through the ages; and was still called the Blue Danube. But on this present visit, there was no time for a leisure stroll.





This time it wasn't about the Danube, your revisit was the calling of the Ganga, that had been witness to a civilization that preceded time; mightier and most revered river of all history. You were the thread that would connect the two. Also, this time, you were on a mission, in uniform; not on foot but in an aircraft; not as a tourist on a leisure holiday, but on a tight mission that would push the aircraft to the limits of its endurance and you to the limits of fatigue. There would be no Bars to visit this time, no time to inhale the years gone by since your last visit, but replaced by the heady smell of Aviation Turbine Fuel and burning rubber on a freezing tarmac.

The aim of the mission was to just Keep-it-Simple-Stupid. Normally, big words like Patriotism and Nationalism are the last things on your mind in such times. Same-Tame Kargil Déjà vu! The mission did not even take you into Ukraine, and the adrenaline junkie hiding inside you thoroughly missed putting the Boeing-737 through some 'Beyond-the-FCTM (Flight Crew Technique Manual) Anti-Aircraft-Missile-Maneuvers'. No such luck. It was just routine, like any other day, except for the route that took you across strange lands an intrepid traveler would love to explore. From India, across the Arabian Sea, into the Persian Gulf, to Kuwait (Refueling Halt) and then through Iran, into Armenia and Turkey, along the Southern coast of the Black

Sea, and then to Bulgaria, Romania and finally into Hungary. What would have taken about 12 months a few hundred years back on a barge to get to Kuwait and then on horseback to Budapest, took you about 12 hours of flying at three-fourths of the Speed of Sound. On D-Day; The flight was delayed; The hotel pick-up time had been advanced by the local Station Manager without any information to you or the Hotel Laundry; Obviously, the laundry was late; There was no allowance to pay for the Food Bill or tip the Hotel Staff; They gave you their dirty looks under their fake smiles; The cab driver was angry for making him wait; The Cabin Crew were angrier as their make-up was running in the hot sun. At the airport, the man at the counter spoke a language you could not understand; On push back, the Commercial asked whether the delay should not be put on him, or Putin. The air-conditioning in the Cockpit wasn't working; There were only 20 other MELs (Minimum Equipment List), their ugly stickers jostling for space on the MIP (Main Instrument Panel); The Crew Catering meals had been uplifted from an Indian station 72 hours back and frozen in Dry Ice; The Roast Eggs had turned into Grilled Chickens in the heat. (Did you again hear 'Roasted Rooster' somewhere?) As you had imagined, it was just a routine day in your life and apart from the Route, Geography and the Freezing Rain in Budapest, a totally unremarkable flight.



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18 hours later, at the end of a very long cold day, back in the Hotel, while you were basking in delusional self-grandeur of mission accomplishment, you mused that it would have been an extraordinary voyage for the students who could make it safely across the war-torn Ukrainian border and then to the safety of their country. From the banks of the freezing Danube to the banks of the warm Ganga in a matter of hours, from Budapest, the city made of Dreams, to Mumbai, the Maximum City. It would not be something they would forget in a hurry, and how you were a small part of their story, you wondered philosophically. And how incorrect you were!

**As a wise man once said, 'In a mad world, only the mad are sane'**

The war continued and lives were ravaged and uncertainty loomed all over the world, destroying plans and dreams and futures, but thankfully, the Indian students were back home, to possibly more uncertain plans and dreams and futures. As soon as the aircraft doors opened in Mumbai, while the cabin crew stood with folded hands and their best smiles despite their weary legs. The students ran out, with no acknowledgement, not even a return smile or a Thank You. That was that.



# Epilogue

Operation Ganga was a diplomatic and humanitarian success. Four union ministers were flown to Ukraine's neighboring countries to negotiate expedited evacuation. Indian Authorities established rescue camps on the borders of Poland, Romania, Hungary and Slovakia. Domestic Airlines along with Indian Air Force operated more than 90 flights to evacuate over 22,500 Indians between 1st Feb – 11th March. The entire cost of the operation was borne by Government of India.

Air India Express evacuated more than 1650 students in 9 evacuation flights over a 10-day period. The author was fortunate to operate one such pattern.

Capt. Vikas Nautiyal grew up in Dehradun and was commissioned in the Indian Air Force in 1991 in the fighter stream. He flew MiG-21 and MiG-29 before graduating as a Cat 'A' Qualified Flying Instructor and Directing Staff / Flight Commander at the prestigious Flying Instructors' School. He is a graduate of the National Defense Academy and has a Master's Degree in Aviation Management. He served as Chief Operations Officer at a frontline forward base and at Flight Safety and Inspection Directorate. On graduating in civil aviation, he is qualified on the Boeing-737, empaneled as a Subject Matter Expert with the Aircraft Accident Investigation Board of the Ministry of Civil Aviation, an IOSA certified Quality Auditor, and currently serving as a management pilot, appointed as Dy Chief Pilot in his airline.

## About the Author



# Excellence in Aviation Safety

Through Safety Education



**Prashant Prabhakar**  
Subject Expert  
100 Knots



Air transportation has historically been the safest mode of transportation among the five modes i.e., highway, railroad, pipeline, marine, and air. Thanks to this industry's ability to learn from aircraft accidents. But, over the years the industry has progressed from reactive safety (investigating accidents and eliminating repetition of same root causes) to proactive safety (deliberately seeking hazards and unsafe conditions that could lead to an accident). While there are stringent regulations governing several aspects like technology, certification, licensing, design, and manufacturing in the aviation industry, safety excellence cannot be achieved by regulations alone. Leveraging proactive safety programs and having personnel who can actively contribute to safety culture in the organization through their safe behaviour, safety awareness, and safety prioritization, holds the key for safety excellence and advancement.

How do we achieve that? Mr. Revanth Gattupalli who is a renowned expert in the field of Aviation Safety says people indoctrinated on topics like

system safety, occupational health & safety, hazard analysis techniques, safety management can provide the raw material to leverage and establish a strong safety culture in the organizations they work for. His statement comes from the fact that a research study he conducted among students in the College of Aviation at Embry Riddle Aeronautical University in Florida, USA, showed that students enrolled in safety majors reported statistically significant safety behaviour compared to students enrolled in non-safety majors.

The sample for the study comprised self-selected 149 students enrolled in safety or non-safety majors in the College of Aviation at Embry Riddle Aeronautical University in Florida, USA. An original survey, the Student Safety Behaviour Scale (SSBS) was developed by Mr. Revanth with qualitative and quantitative questions that examined the below factors in the participants to analyse the safety behaviour of participants. SSBS was based on a 5-point scale and only extreme poles were labelled.

SI No.	Factor	Operational Definition
1	Safety Awareness	Ability to identify hazards and risks.
2	Safety Priority	Beliefs about the importance of safety in his/her activities involving high risk.
3	Safety Activity	Perceptions of the individual's own safe behaviour.



The mean score on SSBS obtained by students enrolled in safety major was significantly higher than the mean score obtained by students on SSBS enrolled in non-safety major. A two independent samples t-test was significant. Hence it was determined that the students in safety majors had higher safety behaviour than students in non-safety majors supporting the study's expectation that safety education influences safety behaviour.

The research finding is significant because there is a humongous need for safety professionals in the aviation industry throughout the world. In India for example, Directorate General of Civil Aviation requires that aviation entities like, but not limited to, airlines, airports, aircraft manufacturers, aircraft maintenance organizations, and air traffic service providers have a Safety Management System to manage safety risks in their respective organizations. To have an efficient safety management system and build a strong safety culture, these organizations need safety professionals indoctrinated on safety topics discussed above because they bring in a wealth of knowledge to manage safety and can bring phenomenal change in safety performance of an organization with their extraordinary ability against the above factors measured during the research study.

The aviation industry all around the world is expanding rapidly in terms of commercial unmanned aerial operations, advanced air mobility around the corner and ready to start sharing the airspace with existing aircraft. Given the complexity this will bring in the future, there is a significant need for learned safety professionals whose technical safety expertise will help in safely integrating these upcoming operations with existing operations.

This study lays the foundation that more collegiate aviation programs should consider including safety centric coursework in the degree programs to help the industry by supplying learned safety professionals who can actively identify hazards and design mitigation methods, who prioritize safety in their activities and tasks, who understand the strong potential of even a trivial hazard to combine with other hazards and cause a catastrophe, and who shall always strive to go beyond the preliminary regulatory requirement and strive for safety excellence.

There is a commonly used industry saying, "safety starts with you". This research finding is an opportunity to recognize that it is time we educate aviation professionals in safety centred coursework before we can expect a strong safety behaviour from them in their activities within their respective organizations.

***"Safety starts with you"***



## About the Researcher

Revanth Gattupalli is one of the topmost experts in the field of Aviation Safety. His work experience managing safety programs in the airline industry spans across two different parts of the world and both in rotorcraft and fixed wing operations. He holds a master's degree in Aeronautical Science specializing in Aviation Safety from Embry Riddle Aeronautical University and a bachelor's degree in mechanical engineering. He was trained at National Transportation Safety Board (NTSB) training centre on On-scene aircraft accident investigation and airport disaster recovery.





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