

July 2023

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India's Aviation Ecosystem

Training

Ideal Training Environment to Maximize Training Delivery

Human Resources

China's Leap into the Commercial Aviation

Flight Operations

Sustainable Aviation Fuel & India's Sustainability Goal

Airlines

In conversation with Manoj Chacko, CEO, Fly91

Business

Regional Connectivity with 19 Seat Aircraft



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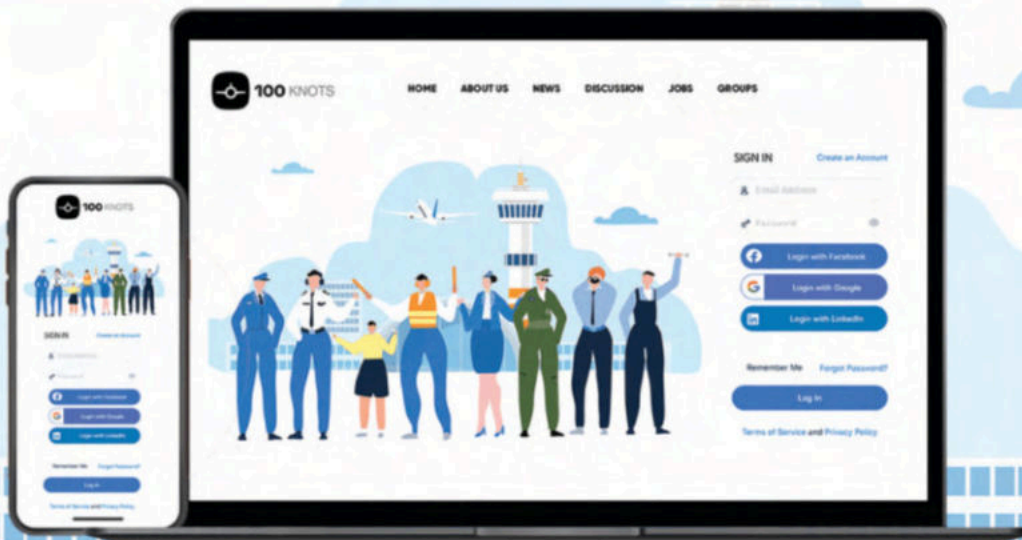
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EDITORIAL DESK



Radhika Bansal
Assistant Editor

Dear Colleagues,

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

June has been a spectacular month for aviation in India. India dominated the Paris Airshow 2023 as IndiGo and Air India finalized a huge order for 970 planes from Airbus and Boeing. In other news, De Havilland Canada and Flybig signed a Purchase Agreement to acquire two Twin Otter Series 400 aircraft and a Letter of Interest to acquire 10 new DHC-6 Twin Otter Classic 300-G™ aircraft. This buying spree by Indian airlines highlights the growing importance of India, the world's fastest-growing aviation market, serving the largest population, to plane makers.

On the training front, Boeing has announced a \$100 million investment in infrastructure and programs to train pilots in India, which will support India's need for 31,000 new pilots over the next 20 years. As the deliveries for these new airplanes begin, training and retaining skilled workforces will be a significant challenge for Indian operators. This is fairly evident as we see airlines like Akasa Air announce a substantial increase in pilots' salaries, offering up to 40 percent raises. This decision will most likely pressure other airlines in India to follow suit.

Like you, we remain optimistic about the coming days and hope to play a valued role in India's journey toward becoming a global aviation leader.

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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New Paradigm

USD 7.5 Million Assured Net Income in UDAN 5.0 on
Regional Connectivity with 19 Seat Aircraft



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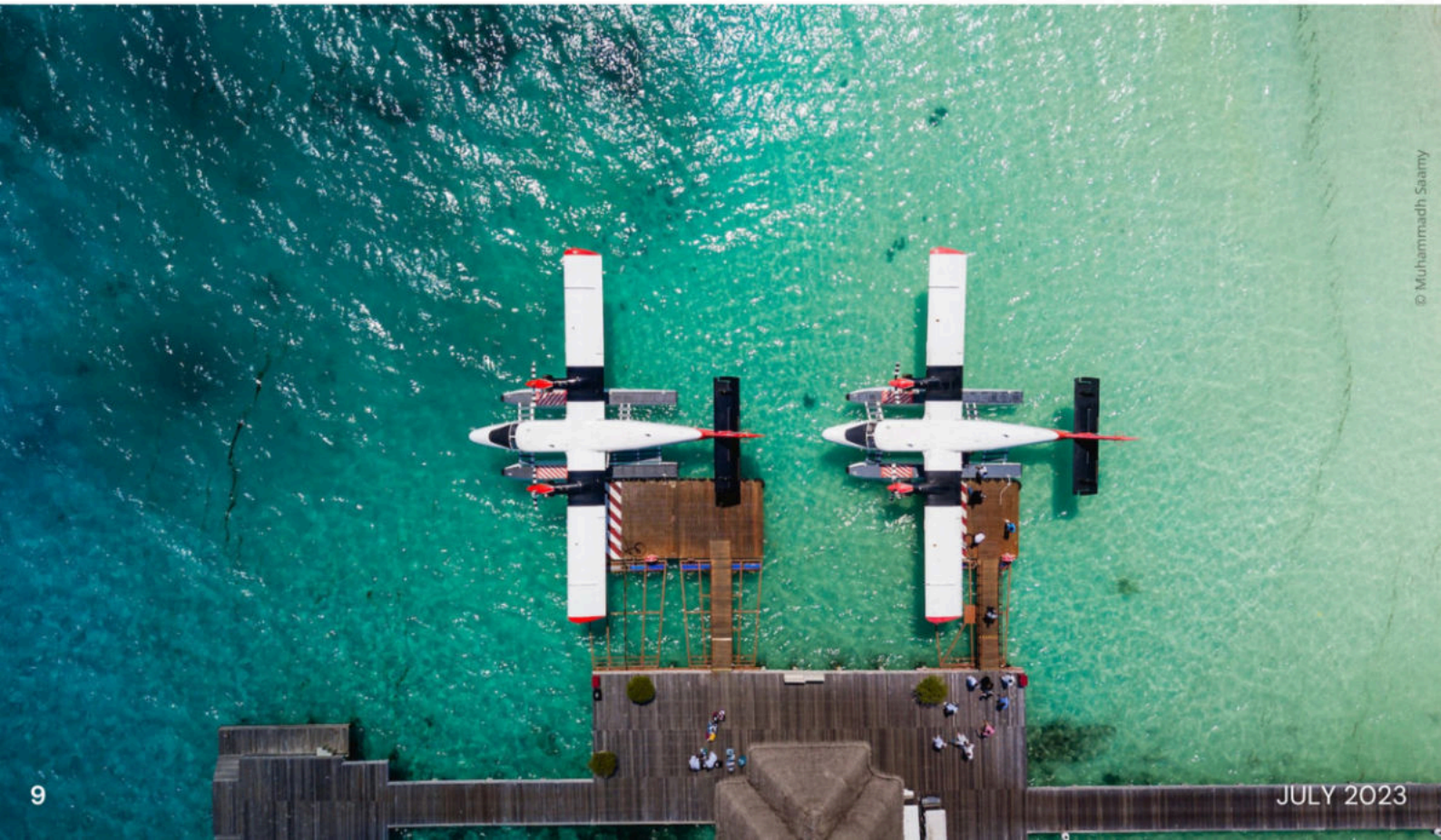
India 100 New Airports with 1000 Metre Runway and Suitable Aircraft

The Government from last 6 years has promoted Regional Connectivity through UDAN, there have been as many as 5 Version and some sub-versions of scheme. Each has been a development and fine tuning to market requirement. So, this is a live scheme unlike many other schemes that are brought in and then they just evaporate with time. With each successive update, it is increasingly becoming clear that Government machinery is now micro focussing on need to strengthen the connectivity into Tier 3 Cities that have smaller airstrips averaging about 1000 meters.

The results of the schemes are yet not evident. Most of the routes for tier 3 cities still lie un-utilised. There are many a reason for the same. In this article we have tried to identify the gaps, indicate possible solution and do a number simulation for one route with a 19 Seat. We have many collaborators to thank in this endeavour, one stands out eminently, Mr Yogesh Garg, Director, Sales -Asia Pacific at De Havilland Aircraft of Canada Limited.

The Paper explores:

- 1.Revenue – Cost Model for a 19–seat aircraft
- 2.Issue with Ecosystem on Pilots, AMEs, SIM, MRO, Parts availability
- 3.Issue with Financing for Aircrafts



Revenue Model

The revenue in UDAN is predominantly derived from two sources,

- 1.The government support with VGF and
- 2.Sale of seats to passengers,

In terms of numbers, it is hypothetically possible to derive the following revenue in a year:

- No of RCS seats available: 19
- RCS support in 300 Km Slab: 14000
- Subsidy Value per flight: 265,000 per hour (19 x 14000)
- Revenue potential from seat sale: 3000 per hour @ 15 seat is 45,000 (15 x 3000)

Total revenue per hour is INR 310,000

We have not considered any ancillary revenues for sake of caution; however, it is very fair to assume a 10% ancillary revenue on overall projections: This gives an extra buffer to Airline operators. In this evaluation we will ignore the ancillary revenue as that gives additional buffer to operator.

Cost Simulations for a 19 Seat Aircraft:

Assumptions

A best-case scenario will be to evaluate on 1500 hours yearly use which translates to about reasonable 5 hours per day flying time even after providing about 30 days for maintenance. The aircraft under consideration has unlimited life cycles. It is usual to see machines from this category operating for more then 20 years. So with this as background:

(1) Variable Cost: USD 700 per hour

Fuel Cost: The Aircraft under study (twin Otter) consumes about 250 Kgs or about 320 Litre Jet fuel every hour and average about 150 Nautical miles or about 280 Kilometres. The average Fuel price at 0% VAT in India (Applicable for RCS) is about INR 85 per Litre or say 1 USD/Litre.

Regular Maintenance: Assumes a cost of USD 50 per hour. The regular maintenance and Maintenance reserves will cost about USD 350. (Input from OEM). Hence pure variable cost is about USD 700 per hours.



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(2) Aircraft Finance Cost:

The aircraft is available at about USD 60000 per month lease (OEM input) and has a residual value of 50% at end of 10 years (this is conservative estimate since practical experience is slight upside on resale value). The list price is USD 7.4 Million that is a depreciation of about 3750000 over a decade or yearly depreciation (straight-line of 375000 USD / year) so the Capital cost of aircraft is USD 90000 per month. At 1500 hours that translates to USD 700 per hour.

(3) The crew and admin expenses: 5700 MTOW – Unique machine that only needs a CPL holder

The Aircraft is less than 5700 KG and requires only a CPL holder. The cost of a crew set (including cabin) would be about 5 lacs a month and there will be a need of two crew sets. Other salaries for ground and admin will be another 5 lacs a month. Total salary expenses will be about 15 lacs a month or USD 20000. The Marketing and other costs are about USD 10000 per month. This totals to USD 30000 per month or USD 360,000 annually. That is salary and admin cost is about USD 250 per hour.

Total Cost per hour at 1500 annual operations: USD 1650 per hour

1. Variable (Maintenance + Fuel) = USD 700 per hour
2. Aircraft Financial cost = USD 700 per hour
3. Admin and salary cost = USD 250 per hours

Summary

All in monthly cost should be about USD 1550-1600 per hour for about 125 hours a month operation. This translates to INR 140,000 per hour.

Net Margins

Revenue	310,000
Cost	140,000
Profit/hour	170,000
Annual Profit	255,000,000
USD Surplus	3,000,000

Pay back period: 2 years 3 months.



© Cessna

The Revenues support the concept very well, In fact it looks like that the UDAN support is more than generous, now we come to other Issues that are operational bottlenecks, we ran this with OEM and here is the reply: What is the take of De Havilland on the prospects:

(1) Is India ready for operations, or how much time will it take after first order?

India has huge potential for 19 seat market considering the different terrains and how Twin Otter can be the tool for the last mile connecting (sea or land) . Government has been working for years to build infrastructure and policy to get small turboprop aircraft and I feel the country is ready. We will face some teething issues however we have the infrastructure to start. I am very happy to share that Flybig will be introducing the 19-seat aircraft in India this month followed by 2 more in Aug-Sep under RCS scheme.

(2) What are your thoughts about financing options?

Financing is the more important pillar for any airline success. With the increase in Libor the financing is expensive now. Since Twin otter has very high residual value and its one of the aircraft, I have seen which appreciates, has many avenues for financing/ leasing. The are EDC banks and many lessors who are very keen in Indian growth story and would be happy to be part of it. I think Indian bank should start investing in small regional aircraft portfolio which will help small operators / start up.

(3) What tweaks are required in government policy to ensure that the financing is available?

Indian govt did start the GIFT city to entice and attract the lessor however it lacks robust financial support for the aircraft leasing industry. Unlike other countries, for instance Singapore lessors are supported by the government owned Temasek Holdings as well as Singaporean banks, Hong Kong and mainland China lessors are supported by banks from Hong Kong and China and lessors in Ireland are supported by European banks.



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(4) Do you think there will be possibilities of offering lease with 3-year support, or do you think a 7-year support is must?

All financial institutes and leasing company prefer long-term lease anything between 8 to 12 years. It would be beneficial if government can extend the scheme for more than 3 years that will help operators to find aircraft under lease.

(5) Do you think there could be a possibility of guaranteed buy back after 3 years, this will increase bankability to get finance?

It's difficult for OEM's now to commit on RGV, however OEM can look Residual Guarantee Value (RGV's) on case basis to support the operators and comforting the banks

(6) Or anything else that really get this project of using smaller runways a success.

- Extending the scheme beyond 4 years as operators
- Think about no frill airport – minimum wait time (30 min from entering airport to take off)
- Promoting seaplanes as they require minimum/no infrastructure.
- 19 seat aircraft will also address the pilot shortage issues ... as a CPL holder can be a captain in 19 seats since they are less than 5700 kg MTOW
- Aligning DGCA with small aircraft operations as they need more flexibility than large aircraft operations.

About the Author

Lokesh is currently managing his own Consultancy in airport revenue in name of Enterprise reach. The Consultancy works in the field of Airline marketing and Destination promotion. He has a rich experience of working with hotel revenues (The Oberoi), Airline passenger revenue sales (was heading Turkish India Sales) in India, Business Development for Airline GSA (Interglobe Air transport) and also as a VP of The Estd. Which was India Representative for Cessna, Hawker, Beechcraft, Textron citation, Sikorsky helicopters and Aircraft industries (Czech). He loves writing about airline revenues and is ardent supporter of bringing profitability in Aviation through change in mindset of Indian airline operators about need for better yield realisation.



Ideal Training Environment to Maximize Training Delivery



Bharat Lakshay Mehta

Manager Learning and Talent Development
Air India SATS Airport Services Pvt. Ltd.



When it comes to training delivery, creating an ideal environment plays a vital role in enhancing learning outcomes and maximizing training effectiveness. By recognizing the importance of an ideal training environment and taking steps to create one, trainers and organizations can maximize the effectiveness of their training initiatives and ensure that trainees receive the best possible learning experience.

This will also guide organizations to achieve an optimum training culture with a supportive and empowering environment that fosters continuous learning and development. Here, knowledge sharing, collaboration, and personal growth are valued, and individuals are encouraged to take ownership of their learning, seek feedback, and embrace challenges as opportunities for growth. It promotes open communication, respect, and recognition of achievements.

This article will explore key factors to consider when setting up a training project.

Objective & Commitment

Define Clear Training Objectives/ Expectations

Before designing the training environment, it is essential to establish clear and specific training objectives. Identifying the desired outcomes helps in tailoring the environment to meet the needs of the participants and the organization. Whether it is skill development, knowledge acquisition, or behavior change, the training objectives should guide the design of the training environment.

Leadership Engagement

It starts with the commitment of senior leaders to prioritize learning and development. They should communicate the importance of continuous learning and actively participate in learning initiatives themselves.



Training Venue Layout

The layout of the training venue plays a significant role in the overall training experience. The following aspects shall be considered while setting up the venue:

Adequate Space

Ensure that the training venue is spacious enough to accommodate all participants comfortably. Sufficient space allows for movement, group activities, and interaction, fostering a collaborative learning environment.

Lighting and Ventilation

Well-lit and well-ventilated spaces contribute to a positive learning environment. Natural light is preferable, but if not available, opt for bright, non-glaring artificial lighting. Proper ventilation ensures a comfortable atmosphere and helps participants stay focused.

Seating Arrangement

The seating arrangement should facilitate interaction and engagement. Depending on the training format, choose a setup that suits the training style, such as a classroom-style, U-shaped, or round table arrangement.

Technological Infrastructure

In today's digital age, technology plays a pivotal role in training delivery. Consider the following technological aspects to create a better experience for the audience:

- Audio-visual Equipment, including projectors, screens, speakers, and microphones. These tools enable the effective presentation of training materials, multimedia content, and audio clarity during discussions.
- Using Training Tools and Software that can enhance the learning experience, such as learning management systems (LMS), virtual classrooms, interactive whiteboards, online resources, remote collaboration, real-time demonstrations, online materials, interactive activities, or simulation software. Choose tools that align with the training objectives and create an immersive learning environment.





Comfort and Ergonomics

Comfortable training environments contribute to improved focus, retention, and overall engagement with participants. The following aspects help in creating a comfortable learning experience:

Temperature Control

Maintain a comfortable temperature range within the training venue to ensure participants' comfort. Extreme temperatures can cause distraction and hinder concentration.

Ergonomic Furniture

Provide ergonomic chairs and tables that support good posture and reduce physical discomfort during extended training sessions. Comfortable participants are more likely to stay engaged and actively participate in the training.

Break Areas

Designate break areas or spaces where participants can relax, refresh, and network during training breaks. These areas should be equipped with seating, refreshments, and amenities like restrooms.

Engaging Training Materials

Training materials and resources play a crucial role in delivering effective training:

Clear and Concise Materials

Ensure training materials are well-structured, visually appealing, and easy to understand. Use a variety of formats, such as handouts, presentations, videos, and interactive online content, to cater to different learning styles.

Interactive Learning Tools

Incorporate interactive elements into the training materials, such as quizzes, case studies, group activities, and discussions. Interactive learning tools promote active participation and reinforce learning.

Accessible Resources

Make sure all necessary training resources are readily available to participants. This includes providing handouts, access to online platforms, relevant software or tools, and any other materials required for the training.

Variety in Learning Opportunities

Provide a variety of learning opportunities to cater to different learning styles and preferences, like workshops, training sessions, webinars, online courses, mentoring programs, job rotations, and access to learning resources such as books, articles, and videos.

Personalization & Adaptive Learning

LMS platforms are capable of using data and analytics to deliver tailored learning experiences based on individual learner preferences, skills, and progress. Adaptive learning algorithms adjust the content and pace of learning to optimize engagement and effectiveness.

Microlearning

Microlearning refers to the delivery of content in small, easily digestible modules. LMS Modules can be configured to offer short, focused lessons that fit into busy schedules and promote better knowledge retention.

Social learning

Social learning features include discussion forums, chat rooms, social media integration, and virtual classrooms that enable learners to engage and learn from each other.

Constant Development

Program Effectiveness

The effectiveness of any training program relies on the fact that the participants are either evaluated on the conclusion or updated regularly on the same. Training is a continuous process. The TNA, revision, and updation of the course content from time to time help in the achievement of the required outcome.

Give Feedback

Implement regular feedback mechanisms to help individuals and teams reflect on their learning progress. Encourage constructive feedback and provide opportunities for employees to discuss their experiences, challenges, and lessons learned.

Embrace Ideas

Encourage feedback from employees with the freedom to explore new ideas and approaches.



Conclusion

Creating an ideal training environment is crucial for maximizing training delivery and ensuring effective learning outcomes. By considering the physical space, technology, comfort, and engaging training materials, trainers can foster an environment that encourages participation, engagement, and knowledge retention. A thoughtfully designed training environment can make a significant difference in the overall training experience and help participants achieve their learning objectives. Training is a continuous process. It should be conducted in regular intervals to ensure efficiency and effectiveness in the performance of the participants and the organization as a whole.

About the Author

An Aviation Professional with over 17 years of experience in the same domain. He 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".



COMAC C919

China's Ambitious Leap into the Commercial Aviation Market



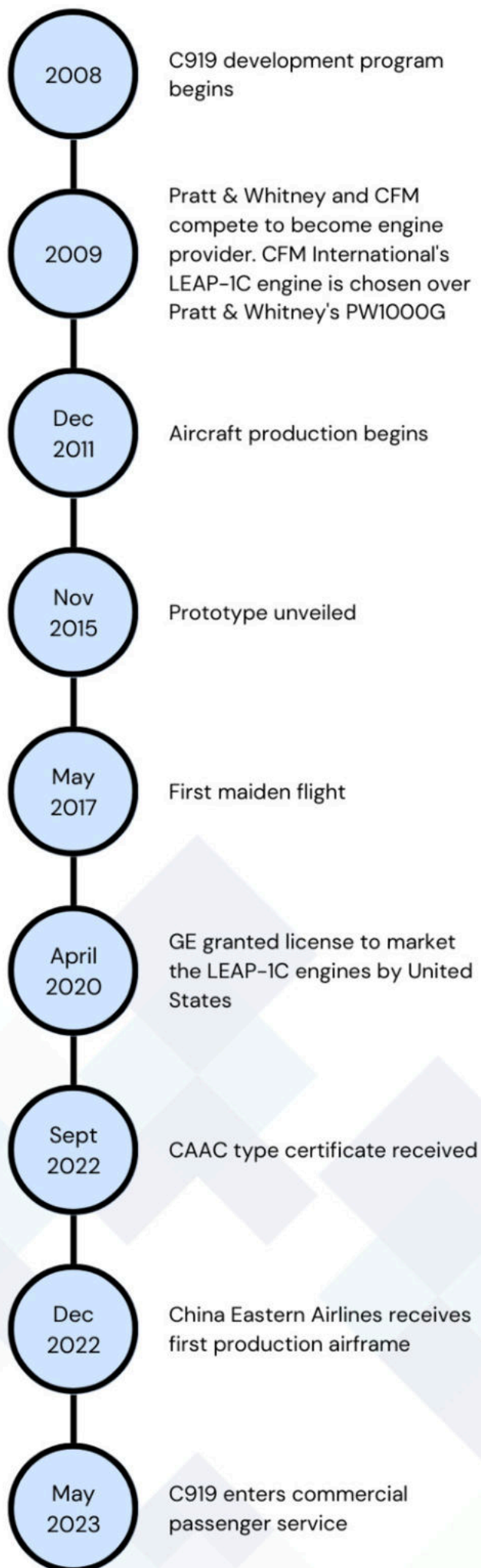
Abhishek Nayyar
Correspondent
100 Knots



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The COMAC C919 is a twin-engine narrow-body airliner developed by the Commercial Aircraft Corporation of China (COMAC). It is designed to compete with the Boeing 737 and the Airbus A320. The C919 has a seating capacity of around 158 to 168 passengers, depending on the configuration. The C919 features a modern and streamlined design, incorporating advanced aerodynamics and composite materials to improve fuel efficiency and reduce operating costs. It is equipped with advanced avionics and fly-by-wire flight control systems, enhancing its maneuverability and safety.

Its development began in 2008 by the Commercial Aircraft Corporation of China (COMAC). The designation "C919" was assigned to emphasize its status as China's major passenger aircraft. The "C" in C919 represents China, while "919" signifies China's National Day on September 19th. The C919 represents China's ambition to become a major player in the commercial aircraft manufacturing industry and reduce its reliance on foreign aircraft manufacturers.



Timeline

Technical Description

Cockpit crew	2 pilots
Seats	158 (2-class) to 174 (1-class HD)
Cargo capacity	45.2 m ³ (1,600 cu ft)
Length	38.9 m (127 ft 7 in)
Wingspan	35.8 m (117 ft 5 in)
Wing area	129.15 m ² (1,390.2 sq ft)
Height	11.95 m (39 ft 2 in)
Fuselage height	4.166 m (13 ft 8.0 in)
Fuselage width	3.96 m (13 ft 0 in)
Fuel capacity	24,917 L (6,582 US gal)

Maximum payload	18,900 kg (41,700 lb)
OEW	45,700 kg (100,800 lb)
MTOW	75,100 kg (165,600lb) ER: 78,900 kg (173,900lb)
Engines (x2)	CFM LEAP-1C
Fan diameter	78 in (198 cm)
Takeoff Thrust	126.63 kN (28,468 lbf)
Cruise Speed	Mach .785
Range	4,139 km ER: 5,576 km
Ceiling	12,100 m (39,800 ft)
Takeoff Distance (MTOW, ISA)	2,052 m (6,732 ft) ER: 2,125 m (6,972 ft)

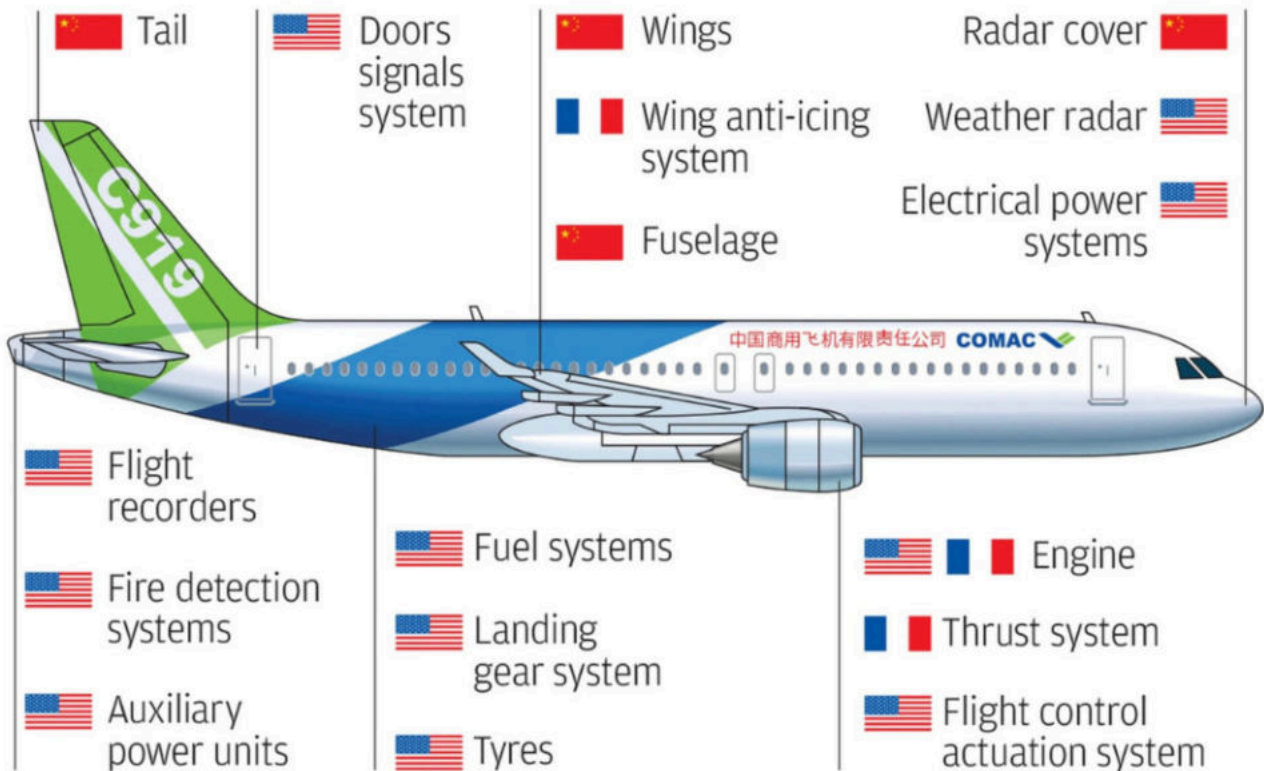


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Manufacturing Locations



Systems Suppliers



Source: CNN research

SCMP

Powerplant

The COMAC C919 is powered by two CFM International LEAP-1C engines, a high-bypass turbofan engine with a thrust range of approximately 31,000 to 33,000 pounds (138 to 147 kilonewtons), specifically developed for the C919. It is a product of CFM International, a joint venture between GE Aviation and Safran Aircraft Engines. Designed to provide improved fuel efficiency, reduced emissions, and lower noise levels compared to previous-generation engines, It incorporates advanced technologies such as 3D-woven carbon fiber composite fan blades and ceramic matrix composite materials in the hot section, which contribute to its performance enhancements.

The US government has considered prohibiting General Electric (GE) from selling the LEAP-1C engine to COMAC. The concerns behind this consideration include fears of reverse engineering, competition with Boeing, and potential military applications of the technology.

ACAE CJ-1000A

The Aviation Industry Corporation of China (AVIC) was assigned the task of developing an indigenous engine for aircraft in 2009. The assembly of the first CJ-1000AX engine was completed in December 2017. The planned entry into service for the CJ-1000AX engine was scheduled for 2021. In March 2023, it was reported that the flight-testing campaign for the CJ-1000A engine had begun, using a Xi'an Y-20 test aircraft.



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Economic Espionage Allegations

According to a US Justice Department indictment, from 2010 to 2015, a Chinese spy penetrated a number of the C919's foreign components manufacturers including Ametek, Capstone Turbine, GE Aviation, Honeywell, Safran, and others and stole intellectual property and industrial process data with the aim of transitioning component manufacturing to Chinese companies. The report stated that the operations involved both cyber intrusion and theft, in most cases using a piece of code custom written for this industrial espionage operation. As of 2019, four people have been arrested in the US as a result of investigations into this economic espionage and theft of trade secrets.

In November 2022, a federal jury in Cincinnati convicted Yanjun Xu, 42, on counts of conspiracy to commit economic espionage, conspiracy to commit trade secret theft, attempted economic espionage and attempted trade secret theft. The US court found that Xu played a key role in a plot to steal trade secrets from western aerospace firms, for the purpose of helping the C919 commercial airliner program. He was sentenced to 20 years in prison.

Market



US\$26 billion

In 2012, C919 order book had 380 units valued at \$26 billion, with an average price of \$68.4 million.



One Fifth of Global Narrowbody Market

The Chinese government and COMAC aim for the C919 to capture a fifth of the global narrowbody market and a third of the Chinese market by 2035, with an expected 2,000 sales in the next 20 years.



1209 Deliveries

FlightGlobal forecasts 1,209 C919 deliveries, with 85% of them in China.

Comac 919 vs Airbus 320neo vs Boeing 737-8

Competition

Comac 919

•Wing span: 35.8m

• Seats: 158 to 192 • Height: 11.95m • Maximum take-off weight: 78,900kg
• Fuel capacity 24,917L • Range: 5,555km



38.9m

Airbus 320neo

• Seats: 150 to 180 • Height: 11.76m • Maximum take-off weight: 79,000kg
• Fuel capacity: 26,730L • Range: 6,300km

•Wing span: 35.8m



37.57m

Boeing 737-8

•Wing span: 35.9m

• Seats: 162 to 178 • Height: 12.45m • Maximum take-off weight: 82,644kg
• Fuel capacity: 25,816L • Range: 6,480km



39.52m

Infographic: Rafa Estrada Sources: Airbus, Comac, Boeing.



	COMAC C919	Airbus A320neo	Boeing 737-8
Origin	China	France	United States
MTOW	78,500 kg	73,500 kg	82,644 kg
Max Range	4075 km	6500 km	6480 km
Max Speed	Mach 0.8	Mach 0.82	Mach 0.79
Passengers	158-174	150-180	160-184
Crew	2	2	2
Engine	2 X CFM LEAP-1C	2 X CFM LEAP-1A	2 X CFM LEAP-1B
Cost	\$90-100 Million	\$111 Million	\$121 Million

Orders

At the November 2010 Zhuhai Airshow, COMAC announced 55 orders for the C919 aircraft from 6 airlines, with 45 additional options. ICBC Leasing became the launch customer by ordering 45 C919s on October 19, 2011. By January 2023, COMAC reported over 1,200 orders and planned to expand annual production capacity to 150 aircraft within five years.

Impact on the Industry

The successful entry of the COMAC C919 into the commercial aviation market could have far-reaching implications for the industry. It would not only establish China as a formidable competitor but also disrupt the duopoly currently held by Boeing and Airbus. The C919's competitive pricing, combined with its advanced features and fuel efficiency, could attract airlines seeking alternatives to existing options.

Whether it will succeed in challenging the dominance of established manufacturers and carve out a significant market share remains to be seen, but one thing is clear: the COMAC C919 is poised to leave a lasting impact on the aviation industry.











Orderbook		
Customer	Orders	Options
ABC Financial Leasing	65	10
AerCap	20	
Air China	5	15
AVIC International Leasing	15	15
Bank of Communications Financial Leasing	30	-
BOC Aviation	20	-
CCB Financial Leasing	50	-
CDB Leasing	10	-
China Aircraft Leasing Co.	20	-
China Eastern Airlines	5	15
China Huarong Financial Leasing	30	-
China Southern Airlines	5	15
Citic Financial Leasing	18	-
Hainan Airlines	20	-
Hebei Airlines	20	-
Huabao Leasing	15	15
ICBC Financial Leasing	100	-
Industrial Bank	20	-
Joy Air	20	-
Nuclear Construction Financial Leasing	20	20
Ping An Leasing	50	-
Sichuan Airlines	20	-
SPDB Financial Leasing	5	15
Total	583	120



Landmark Deals

Indigo's order of 500 A320 neo-family jets from Airbus is one of the largest in civil aviation history and eclipsed Air India's order of 470 planes in Feb 2023.

Selected narrow and wide body airplane deals won by **Airbus** and **Boeing** excluding options.

Airline	Month	A320s	A350s	B737s	B777s	B787s	Total
 IndiGo	Jun 2023	500	0	0	0	0	500
 Air India	Feb 2023	210	40	190	10	20	470
 American Airlines	July 2011	260	0	200	0	0	460
Indigo Partners	Nov 2017	430	0	0	0	0	430
 IndiGo	Oct 2019	300	0	0	0	0	300
 United Airlines	Jun 2021	70	0	200	0	0	270
 Lion Air	Nov 2011	0	0	230	0	0	230
 Air Asia	Jun 2011	200	0	0	0	0	200
 Emirates	Nov 2013	0	0	0	150	0	150
 Ryan Air	May 2023	0	0	150	0	0	150
 United Airlines	Dec 2022	0	0	0	0	100	100

Note: Emirates' order includes 50 A380s.
 Source: Reuters reporting | Reuters, June 20, 2023 | By Sumanta Sen



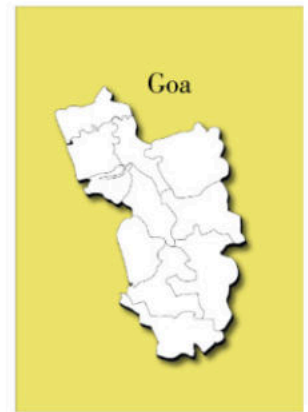
The logo for Fly91, featuring a stylized bird icon in blue and yellow to the left of the text "FLY91". The letters "FLY" are in blue and "91" are in yellow.

In conversation with Manoj Chacko, CEO, Fly91



Fly91 is helmed by aviation industry veterans such as Mr. Manoj Chacko, formerly executive vice-president of suspended Kingfisher Airlines and CEO of Business Travel, SOTC, who has joined hands with Harsha Raghavan, former India head of Fairfax, the Canada-based financial company that has a stake in Bengaluru International Airport Ltd, to launch Just UDO (which translates to just fly) Aviation, the company behind the airline. Raghavan's investment firm Convergent Finance earmarked INR 200 crore as the project outlay for the upcoming airline.

The airline is currently looking to cater to the short-haul segment (45-90 minute flight duration) and fly to locations where bigger aircraft cannot land or has less demand that those bigger airlines can't viably cater to. These underserved locations also have an advantage that Fly91 can profit from: the lower value-added tax that states levy on aviation fuel, which typically tend to be higher in high-traffic airports.



Base

Dabolim
Airport : Joint
Civil and
Naval Airport

Statistics (April 2022 – March 2023)

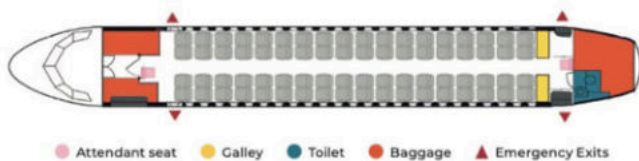
Passengers	8,359,393
Aircraft Movements	56,904
Cargo Tonnage	6,452

Source: AAI

Aircraft

Standard configuration

72 seats at 29" pitch

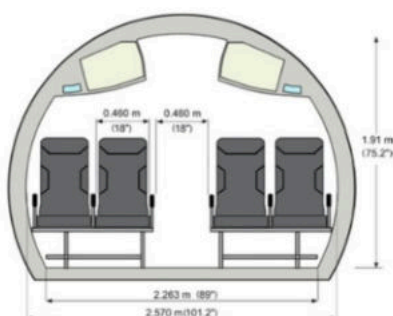


ENGINES

Pratt & Whitney Canada	PW127XT-M
Power	2,750 SHP

WEIGHTS

Max take-off weight	23,000 kg	50,705 lb
Max landing weight	22,350 kg	49,272 lb
Max zero fuel weight	21,000 kg	46,296 lb
Operational empty weight (typical in-service)	13,600 kg	29,983 lb
Max payload	7,400 kg	16,313 lb
Max fuel load	5,000 kg	11,024 lb



AIRFIELD PERFORMANCE

Take-off field length

> @ MTOW - ISA - Sea Level	1,315 m	4,314 ft
> @ TOW for 300 NM - Max Pax - ISA +10 - Sea Level ⁽¹⁾	1,231 m	4,039 ft

Landing field length

> @ MLW - ISA - Sea Level (EASA Air Ops)	915 m	3,002 ft
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EN-ROUTE PERFORMANCE

Climb speed	170 KCAS	
Max cruise speed (95% MTOW - ISA - FL200)	270 KTAS	500 km/h
Fuel consumption in cruise (95% MTOW - ISA - FL200)	650 kg/h	1432 lb/h
One engine-out net ceiling (95% MTOW - ISA +10)	2,990 m	9,800 ft
Range with max pax ⁽¹⁾	740 NM	1,370 km

Standard routes ⁽²⁾	200 NM	300 NM	400 NM
Block fuel	624 kg - 1,376 lb	869 kg - 1,916 lb	1,115 kg - 2,458 lb
CO ₂ emissions	1.97 t	2.75 t	3.52 t
Block time	01:02	01:24	01:47

ENVIRONMENTAL PERFORMANCE

CO ₂ per seat/km ⁽³⁾	69 g	0.15 lb
NOx per Landing and Take-off cycle	2.6 kg	5.7 lb
Noise certification (ICAO Ch 14) margin ⁽⁴⁾	-5.1 EPNdB	



Management Team



Manoj Chacko

MD and CEO



Harsha Raghavan

Chairman



Chenna Reddy

Chief Operating
Officer



Akshay Renavikar

Head, Flight
Operations



Deepak Gandhi

Head, Flight Safety

The Idea

Other airlines have done well in the regional sector, like Kingfisher, Vayudoot, Air Deccan, Jet Airways, and even IndiGo and SpiceJet had very nice regional networks. But the only challenge is they need to have stand-alone regional networks. For them, regional networks were always part of a different strategy. It was part of a network leader strategy, not a stand-alone system. Flights do exceptionally well with good loads, and people want to travel. Most Tier 2 and Tier 3 cities today don't have flights because their runways and airports are restricted. Because of that, the bigger aircraft can't fly to these cities. The physical infrastructure of the airport does not permit more significant aircraft movements. Proper traffic stimulation needs to be done to bring air traffic to these cities, and smaller aircraft like turboprops must be brought to the cities. Because of this, Regional Aviation came to me as an essential aspect.

This is the reason why ATR aircraft was chosen for the operations with. It is going to be the airline's aircraft of choice. The airline intends to build a network using the ATR 72-600 aircraft. There are no plans to add any Airbus or Boeing aircraft. Mr. Chacko mentioned, "We are very clearly focused on being a national player, very clearly focused on being in that 80-seat category."



Jagtesh Saini

Head, Ground
Operations

Strategy

Open Digital Distribution

FLY91's distribution strategy will be "open digital distribution," meaning the airline will be digitally enabled. The airline's inventory will be available for everyone to buy or consume. We want to position ourselves as one of the last five airlines in the country, so if any airline wants to pick up the inventory and sell it as their own, we are more than happy for them to do. It can be either a domestic airline or an international airline. Mr. Chacko said, "We don't want to be restricted to only providing a network to our airline. We are saying that we can provide the network to any airline. It could be domestic, it can be international, it can be low cost, it can be full service, it doesn't matter. We are creating a digital mechanism that can happen easily and seamlessly." For the Distribution side, the airline will provide an open API wherein anybody who wants to consume its content kit can easily eradicate it. "In the future, our content can even be sold on the bus booking website," Mr. Chacko said.

Product

Network

FLY91's focus will be on the network that they are going to build. Mr. Chacko said, "I always believe that an airline's product is a network. If you have a smart network that is aligned with the flyer's needs, people will automatically come to you, and you will also get what is the money and the demand required. Many airlines don't focus on the network. For us network is going to be very, very critical, and once we get the network right, I think everything else is only a matter of detailing. We are not here to get into an airfare war. We are here to provide the customer with a good product. At the right time to go between the city pair is our focus, and when you do that consistently, customers will start coming to you."



Lessons from Past

According to Mr. Chacko, Airlines in the past have failed for a bunch of reasons, and those reasons are taken care of by the airline from the very first day. Firstly, airlines needed to be capitalized better. Aviation is a business where you must be adequately capitalized on day one. So that is one thing that we are taking care of.

Another thing that is very important in the aviation business is to create a proper business model and stick to the business model. "Our business model 76 seater turboprop aircraft flying city pairs where a bus or train can take up to 8-10 hours. We should stick to that business model. Most of the airlines that we have seen historically in the past is that they started in a particular fashion. And then they have gone in all directions, which is very wrong. So you got to stick to the model."

The 3rd most important thing is keeping the business model extremely simple. And you got to be a cost leader. "In Aviation, cost leadership is very, very important. And this is the area where, again, there are a lot of airlines that start incurring extravagant costs. Aviation is being showcased by many as a luxury product. So, you start doing this, you are spending money on all the wrong things, and I think that's where the problem starts happening," Mr. Chacko said.

International Expansion

Fly91 has selected ATR-72 aircraft for operations and intends to acquire 6 to 7 planes in the first year of operations. Within five years after that, it plans to gain a similar amount of aircraft. It currently has two ATR 72 aircraft taken on a dry lease.

Commenting on the plans for future international expansion, Mr. Chacko said, "Whatever is the aircraft's capability is where the airline will fly. For example, if ATR 72 aircraft can fly to neighbouring countries, nothing stops us from starting operations there. I remember ATR flew to Sri Lanka and Bangladesh during my Kingfisher days. Nothing stops us from flying to the neighbouring countries at the appropriate time, but that's a long way to go, probably once we get the 20 aircraft in our fleet."

Currently, the airline's primary focus is connecting the Indian regional cities. There is tremendous potential in the Indian regional market. This will be the center of focus for the airline for the next 5-6 years.



Goa

There are particular reasons for the FLY91 to choose Goa as its headquarters instead of the top metro cities. Mr. Chacko specifies, "Goa is the only place in the country where two fully full-fledged airports are within a 60-minute driving distance from each other. Goa is also the only place with five airports accessible within a 2-and-a-half-hour drive. This is a plus point because you can easily recover your network rapidly whenever there are flight diversions or any other issue. Unlike when you are in one of the big cities where the aircraft will divert into another city, and you are sending engineers, pilots, and other personnel to recover it, it becomes a logistical nightmare."

This is one of the key reasons why the airline selected Goa as its headquarters because no other place in India you have this particular advantage.

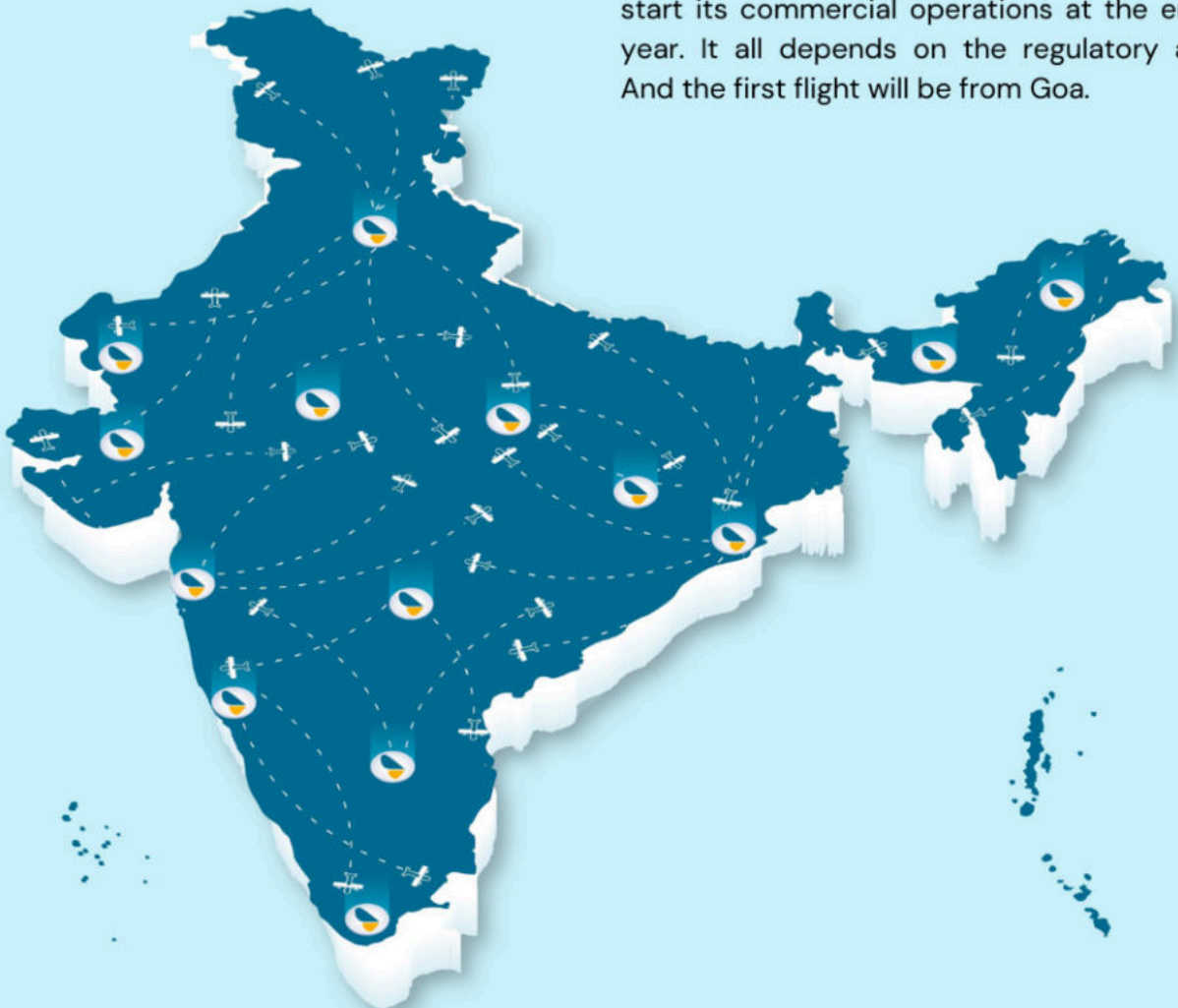
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Starting Operations

The airline received its NOC in April 2023 and is in the process of getting its AOP. So if everything goes according to the plan, the airline expects to start its commercial operations at the end of this year. It all depends on the regulatory approvals. And the first flight will be from Goa.



Sustainable Aviation Fuel (SAF)

The “Real Deal” For Achieving India’s Sustainability Goal



Meghna Goradia
Manager, Aviation,
Travel & Tourism
ICF



Shubhankar Jain
Associate, Aviation,
Travel & Tourism
ICF



Yasar Yetiskin
Manager, Sustainable
Aviation
ICF



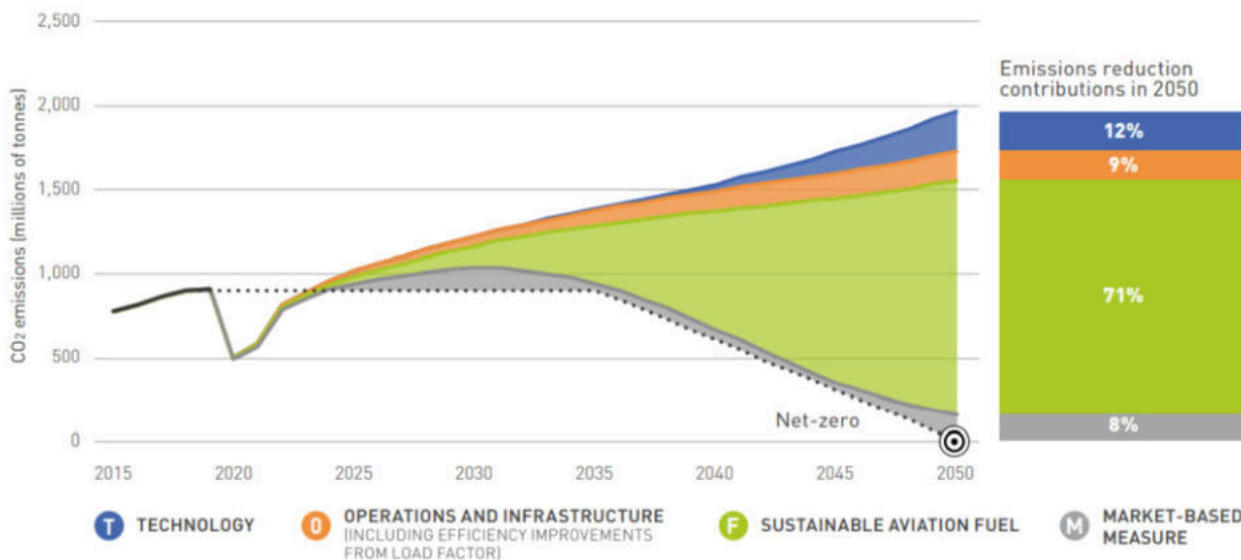
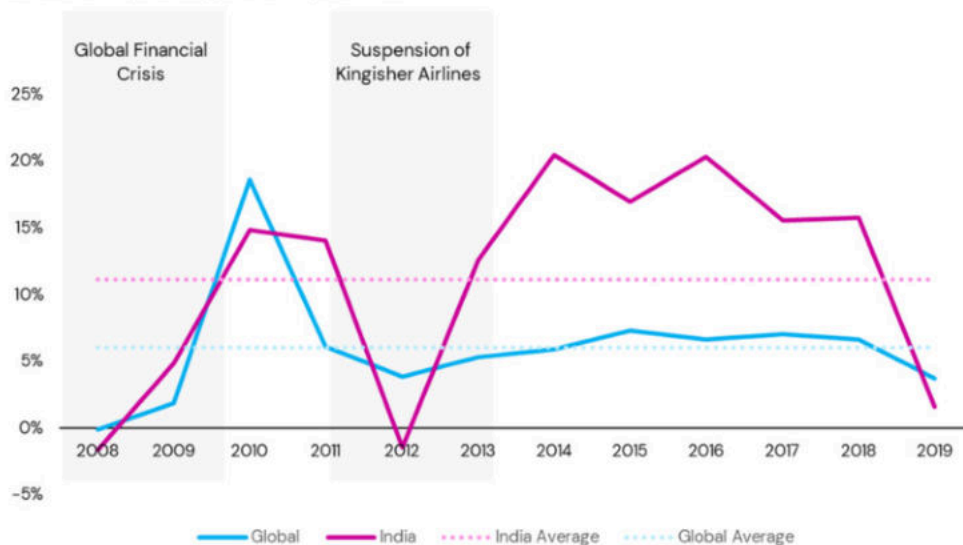
India's aviation journey has been strong with an annual growth rate of 13% since last two decades reaching 344 million pax in FY19 while the global growth was around 5-6%. While the total number of airports doubled in the last 10 years to almost 140+, the airlines have been through a turmoil of their own in the backdrop of surging passenger demand. Post covid recovery has been one of the highest in the world with FY23 domestic passengers at 98% and international passengers at 82% of FY19 levels. The aviation industry in India is poised to continue its feat of double-digit growth from FY24 onwards to be on target of flying one billion plus passengers by 2040.

However, this growth story will have to be decoupled from the CO2 emissions and other Greenhouse gases (GHG). This is particularly in line

with India's pledge of net zero target by 2070 in COP26 in 2021. The aviation industry contributes less than 1% of India's total emission today. But with targeted double-digit growth this may slowly and steadily increase and hence needs to be curtailed.

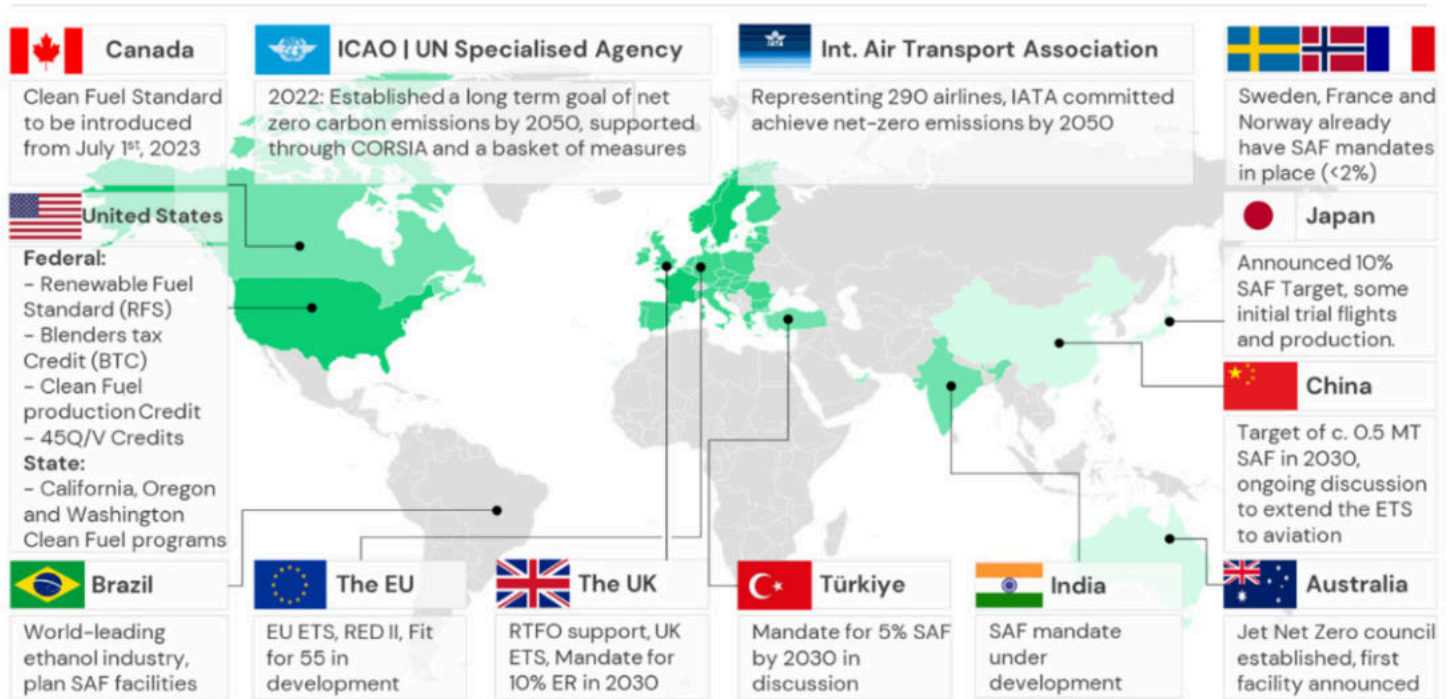
The global aviation industry has set out climate goals to maintain its social license to operate, by tackling its increasing emissions. The global aviation industry has committed to net zero emissions by 2050. The only realistic way to achieve this is by rapidly deploying a basket of measures. These include operational improvements, market-based measures (such as CORSIA), advanced aircraft technology (e.g., hydrogen aircraft), and the utilization of Sustainable Aviation Fuels (SAF). Across these aviation decarbonization options, SAF production is recognized as the most significant lever.

% Growth in passenger traffic pre-covid



Source: Waypoint 2050 report ATAG, Scenario 2: aggressive sustainable fuel deployment

Public and private aviation industry stakeholders are working across the world to scale up implementation of SAF. However, compared to industry aspirations, a supply gap still remains. From a global point of view, a lot of action is being taken on this front. Let's look at some of the key initiatives taken by some countries in the last few years:



The World Economic Forum in collaboration with several stakeholders along the aviation value chain have embarked upon the Clean Skies for Tomorrow (CST) initiative by convening an Indian SAF community of private and public institutions with the shared vision of transporting 100 million domestic passengers in India on SAF by 2030 on a 10% blend, which translates to 360,000 metric tons of SAF. However, this is voluntary at this point in time.

Several airlines in India have started blending SAF in their one-off flight to be in the elite list of SAF users thus targeting sustainable way of flying. Recently, Air Asia flew a passenger flight using indigenously produced SAF blend by Praj Industries Ltd. supplied by Indian Oil Corporation Ltd. This SAF was manufactured using sugarcane molasses as indigenous feedstock and Alcohol-to-Jet (ATJ) technology. Blended SAF is operationally identical to kerosene. It can be made through nine ASTM approved pathways as showcased below:

Pathway	Feedstock	Max. Blending Limit
FT-SPK	Biomass (e.g. trash/rubbish, forestry residues, grasses)	50%
HEFA-SPK	Waste lipids & fats (e.g. UCO, tallow, DCO)	50%
HFS-SIP	Sugars to hydrocarbon (e.g. molasses, sugar beet, corn dextrose)	50%
FT-SPK / A	Same feedstock as FT-SPK, but slightly different process	10%
ATJ-SPK	Agricultural waste (e.g. forestry slash, crop straws)	50%
CH-HK	Plant and animal fats, oils and greases (FOGs)	50%
HC-HEFA-SPK	Bio-derived hydrocarbons, fatty acid esters	10%
Co-processed HEFA*	Fats, oils, and greases (FOG) co-processed with petroleum	5%
Co-processed FT*	Fischer-Tropsch hydrocarbons co-processed with petroleum	5%

As per the current situation, the four most suited technology based on availability of feedstock in India as suggested by CST report could be:

1. Hydro-processed esters and fatty acids (HEFA), mostly from used cooking oil (UCO)
2. Alcohol-to-jet (AtJ) using agricultural residues and surplus sugar streams such as cane molasses and syrup
3. Gasification/Fischer-Tropsch (GAS-FT), using municipal solid waste and agricultural residues
4. Power-to-liquid (PtL) could be feasible based on hydrogen technology and access to point sources of carbon in the chemical, steel, and cement industries.

While on a global scale the production capacity is slowly ramping up, it may not be sufficient in the current context considering the supply demand gap expected by 2030.

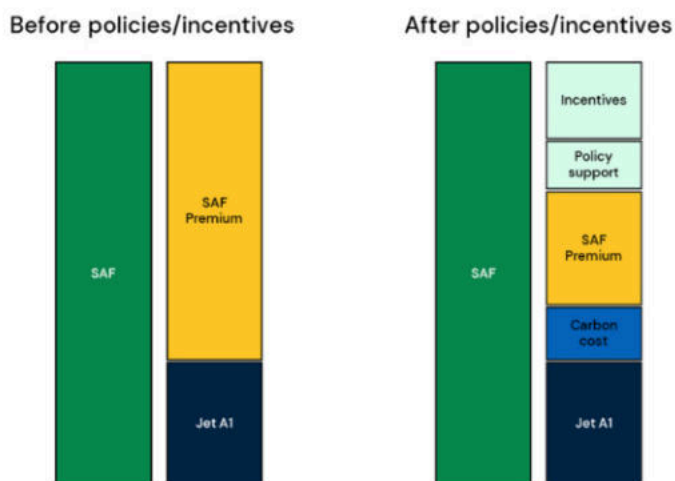
India has feedstock for potential production of 19 to 24² million tons of SAF per year, whereas the estimated maximum requirement of SAF in India, considering 50% blend, is around 8 to 10³ million tons per year by 2030. Indian players such as

Indian Oil Corporation, Praj Industries, Mangalore Refinery and Petrochemicals amongst others have already initiated their production plans to commensurate India's requirement in meeting this objective. While it may seem that India may be self-sufficient in terms of the current requirement, the cost dynamics for SAF may hinder its maximum use.

In a price sensitive market like India, sustainability and reduction in emissions may not be enough for the deployment of SAF with this cost dynamics. For instance, as per Petroleum Planning and Analysis Cell (PPAC), India's yearly uptake of jet fuel is expected to increase by 17% to reach 8.6⁴ million tonnes in FY24 due to surge in air travel demand. This substantial increase in jet fuel consumption is expected to continue by 2030, increasing the need for SAF accordingly. Considering the need for SAF and the green premium it requires on top of the fossil-based jet fuel, policy support is crucial to balance the economic dynamics.

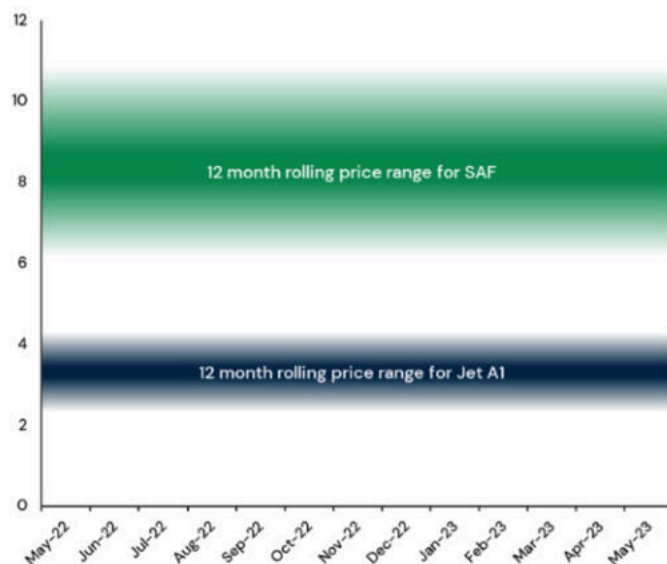
Role of SAF policies/incentives in reducing SAF premium (Illustrative)

USD per tonne SAF



SAF vs Jet fuel price

USD/gallon



2 <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1925417>

3 <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1925417>

4 <https://www.thehindubusinessline.com/economy/logistics/aviation-fuel-demand-to-surpass-pre-pandemic-levels-in-fy24/article66564107.ece#:~:text=India's%20consumption%20of%20aviation%20turbine,levels%20for%20the%20first%20time.>

India currently does not have a policy framework around SAF. Hence, policy support framework for phased implementation of SAF needs to be developed on an urgent basis if India were to be amongst the countries committed to sustainable future while being crowned as the third largest aviation market in the near future. The role of each party in this framework will be critical to make SAF a viable proposition:

1. Government – SAF policy support such as mandates, incentives, grants, tax benefits
2. Feedstock suppliers – ability to provide the requisite feedstock by integrating modern technology.
3. Fuel producers and suppliers – Blend and efficient use of distribution infrastructure to transport the fuel at airports.
4. Airports – provide infrastructure at airports, cross-subsidize through a portion of user charges.
5. Airlines – Guarantee uptake of SAF based on government mandate.
6. End users – payment of a reasonable green cess or surcharge on ticket price

If this collaboration of various stakeholders is facilitated by the government through a national SAF coalition, then a top-down driven strategy will ensure India is on track to achieve its net zero emissions target by 2070.

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