पोस्ट ऑपरेशन विश्लेषण रिपोर्ट
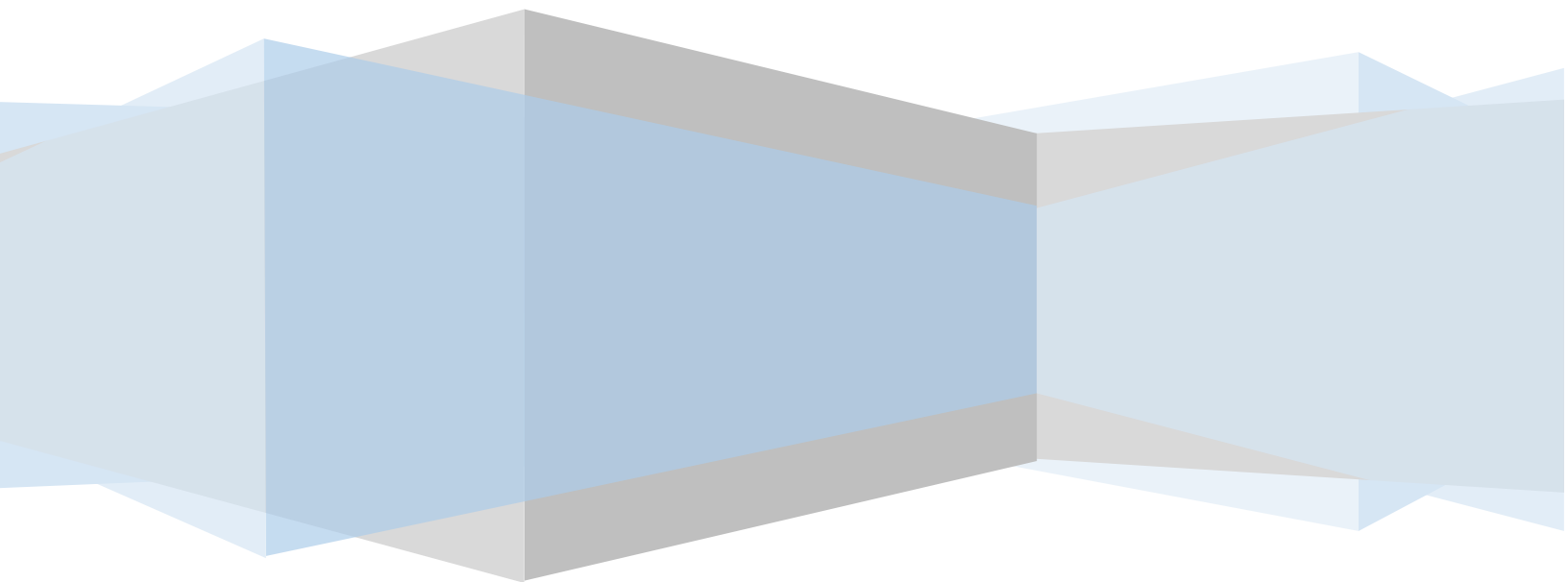
नवंबर, 2025

सेंट्रल कमांड सेंटर, सी ए टी एफ एम, दिल्ली

POST OPERATIONS ANALYSIS REPORT

November, 2025

CENTRAL COMMAND CENTER, C-ATFM, DELHI

अंतर्वस्तु/Contents

List of Figures

A. कार्यकारी सारांश/Executive Summary

Average Domestic air traffic (30 days) has recorded a decrease of 1.6% whereas the average international air traffic has decreased by 0.5 % in the month of November 2025 as compared to October '25.

On average, the Indian Airports in the ATFCM area saw 4931 IFR flights per day in the month of November 2025. The peak days were on 14th November 2025 (5419 IFR flights). Monday's were the busiest days throughout this month with an average of 5221 IFR flights per day.

Total Sixty six (66) ATFM measures were applied this month during periods of congestion at Chennai, Delhi, Mumbai and Raipur Airport.
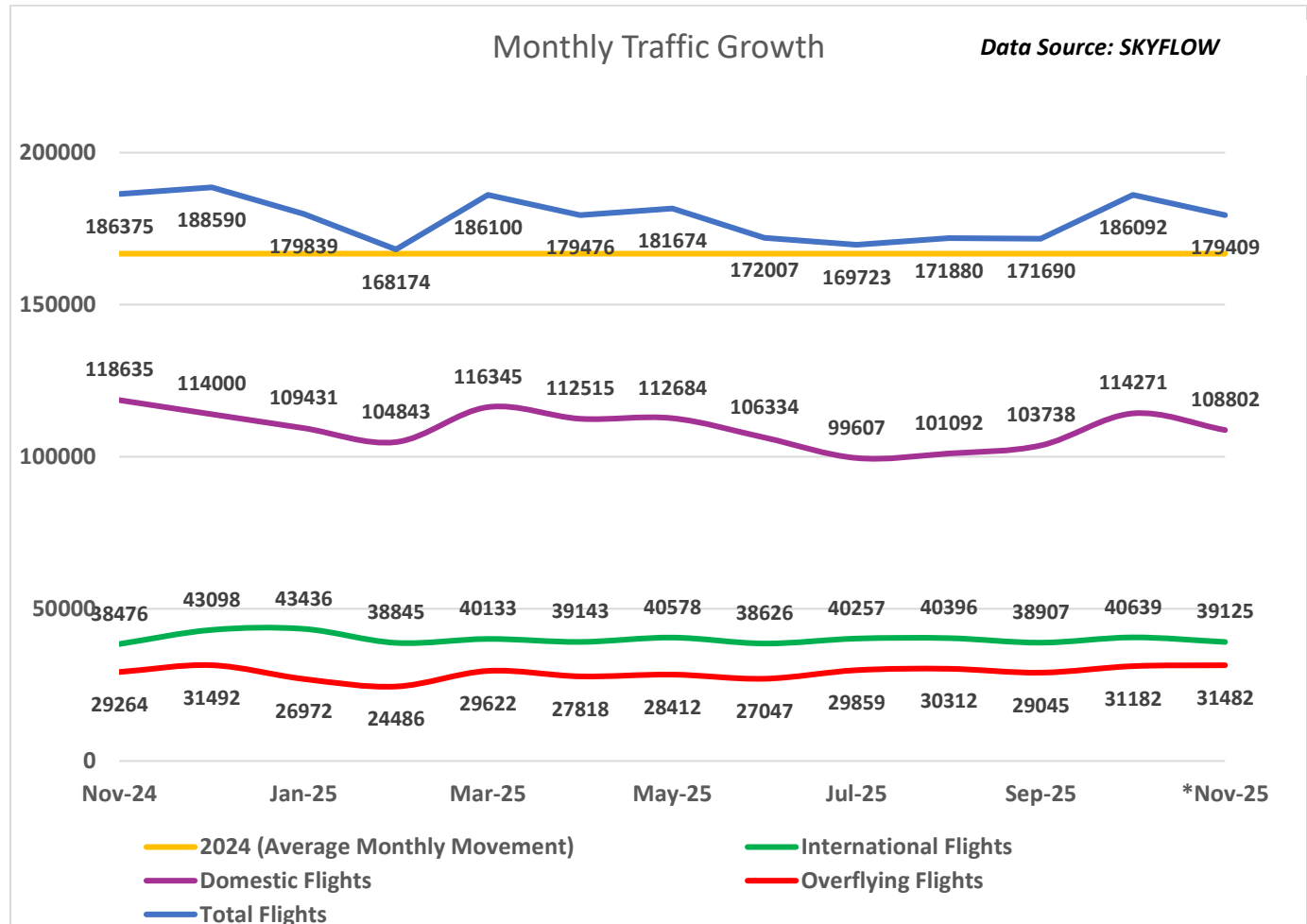
Figure 1: Monthly Traffic Growth

The graph above depicts the Domestic, International and Overflying Air traffic in Indian ATFCM Area during the last 13 months (Nov'24 to Nov'25).

Note: ATFM services were unavailable from 06-11-2025 to 08-11-2025 vide NOTAM: A2820,A2831,A2840/25.

B. यातायात विश्लेषण/Traffic Analysis

I. भारत के प्रमुख हवाई अड्डों पर हवाई यातायात गतिविधि /Air Traffic Movement at Major Airports in India

Average Daily Movements(Oct'25 vs Nov'25)

Source: AOCC, Skyflow & ATC Automation
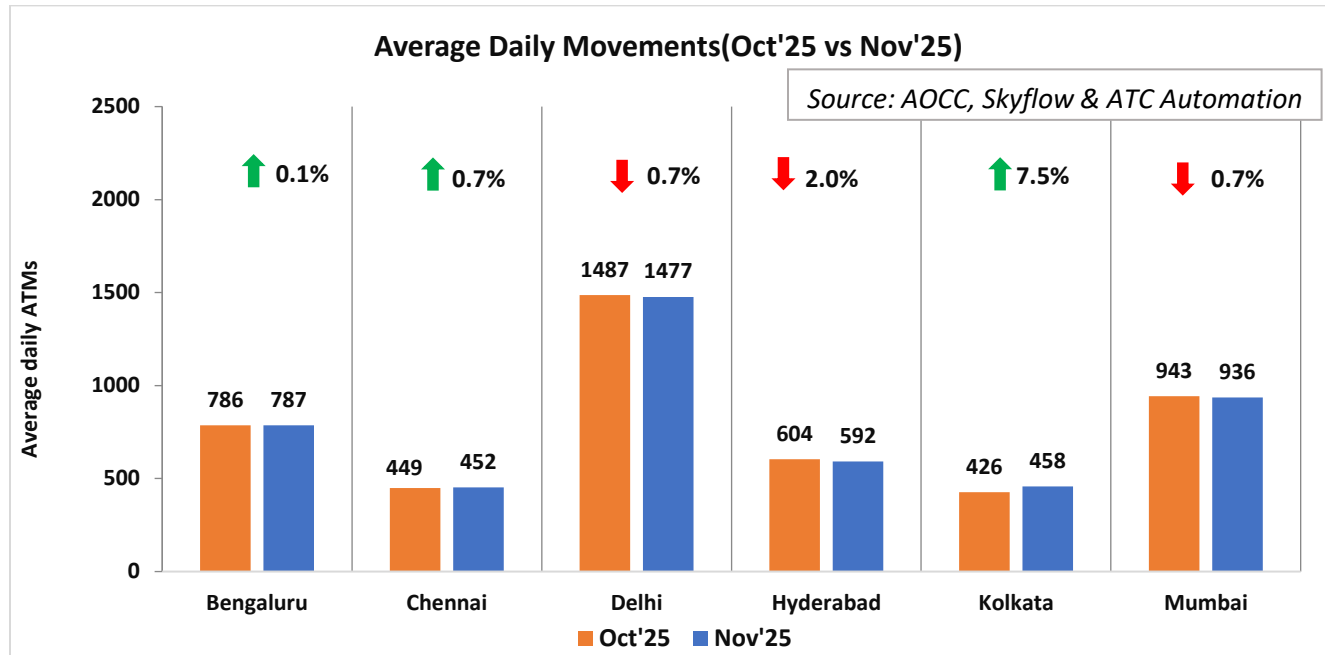
Figure 2: Average Daily Movements (Oct'25 vs Nov'25)

The above chart depicts the percentage change in average daily ATMs at six major Airports in November 2025 as compared to the previous month October 2025.

Airports\Year	Avg. Daily ATMs (YoY) for six major airports				
	Nov'21	Nov'22	Nov'23	Nov'24	Nov'25
Bengaluru	540	623	687	739	787
Chennai	323	339	404	431	452
Delhi	1210	1270	1290	1343	1477
Hyderabad	388	423	490	561	592
Kolkata	369	394	403	409	458
Mumbai	715	845	955	959	936

Air Traffic Movement for each day in November 2025 is plotted for Delhi, Mumbai, Bengaluru and Hyderabad Airport along with the percentage change w.r.t. Avg. Daily Movements for the same month.
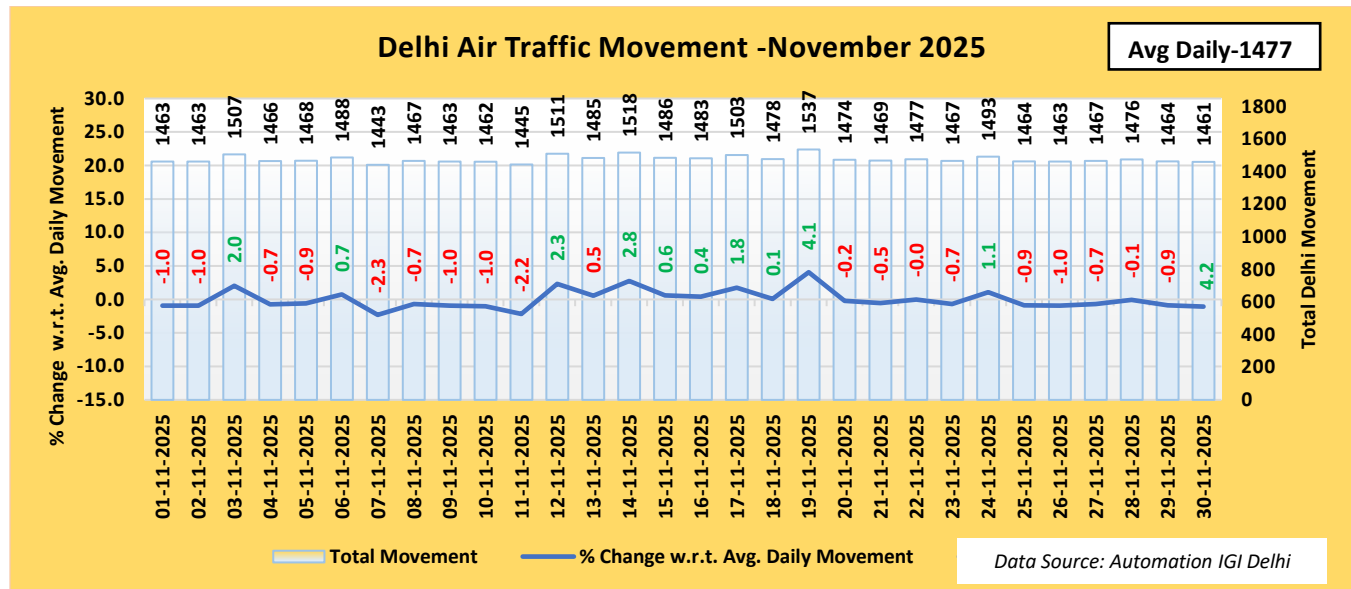
Figure 3: Air Traffic Movement for Delhi –Nov'25
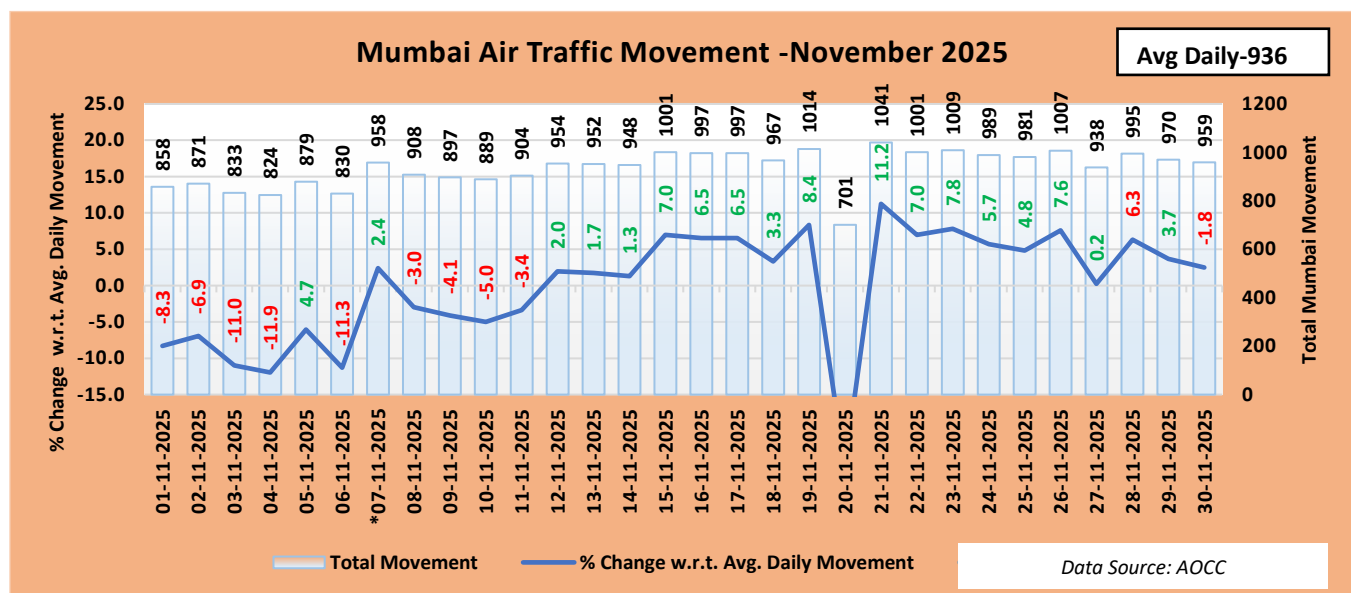
Figure 4: Air Traffic Movement for Mumbai – Nov'25
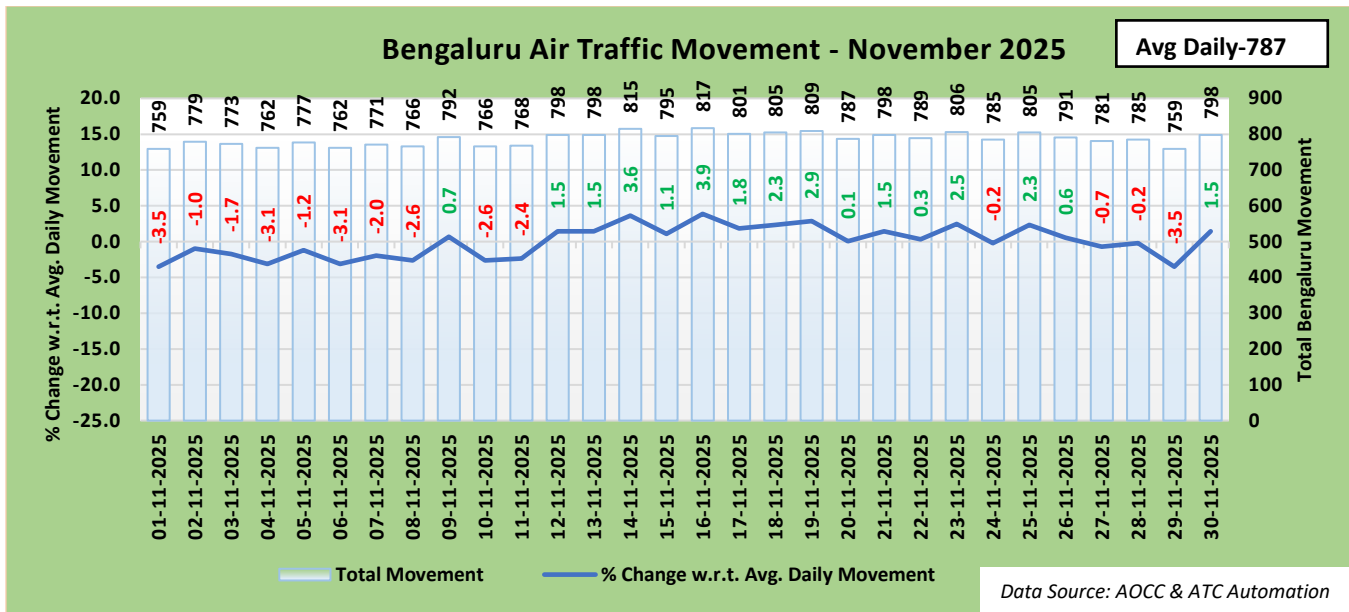
Figure 5: Air Traffic Movement for Bengaluru – Nov'25
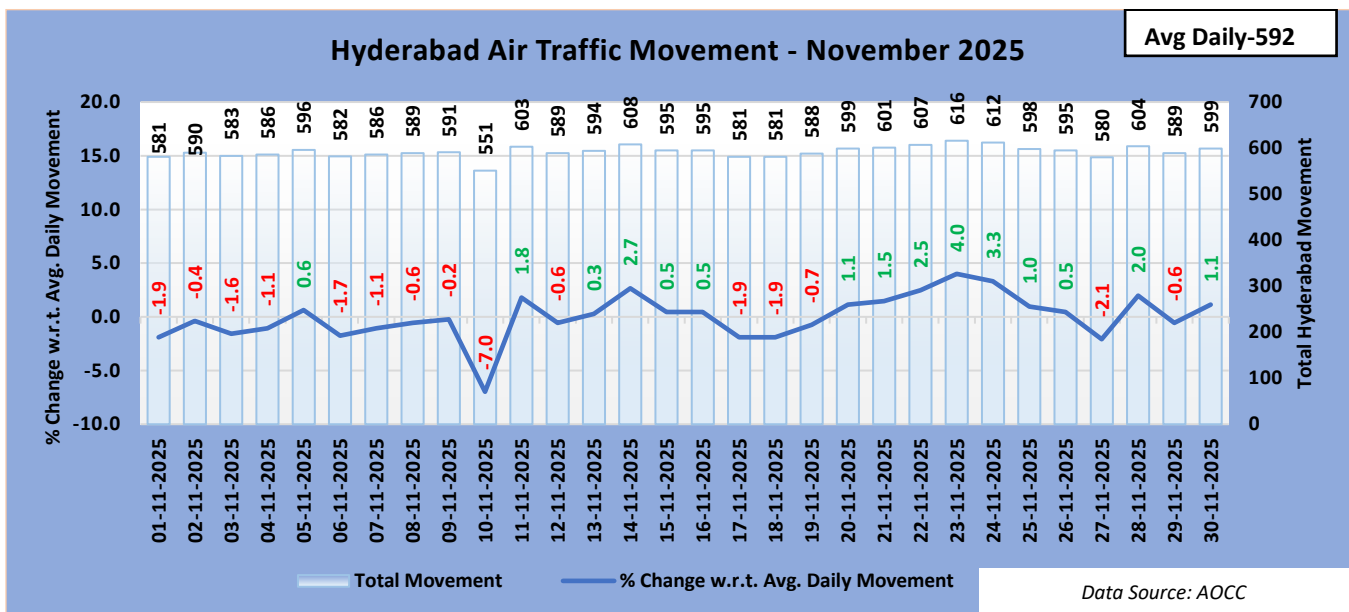
Figure 6: Air Traffic Movement for Hyderabad – Nov'25

It can be concluded from the above charts that the ATM at Delhi, Mumbai, Bengaluru and Hyderabad exceeds the average daily movement for 11 days, 18 days, 16 days and 15 days respectively in the month of November 2025.

II.   एटीएम की वार्षिक व मासिक तुलना/Comparison of total ATMs (YoY) and Monthwise

The total Air traffic movement(ATMs) including Passenger and other flights such as Cargo flights, International scheduled, International non-scheduled, Domestic scheduled, Domestic non-scheduled, Air taxi & commercial business flights at six major Indian Airports namely Delhi, Mumbai, Bengaluru, Hyderabad, Kolkata and Chennai is plotted for the month of November for two consecutive years 2024 and 2025 respectively. Air Traffic movement is also plotted Airline wise for the last six months for the major Scheduled Operators.
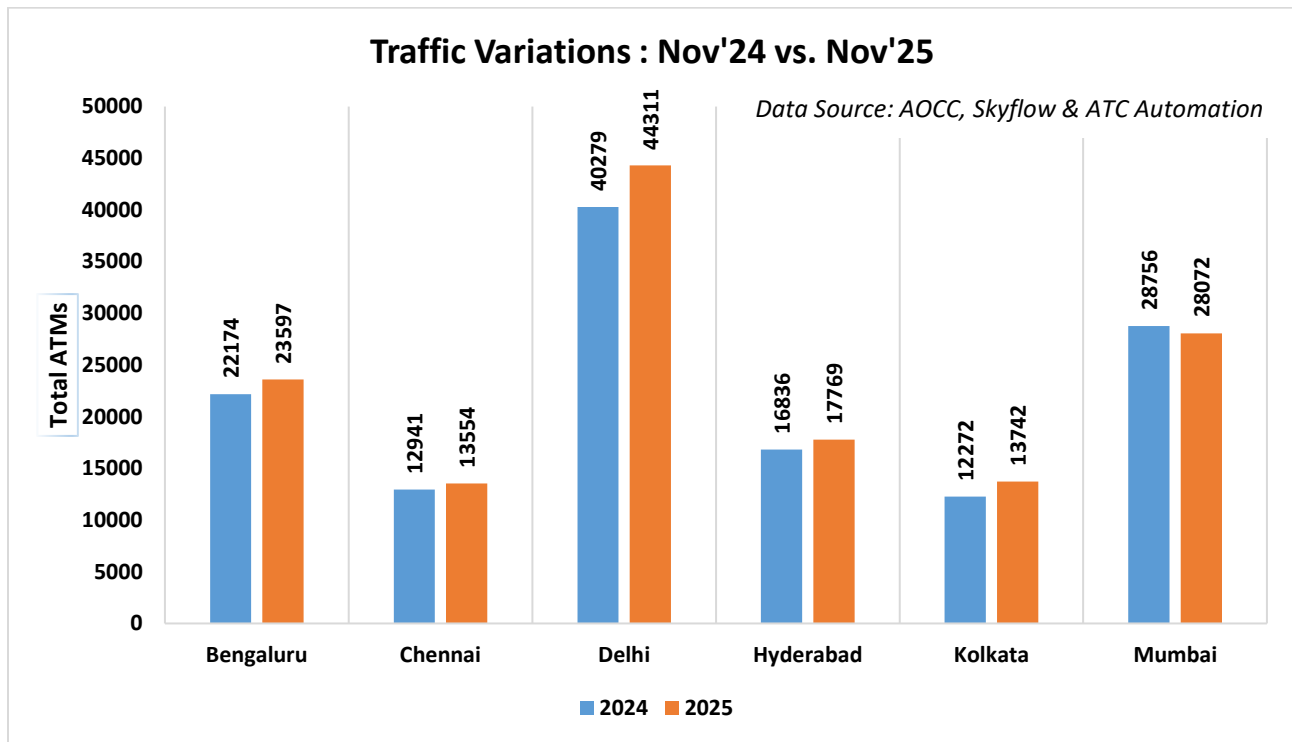
Figure 7: Traffic Variation (YoY)

III. उड़ान संचालन - एयरलाइन अनुसार/Flight Operations – Airlinewise
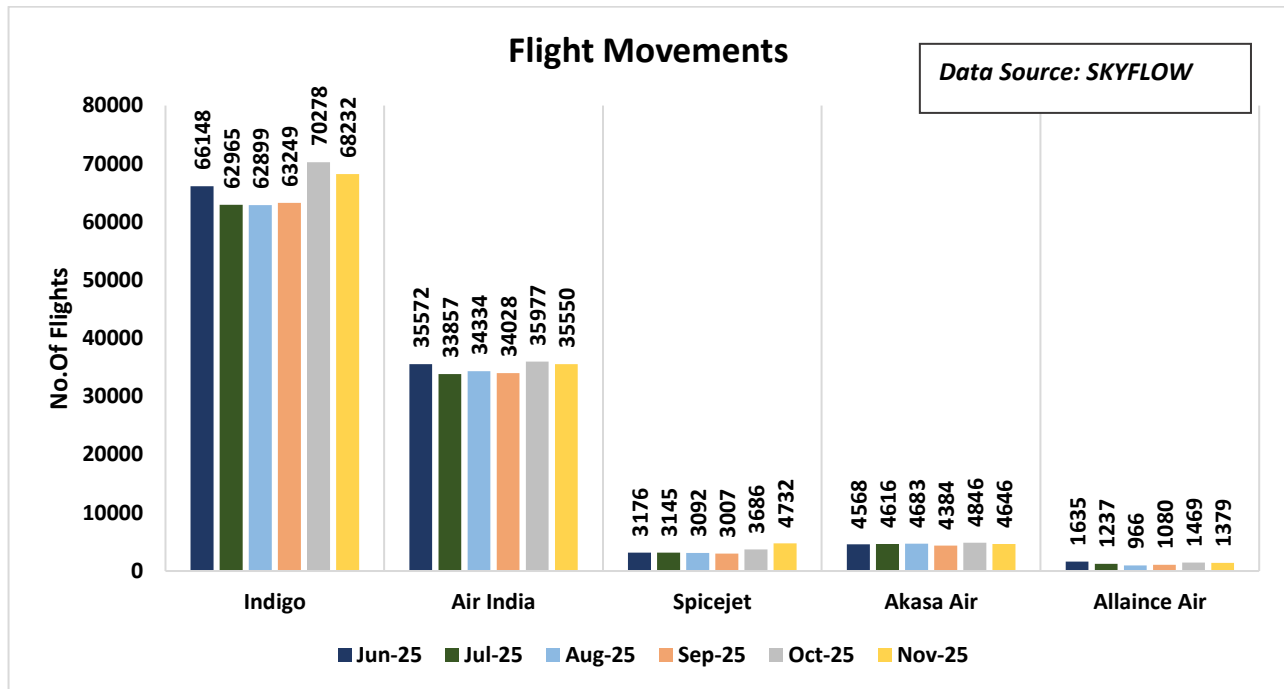
Figure 8: Flight Movements –Airlinewise

Inference:

1. Indigo,Air India and Spicejet airlines have recorded an increase whereas Alliance Air and Akasa Air has recorded a decrease in the monthly average(30 days) Flight movement in Nov'25 as compared to Oct'25.

C. सी.एटीएफएम पोस्ट ऑपरेशन - सीडीएम विश्लेषण

ATFM Post Operations – CDM Analysis

I. परिचय/Introduction

Analysis Period   **1ˢᵗ – 30ᵗʰ November 25**

Back Ground   During the above mentioned period**, Eight (08)** ATFM measures were applied **for Chennai Airport, Ten (10)** ATFM measures were applied **for Delhi Airport, Forty seven (47)** ATFM measures were applied **for Mumbai Airport and One (01)** ATFM measures was applied **for Raipur Airport** due to the following reasons as illustrated in the bar chart below:–
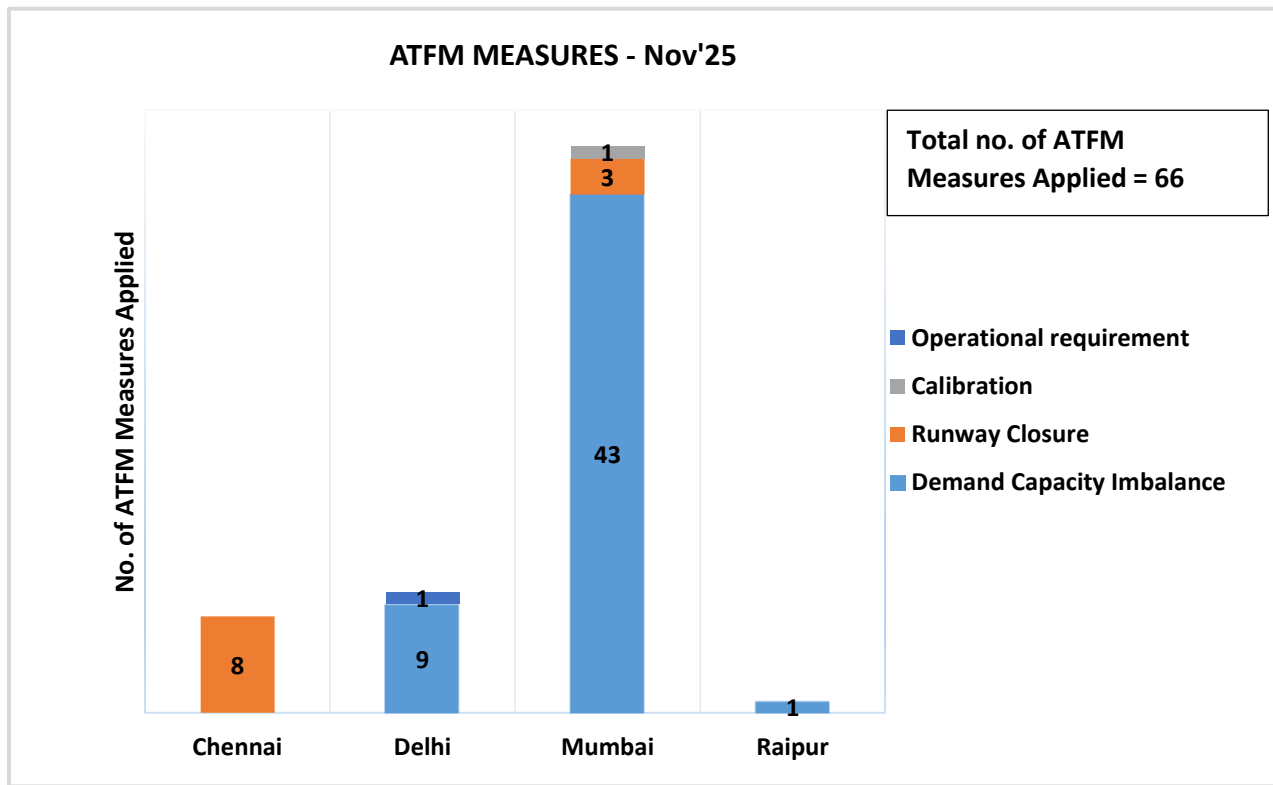
Figure 9: ATFM Measures –Nov'25

II. एटीएफएम मेजर्स का अवलोकन/ATFM Measures Overview

Constrained Airport	Chennai	Delhi	Mumbai	Raipur
Number of ATFM measures applied	8	10	47	1
Average ATFM Ground delay(in min) due to measures*	28.9	14.9	27.7	7.1
Maximum ATFM Ground delay(in min) due to measures	53	38	105	22
% Compliance	99.3	97.9	98.8	100

Note: * $Average\ ATFM\ Delay = \dfrac{Total\ ATFM\ Delay}{Total\ Domestic\ Arrivals}$

Total Arrivals	5159
Total International Arrivals(exempted)	1295
Total affected flights in scenario (Domestic Arrivals)	3864
Total Domestic Arrivals with zero ATFM delay	245
Total Domestic Arrivals with ATFM delay	3619

Affected Flight Statistics

6%

94%

■ Delayed flights   ■ Non-delayed flights
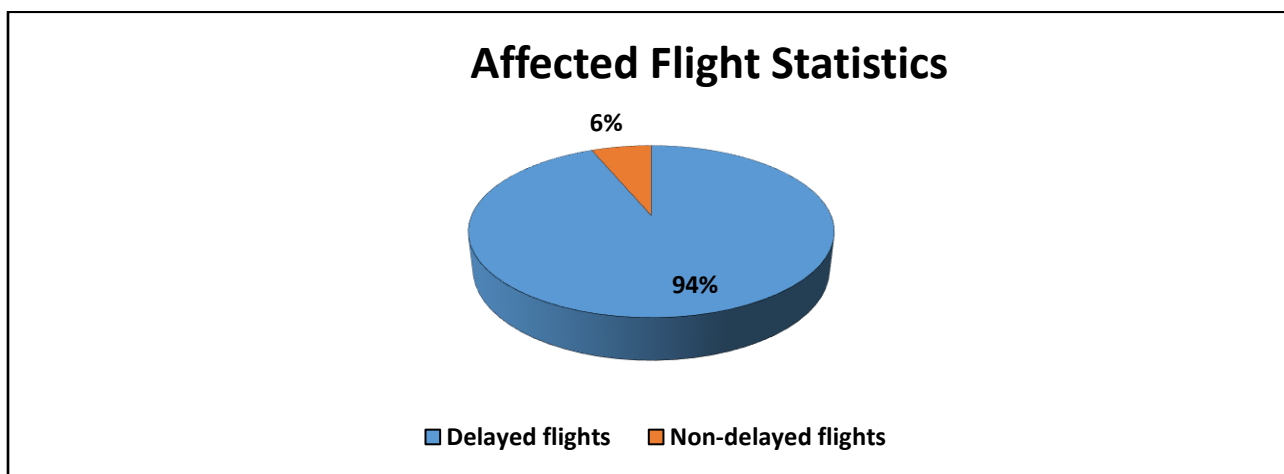
Figure 10: Affected Flight Statistics –Nov'25

III. समग्र अनुपालन/Overall Compliance

Total arrivals	5159
Domestic arrivals	3864
Flights with complete data (ATOT)	3837
Flights with incomplete data	9
Flights Not Operated	18
Compliant*	3783
Non-Compliant	54

*Total No. of Revised CTOTs issued = 1429 (Compliance calculation for flights which were issued revised CTOT is w.r.t. new CTOT issued)

Overall Compliance

2%

98%

■ Compliance   ■ Non-Compliance
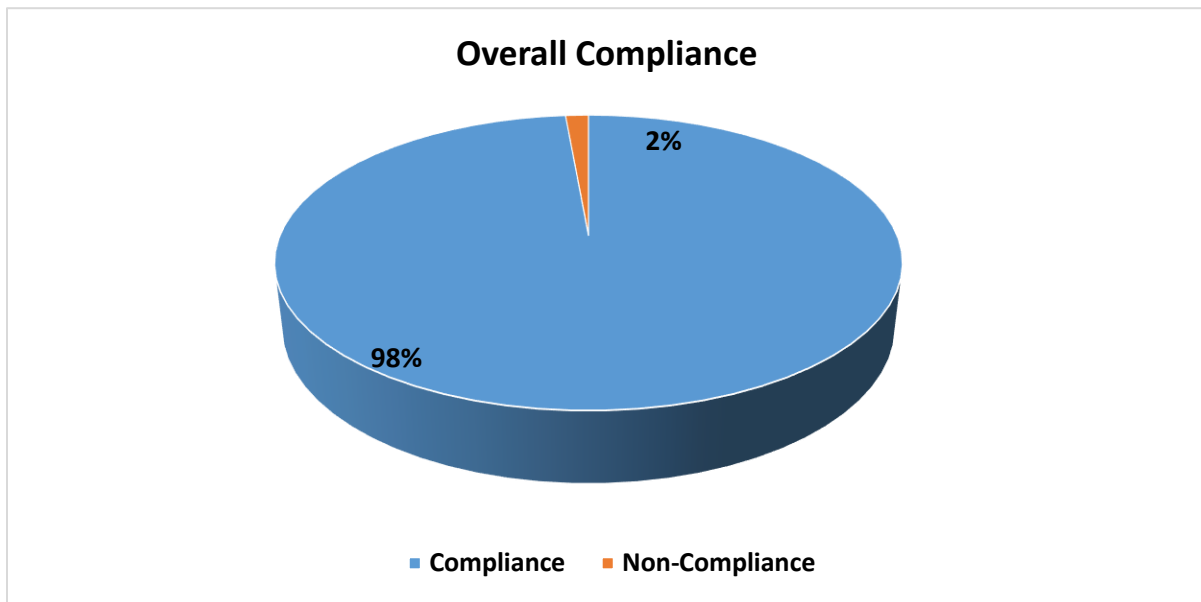
Figure 11: **Overall Compliance – Nov'25**

NOTE: Flights with required data (i.e. ATOT) are only considered for compliance measurement.

Out of the total domestic arrivals with complete data in the CDM scenario, 98% arrivals are compliant for the month of November 2025.

Figure 12: Compliance(Monthwise)
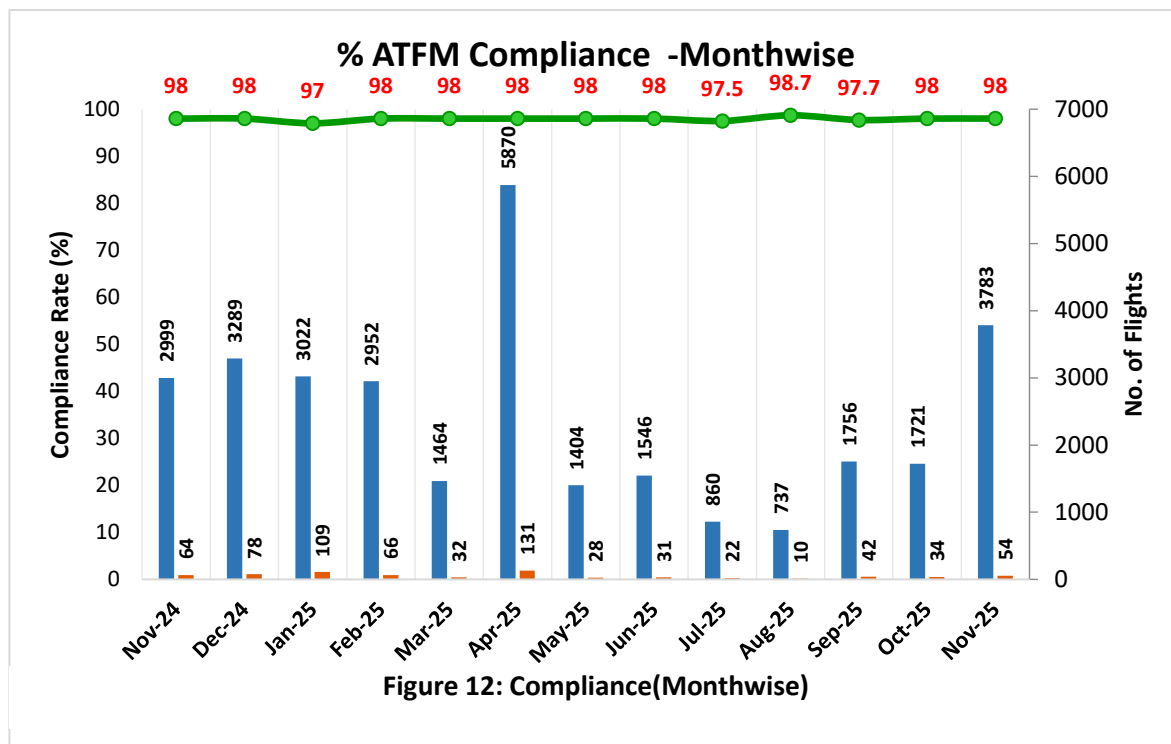
Inference

1. Out of the total arrivals captured(5159 flights) during the CDM scenario for the constrained Airports, 74.9% of flights i.e. domestic arrivals(3864 flights) were candidates for ground delay(participating).
2. Out of these Domestic Arrivals(3864), 93.6% (3619 flights) are assigned ATFM ground delay.
3. Out of the total arrivals captured(5159 flights) to the constrained Airport during the ATFM scenario, 70.2% of flights(3619 flights) were assigned ATFM Ground Delay.

IV. सीटीओटी अनुपालन दर -एयरपोर्टवाइज/CTOT Compliance rate – Airportwise

MUMBAI FIR (99%)*	Compliant	Non Compliant	% Compliant
Ahmedabad	151	2	99%
Amravati	1	0	100%
Aurangabad	28	0	100%
Mumbai	95	1	99%
Bhuj	4	2	67%
Vadodara	23	2	92%
Bhopal	27	0	100%
Diu	7	0	100%
Hirasar, rajkot	43	0	100%
Indore	63	0	100%
Jabalpur	17	0	100%
Jalgaon	15	0	100%
Jamnagar	23	0	100%
Kandla	7	0	100%
Kolhapur	3	0	100%
Keshod	1	0	100%
Nagpur	54	1	98%
Nasik	4	0	100%
Pune	25	2	93%
Porbandar	2	0	100%
Shirdi	11	0	100%
Solapur	3	0	100%
Surat	5	0	100%
Udaipur	68	0	100%
KOLKATA FIR (99%)*	Compliant	Non Compliant	% Compliant
Prayagraj	13	0	100%
Ayodhya	21	1	95%
Siliguri	55	0	100%
Varanasi	81	0	100%
Bhubaneswar	75	0	100%
Kolkata	212	0	100%

	Compliant	Non Compliant	% Compliant
Chakeri	4	1	80%
Durgapur	12	0	100%
Darbhanga	21	1	95%
Deoghar	1	0	100%
Gorakhpur	31	0	100%
Guwahati	60	1	98%
Gaya	4	0	100%
Hollongi	2	0	100%
Imphal	5	0	100%
Jharsuguda	12	0	100%
Jagdalpur	1	0	100%
Jorhat	2	0	100%
Aizawl	2	0	100%
Dibrugarh	4	0	100%
Patna	90	1	99%
Ranchi	39	1	98%
Raipur	51	0	100%
DELHI FIR (97%)*	Compliant	Non Compliant	% Compliant
Amritsar	43	1	98%
Adampur	9	0	100%
Bikaner	7	0	100%
Bhuntar	4	0	100%
Beas	1	1	50%
Bathinda	1	0	100%
Bareilly	6	0	100%
Chandigarh	47	1	98%
Dehradun	32	0	100%
Delhi	481	12	98%
Hindon	14	2	88%
Kangra	11	0	100%
Gwalior	8	0	100%
Jodhpur	34	2	94%
Jaipur	109	0	100%
Jaisalmer	12	1	92%
Jammu	25	2	93%
Leh	20	2	91%
Lucknow	53	0	100%
Pantnagar	3	0	100%

Srinagar	43	2	96%
Uttarlai	1	0	100%
CHENNAI FIR (99%)*	**Compliant**	**Non Compliant**	**% Compliant**
Hal Bangalore	9	0	100%
Bangalore	335	2	99%
Belgaum	7	0	100%
Vijayawada	35	0	100%
Coimbatore	75	0	100%
Kochi	101	4	96%
Calicut	7	0	100%
MOPA Goa	93	0	100%
Goa	121	1	99%
Shamsabad, Hyderabad	181	1	99%
Begumpet Hyderabad	4	0	100%
Vijaynagar	1	1	50%
Kannur	4	0	100%
Madurai	31	0	100%
Mangalore	42	0	100%
Chennai	181	0	100%
Mysore	1	0	100%
Port Blair	30	1	97%
Rajahmundry	11	0	100%
Salem	2	0	100%
Tuticorin	6	0	100%
Tirupati	15	0	100%
Tiruchirappally	7	0	100%
Thiruvananthapuram	29	1	97%
Visakhapatnam	12	1	92%

*FIR wise compliance rate (decimals rounded off to nearest integer value).
Note: The above list contains only those airports which had flights to the Constrained Airport and are affected by ATFM measures.
Airports with % compliance less than the average compliance(98%) for the month are highlighted in red.

V. सीटीओटी अनुपालन दर- एयरलाइनवाइज़/CTOT Compliance rate – Airlinewise

Overall Compliance Chart of Airline Operators - Nov'25
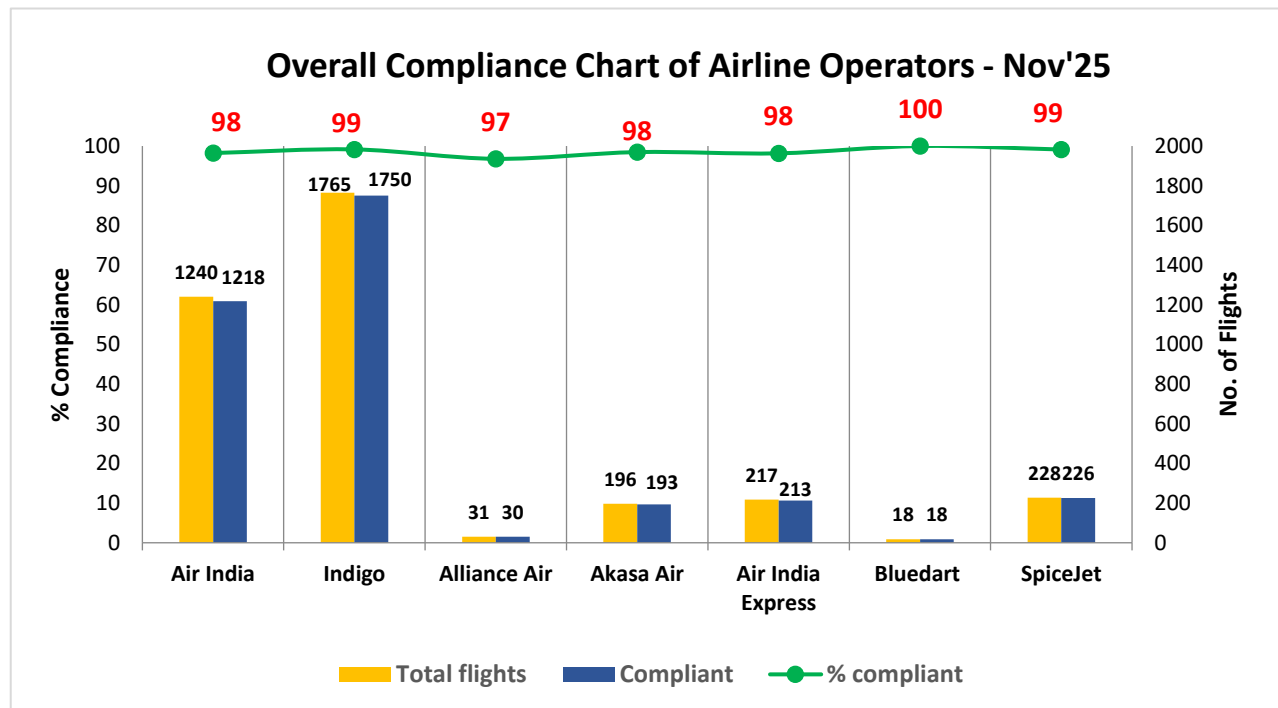
Figure 13: Airline wise Compliance –Nov'25

Inference

1. Chennai, Kolkata and Mumbai region record the highest compliance of 99% whereas Delhi region has the lowest percentage compliance of 97%.

2. Air India,Indigo, Akasa Air, Air India Express, Spicejet and Blue Dart have a CTOT compliance higher than or equal to the average recorded compliance for the month of November'25.

VI. गैर-अनुपालन का कारण/Reason For Non Compliance
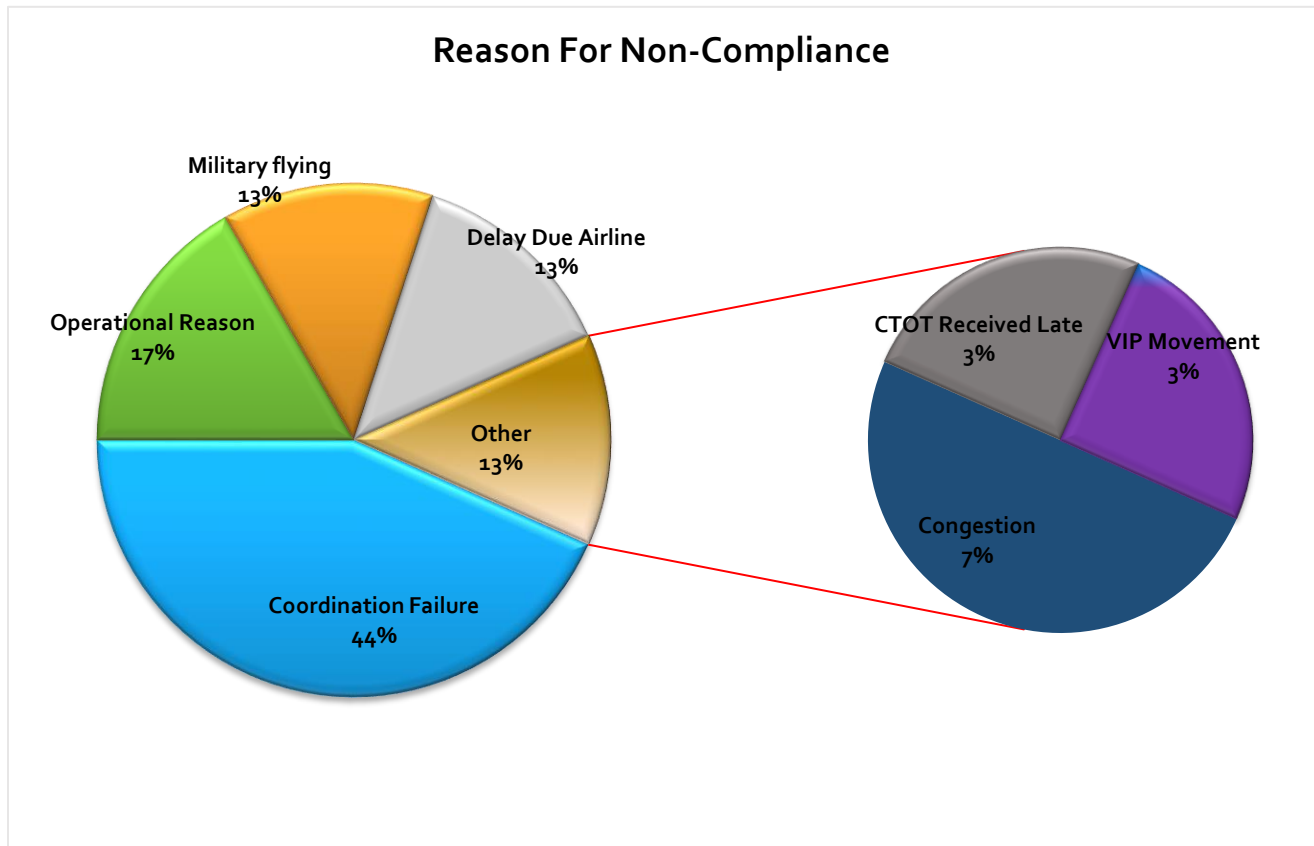
Figure 14: Reason for Non-Compliance as provided by FMPs

Inference:

1. 44 % of CTOT Non- Compliance was reported by concerned FMPs to be due to coordination failure between FMP and Station.

2. 17 % of the CTOT Non- compliance was due to operational reasons (due to Bird Activity on Runway, ATC handling emergency etc) and 13% due to military flying at the concerned station.

3. 13 % of the CTOT Non- compliance was reported by concerned FMPs to be due delay by airlines.

4. 7% each of the CTOT Non- compliance was due to congestion at concerned station and 3% each due VIP Movement and due to late receipt of CTOTs and by the time the aircraft had already initiated pushed back or start up.

VII.सीडीएम परिदृश्य अवधि के दौरान वायु विलंब/Air Delay during the CDM Scenario period

Average Air Delay to domestic arrivals* within the CDM Scenario period for Chennai, Delhi, Mumbai and Raipur was 7.8, 9.3, 13.7 and 13.6 minutes respectively.

*Note: Only calculated for domestic arrivals with both ATOT and ALDT information
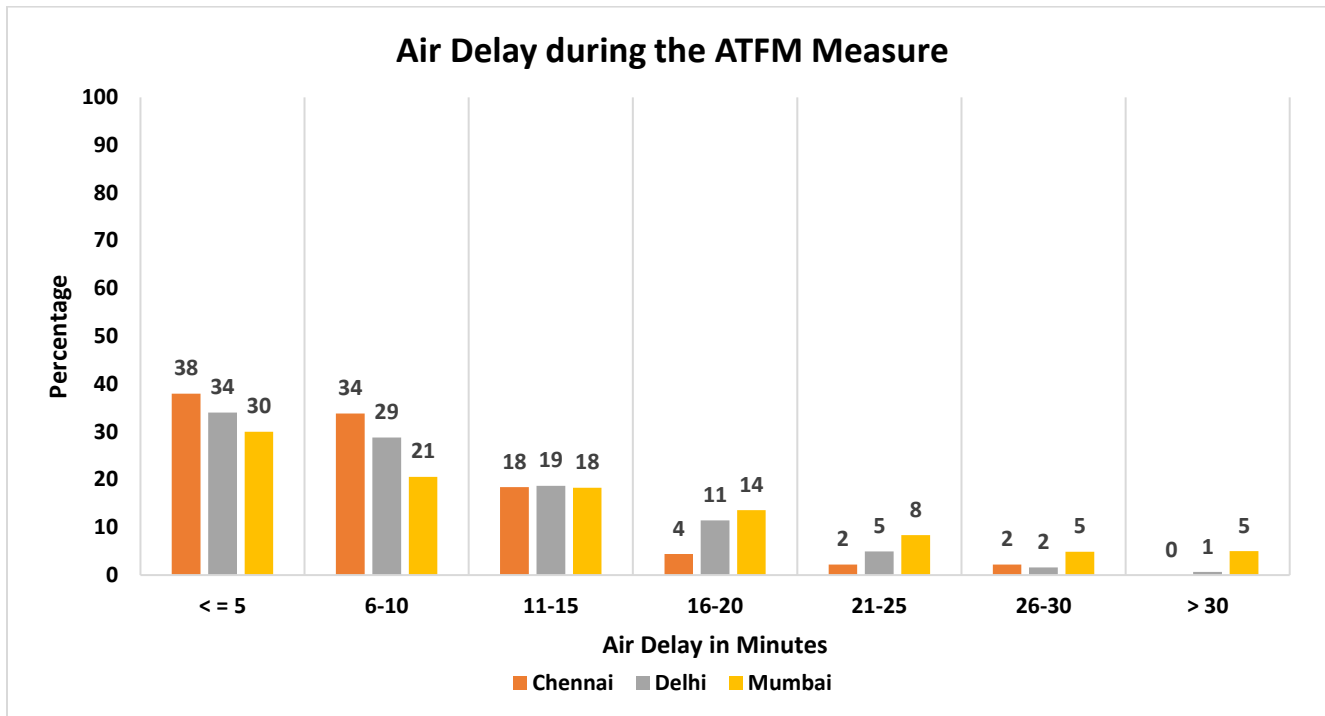
Figure 15: Air Delay distribution during the CDM period

Inference

1. 72% of domestic arriving flights to Chennai had an Air delay of equal to or less than 10 minutes during the CDM period.
2. 63% of domestic arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period.
3. 51% of domestic arriving flights to Mumbai had an Air delay of equal to or less than 10 minutes during the CDM period.

VIII. एटीएफएम उपायों के कारण मूर्त लाभ/Tangible Benefits due to ATFM Measures

A modest attempt is made to find out the tangible benefit of ATFM measures applied.

Assumptions:

•When ATFM measures are not in force, all flights take off at their ETOT where Estimated take off time(ETOT)= Estimated off block time(EOBT) + default taxi time

•All flights have an Estimated elapsed time(EET) as calculated by SKYFLOW using the Flight Plan information and Basic Aircraft data.

Methodology:

Air delay (with ATFM measures in force) is calculated during the period when ATFM measures are in force by summing the air delay for all the flights landing at constrained Airport.

i.e. **Total Air Delay = ∑ (Actual Flying time – SKYFLOW calculated EET)**

Air delay (with no ATFM measures) is calculated as the sum of Air delay for all the flights during the above said period with no ATFM measures in place and the air delay for each flight is the difference in its ideal landing time and its ideal estimated landing time.

Total Air Delay (with no ATFM measures) = **∑ (Ideal LDT - Ideal ELDT)**

*Ideal LDT is taken by assuming every flight is landing at a specified interval based on the Arrival acceptance rate(AAR) defined,

*Ideal ELDT = ETOT + SKYFLOW calculated Flying time

Fuel Saving Calculation :

Great Circle Distance(GCD)* was calculated for all the arrivals during the ATFM Measure from the point of origin to destination. Assuming Airbus 320 as reference aircraft for flights (flight distance equal to or less than 3000 nm) and B777 for international flights (flight distance more than 3000nm):

Fuel consumption (Kgs / nm) for each affected flight in the scenario was then calculated using the Reference document: ICAO Carbon emissions calculator methodology, version10, Appendix C: ICAO Fuel Consumption Table.

The Fuel consumed per minute(Kg/min) was calculated for each affected flight.

Total Air Delay(with ATFM Measures)= 57187 mins

Total Air Delay (with no ATFM measures) = 82887 mins

Reduction in Air delay due to ATFM measures= (82887-57187) = **25700 mins**

Fuel Saving Calculation:

 Total Fuel saved during the ATFM Measure: ***16,95,361.78 Kg***

***Total reduction in CO$_2$ emission : 3.16(KgCO$_2$/kg fuel)* 16,95,361.78** Kg = 53,57,343.23 Kg*

*GCD (Great Circle Distance): The distance between origin and destination airports is derived from latitude and longitude coordinates originally obtained from ICAO Location Indicators database.

3.16 = constant representing the number of tonnes of CO2 produced by burning a tonne of aviation fuel.

D. शब्दकोश/**Glossary**

ATFM Parameters	Definition
Affected Flight statistics	An insight of participating traffic in the scenario i.e. ratio of the domestic arrivals to the constrained airport affected by ATFM measures (assigned delay by the Ground Delay Program) to the domestic arrivals not affected by ATFM measures (not assigned any delay) within the CDM scenario.
ATFM Ground delay	ATFM ground delay defined as CTOT-ETOT (Calculated take off time – Estimated take off time)
Average ATFM delay	$$\frac{Total\ monthly\ ATFM\ delay\ (in\ minutes)}{Total\ Domestic\ Arrivals}$$
Maximum ATFM delay	Maximum ATFM delay (in minutes) assigned in the month
Overall compliance rate	Defined as monthly ATFM departure slot adherence rate of regulated flights. Flights having ATOT within theATFM Slot Tolerance Window (STW) of minus 5 to plus 10 minutes of CTOTs, are considered as compliant flights
CTOT Compliance rate of Airline operators	An overview of CTOT compliance rate of various Airline operators
CTOT Compliance rate of Airports within different Regions	An overview of CTOT compliance rate of Airports within 4 FIRs
Air delay statistics	Air delay defined as difference between AET & EET, whereAET(actual elapsed time) can be obtained from (ALDT-ATOT) and estimated elapsed time(EET)can be obtained from FPL/RPL or (CLDT-CTOT). **Therefore, Air delay = AET-EET** Average Air Delay is calculated as: $$Average\ Air\ Delay = \frac{Total\ Air\ Delay\ to\ domestic\ arrivals\ (with\ values\ greater\ than\ zero)}{Total\ Domestic\ Arrivals}$$ *CLDT: Calculated Landing Time* *CTOT: Calculated Take off Time* *ALDT: Actual Landing Time* *ATOT: Actual Take off Time*

Annexure-A

एयरलाइनों द्वारा सामान्य व्यावसायिक नियमों (सीबीआर) की उड़ान योजना आवश्यकताओं का अनुपालन - नवंबर 2025

Compliance by Airlines with Flight Planning Requirements of Common Business rules(CBR)- November 2025.

I. Introduction:

Accurate and timely input in respect of flight intent is paramount to the correct traffic demand projection and eventually effective ATFM implementation. FPLs remain the main source of tactical demand prediction for ATFM systems. Early filing of error free FPL helps in improving the lead time required for ATFM measures and reduces the number of unexpected flights(pop-up). This in turn helps in improving the accuracy of demand-capacity imbalance prediction and optimizes slot utilization.
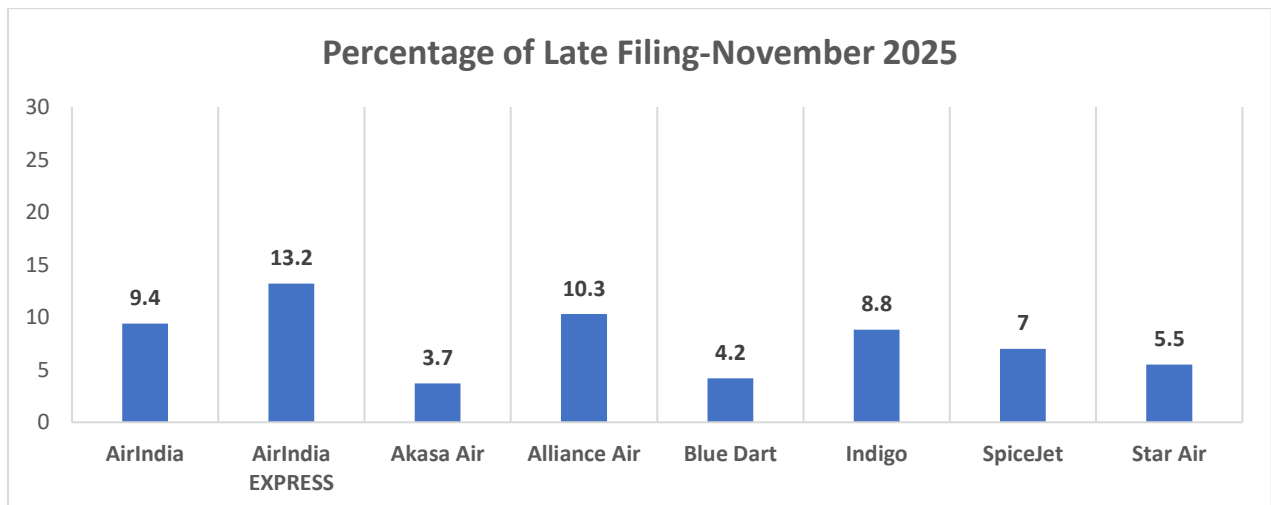
AIP India, ENR 1.9 section 4 on Flight Planning in the context of ATFM recommends Flight Planning requirements for all Airline Operators –

a) Flight plans shall be submitted at least 3 hours before the estimated off block time (EOBT);
b) The window for filing FPL is between 3 Hours and 120 Hours (Five days) before the EOBT. Earlier filing of FPL will give a realistic demand data to the CCC and hence the requirement of ATFM measures can be identified early for better planning. Late filing of a flight plan will lead to inaccuracies in predicting the demand and may lead to undesirable delay;"

II. Analysis

A. An analysis has been conducted to find out the difference between the flight plan filing time and filed EOBT for all the FPLs received at ATFM system from 1st November 2025 to 30th November 2025.
The purpose of the analysis is to monitor the compliance with provisions of AIP India, section 4, ENR 1.9 regarding Flight Planning requirements in context of the ATFM.

This flight plan filing requirement has been reiterated through the recently agreed ATFM common business rules (CBR) document and is recognized as a metrics to be monitored regularly for any improvement.
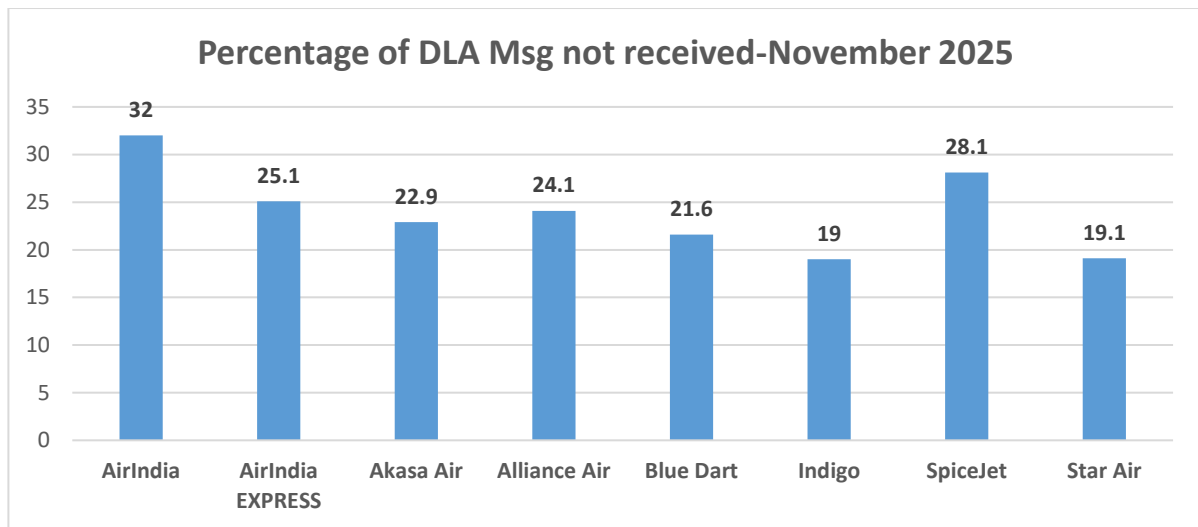

Percentage of Late Filing-November 2025

Airline	Percentage
AirIndia	9.4
AirIndia EXPRESS	13.2
Akasa Air	3.7
Alliance Air	10.3
Blue Dart	4.2
Indigo	8.8
SpiceJet	7
Star Air	5.5

The table below lists number of filed flight plans (FPLs) with less than 3 Hours prior to EOBT:

Name of Airline	Late Filed FPL	Total No. Of FPL	% Delayed Filing
AirIndia	1918	20343	9.4
AirIndia EXPRESS	1922	14599	13.2
Akasa Air	172	4680	3.7
Alliance Air	137	1333	10.3
Blue Dart	25	597	4.2
Indigo	5805	66314	8.8
SpiceJet	347	4966	7.0
Star Air	92	1687	5.5
Total no. of FPLs for Scheduled Airlines	**10418**	**114519**	**9.1**

B. For the analysis of non-receipt of DLA (Delay) messages for flight plans filed, the EOBT of FPL received has been compared with Actual Take off time (ATOT)received through DEP(Departure)messages.
Thus, only those FPLs were considered for analysis for which DEP messages were available and no associated DLA messages was received.

The Table below lists number of flights for which no DLA message was received in November 2025. **{(EOBT of original FPL)- (ATOT received)} > 30 minutes)**

Name of Airline	DLA Message not received	Total No. of flights considered for analysis	% of flights for which no DLA message was received
AirIndia	4472	13987	32.0
AirIndia EXPRESS	1991	7927	25.1
Akasa Air	632	2755	22.9
Alliance Air	139	576	24.1
Blue Dart	78	361	21.6
Indigo	8001	42140	19.0
SpiceJet	637	2265	28.1
Star Air	97	508	19.1

Percentage of DLA Msg not received-November 2025

Airline	Value
AirIndia	32
AirIndia EXPRESS	25.1
Akasa Air	22.9
Alliance Air	24.1
Blue Dart	21.6
Indigo	19
SpiceJet	28.1
Star Air	19.1

C. For analysis of non-receipt of CNL (cancel) messages for November 2025, annulled FPLs were considered for which no CNL/DEP/DLA messages were received. A FPL gets annulled in SKYFLOW system, if it doesn't get activated through Dep message /surveillance data/ manual activation by FMP within a defined system parameter.

The table below lists the number of Flights for which no CNL Msg. was received in November 2025:

Name of Airline	CNL message not received	No. of flights annulled
AirIndia	313	314
AirIndia EXPRESS	247	250
Akasa Air	77	78
Alliance Air	111	112
Blue Dart	15	16
Indigo	1184	1194
SpiceJet	86	88
Star Air	49	50

Note: Due to non-receipt or delayed receipt of AFTN messages during the period 06-11-2025 to 08-11-2025, the above data analysis may contain certain inaccuracies.

Annexure-B

बंगाल की खाड़ी सहयोगी वायु यातायात प्रवाह प्रबंधन (बीओबीसीएटी): अनुपालन रिपोर्ट नवंबर 2025

Bay of Bengal Co-operative Air Traffic Flow Management (BOBCAT): Compliance Report November 2025.

I. Introduction:

On 24 July 2006, the States of the ICAO Asia/Pacific Region within the Bay of Bengal, South Asia and Pakistan airspace implemented an operational trial of an automated Air Traffic Flow Management (ATFM) service under the auspices of the ICAO Bay of Bengal ATS Coordination Group - ATFM Task Force. Pursuant to comprehensive reviews of the performance of the operational trial by the ATFM Task Force, ATFM procedures were permanently implemented.

Bay of Bengal cooperative ATFM system (BOBCAT), services were temporarily suspended since 08th September 2021, due to the absence of Enroute overflight Air Traffic Service (ATS) in Afghanistan airspace (Kabul FIR) and lack of traffic demand to operate through the Kabul FIR.

The States of the ICAO Asia/Pacific Region, which have westbound night time flights operating through the Kabul FIR between 2000 UTC to 2359 UTC, re-activated the integrated Air Traffic Flow Management (ATFM) service using the BOBCAT wef 04 September 2025. However, enroute ATS service in the Kabul FIR remain unavailable. Aircraft's are operating through Kabul airspace via designated routes using Traffic information broadcast by aircrafts (TIBA) with larger longitudinal separation of 15 minutes.

India is also part of BOBCAT reactivation group. Accordingly, AAI has also published AIP supplement 139 of 2025 effective from 04.09.2025 for the reactivation of Bay of Bengal Cooperative Air Traffic Flow Management (BOBCAT) Procedures and Implementation of BOBCAT Services. The cited AIP supplement contains the detailed processes, procedure, and duties and responsibilities of the stakeholders.

The cited AIP supplement is complimented by NOTAM G-325 issued by Kabul FIR OAKX and/or any subsequent relevant NOTAM issued by Kabul FIR OAKX.

II. Analysis:

The compliance analysis is performed only for departures from India participating in the BOBCAT. As it is an airspace program the compliance window for the same is from -5 minutes to +5 minutes of the CTOTs issued.

No. of Compliant Flights	No. of Non- Compliant Flight	Total
170	78	248

A) BOBCAT Compliance Overview:

BOBCAT Compliance Statistics

■ Compliant Flights   ■ Non-Compliant flights
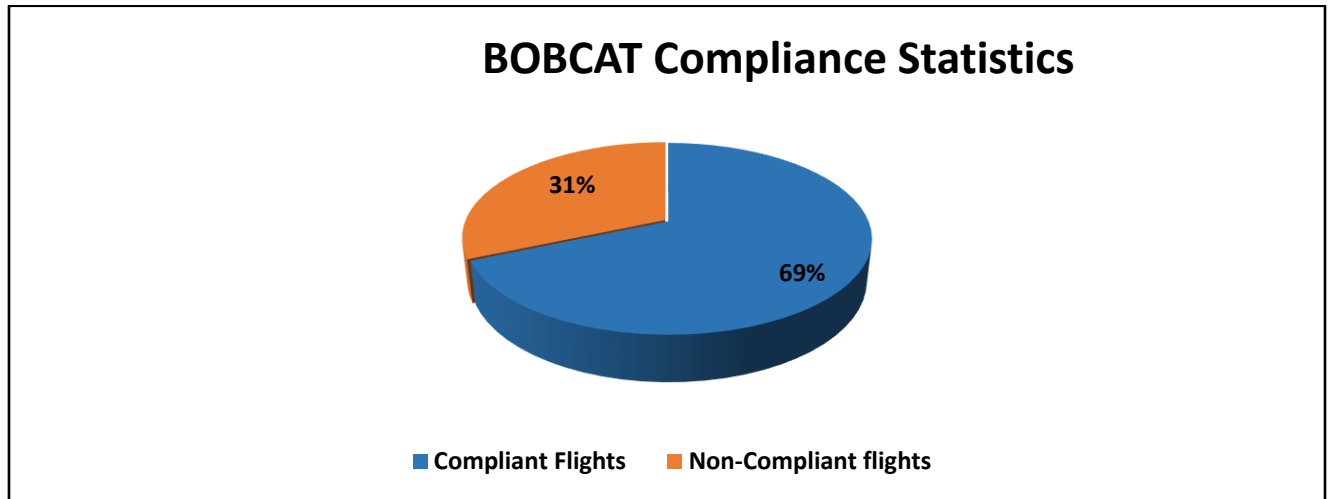
B) Station Wise Compliance:

Percentage Compliance: Station-wise

■ No. of Compliant Flights   ■ No. of Non -Compliant Flights   ● %Compliance
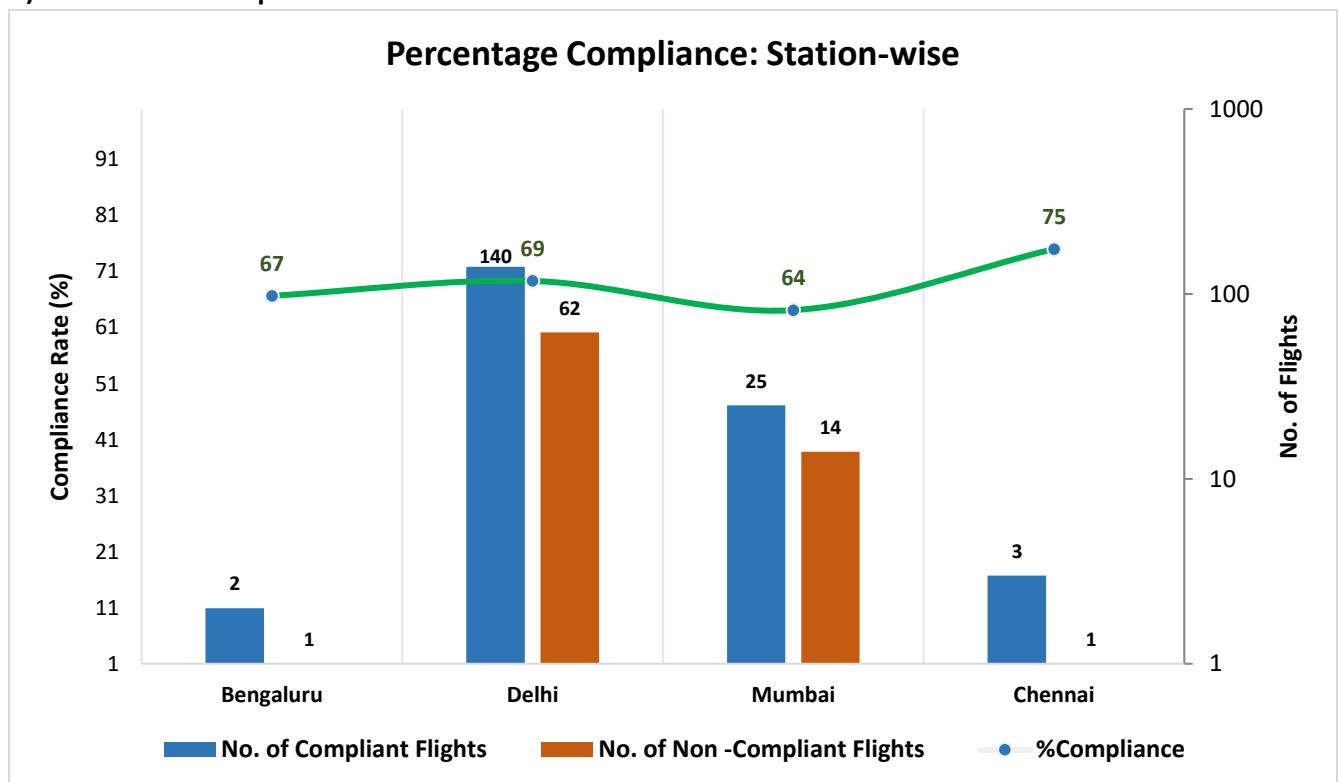
	Bengaluru	Delhi	Mumbai	Chennai

No. Of Compliant Flights	2	140	25	3
No. of Non-Compliant Flights	1	62	14	1
Compliance %	67	69	64	75

C) Airline wise Compliance:

Percentage Compliance: Airline-wise

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