

पोस्ट ऑपरेशन विश्लेषण रिपोर्ट

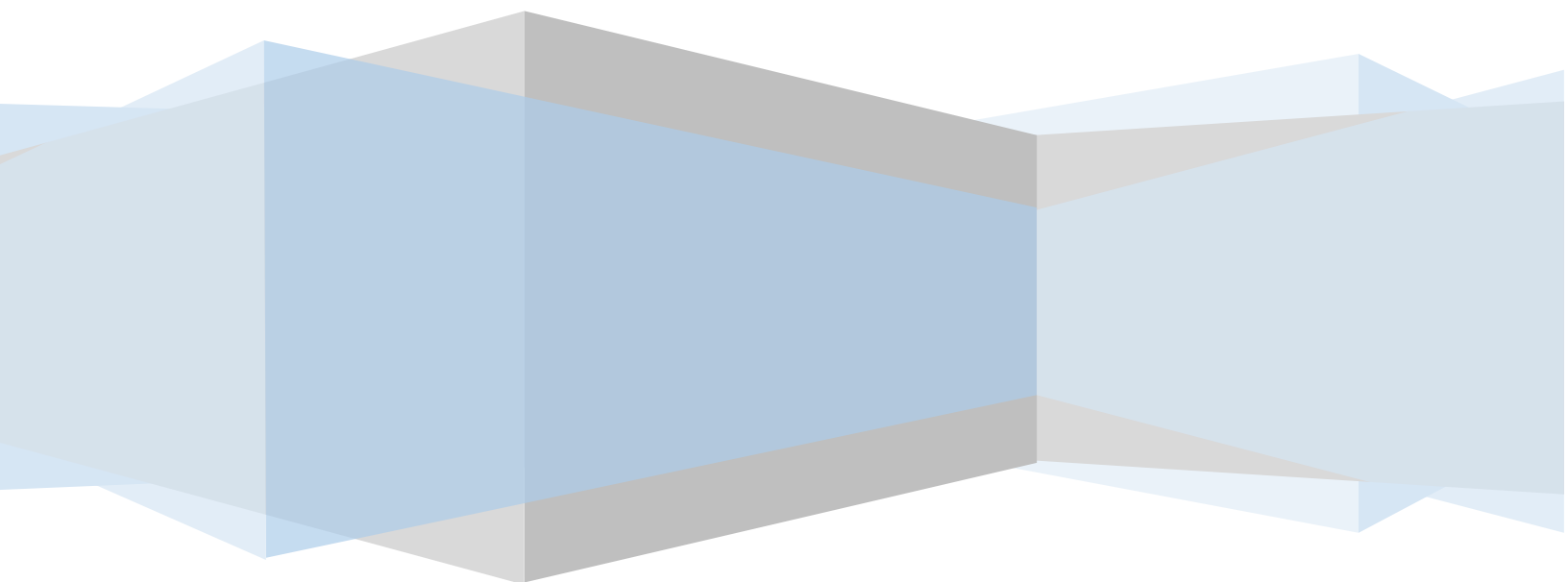
जून, 2025

सेंट्रल कमांड सेंटर, सी ए टी एफ एम, दिल्ली

POST OPERATIONS ANALYSIS REPORT

June, 2025

CENTRAL COMMAND CENTER, C-ATFM, DELHI





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A. कार्यकारी सारांश/Executive Summary

Average Domestic air traffic (30 days) has recorded a decrease of 2.5% whereas the average international air traffic has decreased by 1.6 % in the month of June 2025 as compared to May '25.

On average, the Indian Airports in the ATFCM area saw 4832 IFR flights per day in the month of June 2025. The peak days were on 14th June 2025 (5158 IFR flights). Friday's were the busiest days throughout this month with an average of 4925 IFR flights per day.

Total Thirty Four (34) ATFM measures were applied this month during periods of congestion at Bengaluru, Chennai, Delhi and Mumbai Airport.

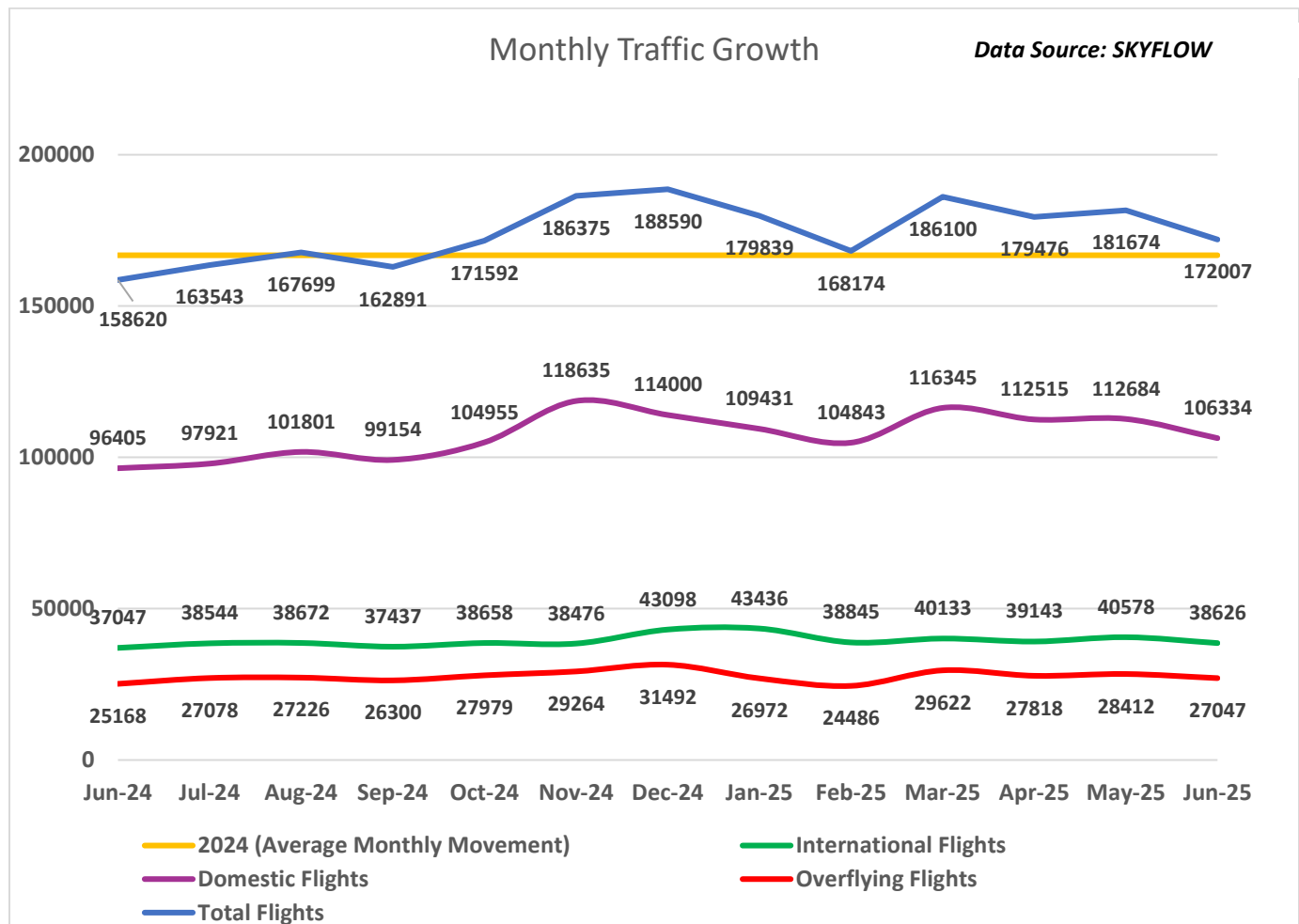


Figure 1: Monthly Traffic Growth

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

B. यातायात विश्लेषण/Traffic Analysis

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

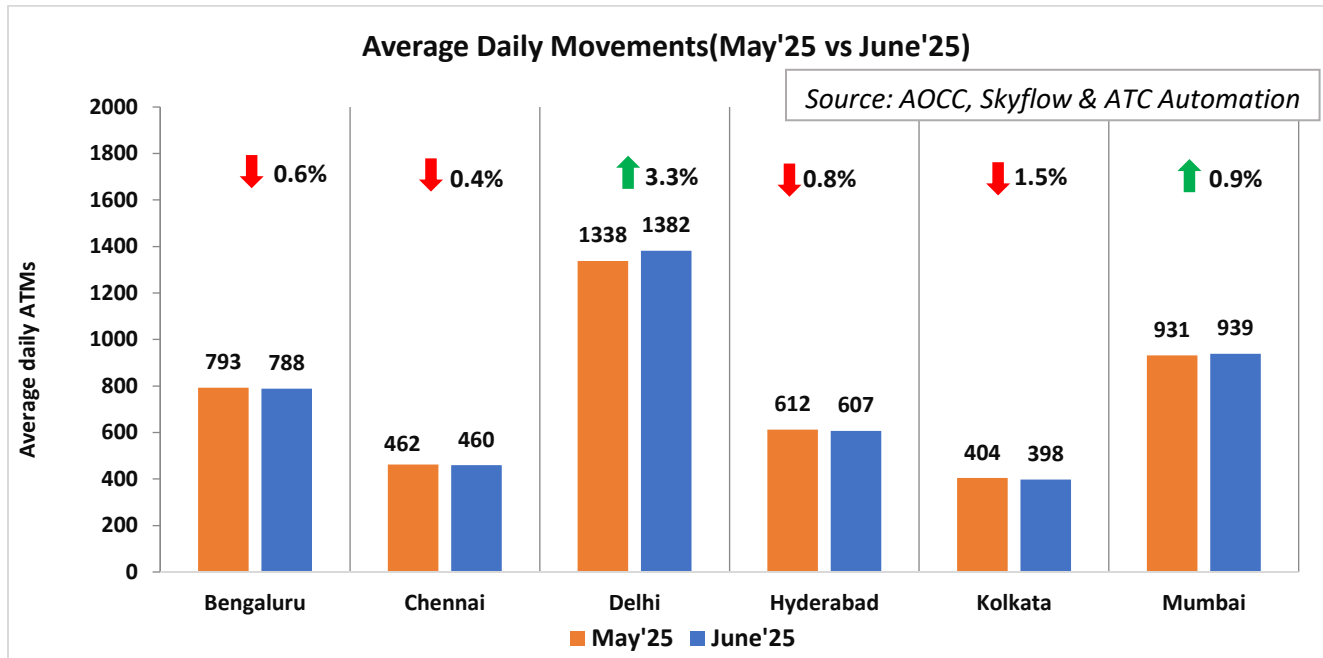


Figure 2: Average Daily Movements (May'25 vs June'25)

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

Airports\Year	Avg. Daily ATMs (YoY) for six major airports				
	June'21	June'22	June'23	June'24	June'25
Bengaluru	221	571	638	712	788
Chennai	150	369	394	406	460
Delhi	584	1232	1219	1340	1382
Hyderabad	176	441	457	515	607
Kolkata	151	390	379	401	398
Mumbai	299	783	872	926	939



Air Traffic Movement for each day in June 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.

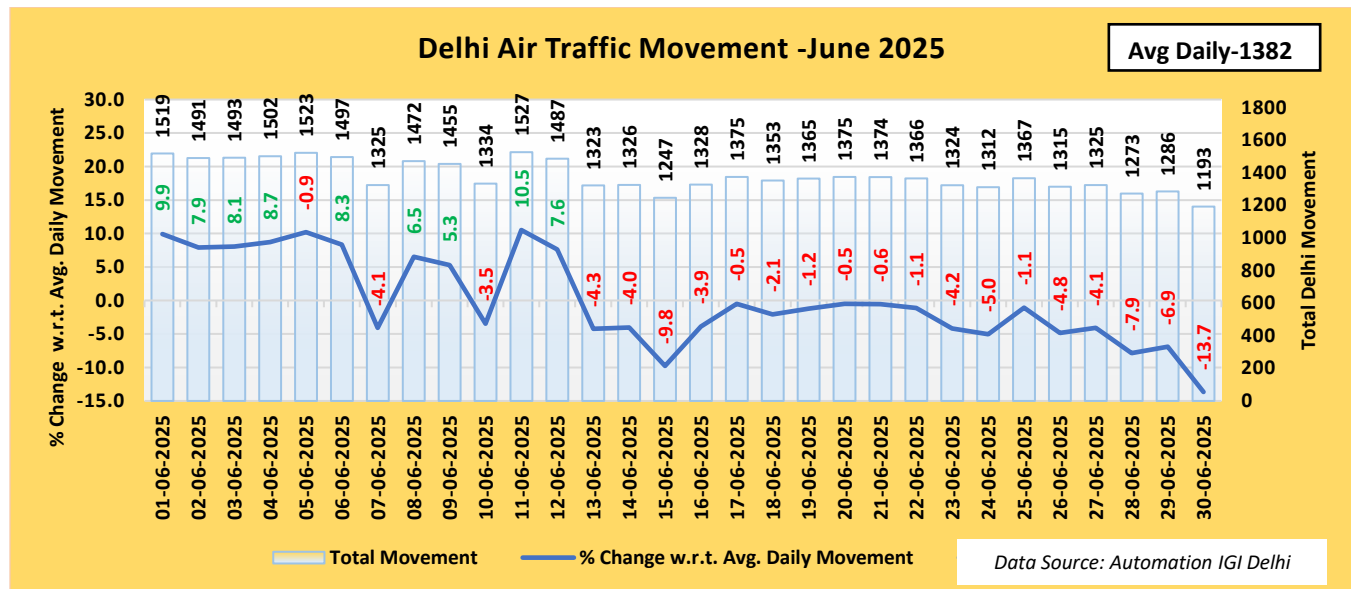


Figure 3: Air Traffic Movement for Delhi –June'25

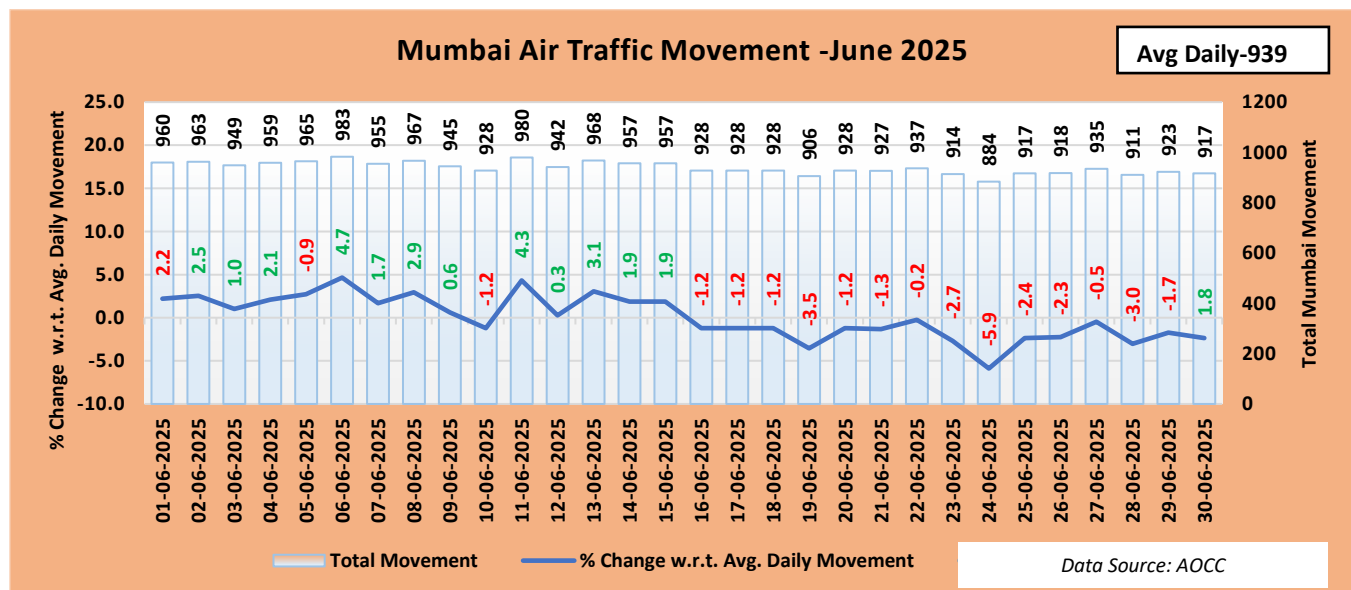


Figure 4: Air Traffic Movement for Mumbai – June'25

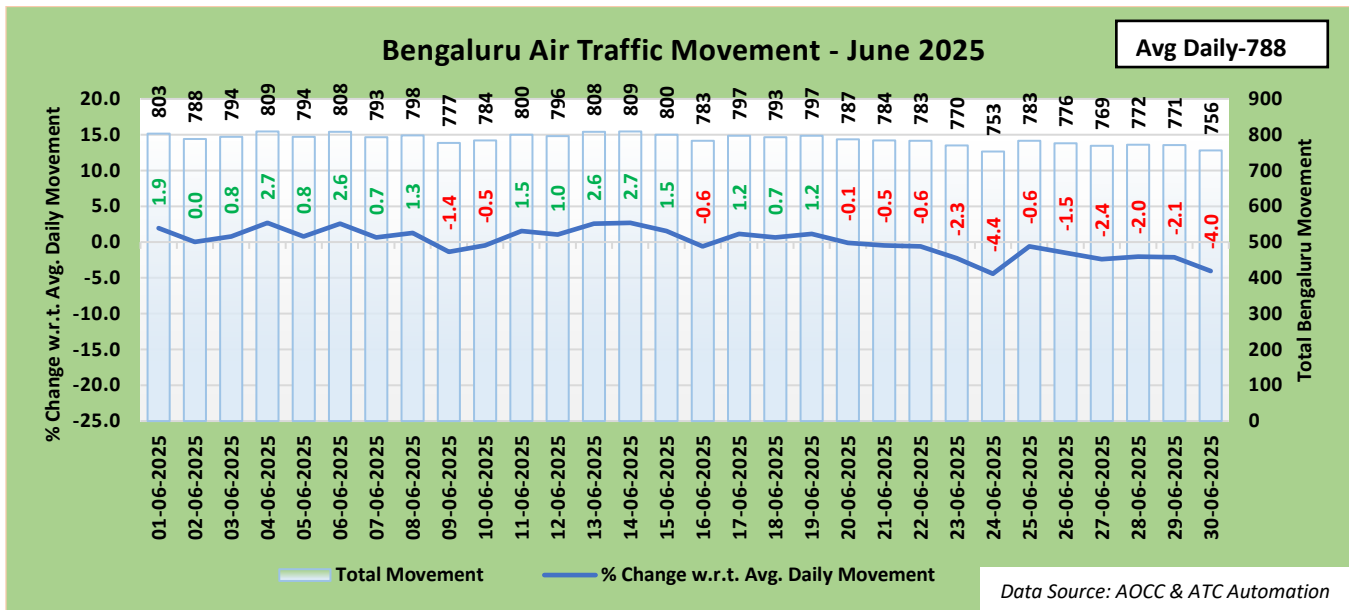


Figure 5: Air Traffic Movement for Bengaluru – June'25

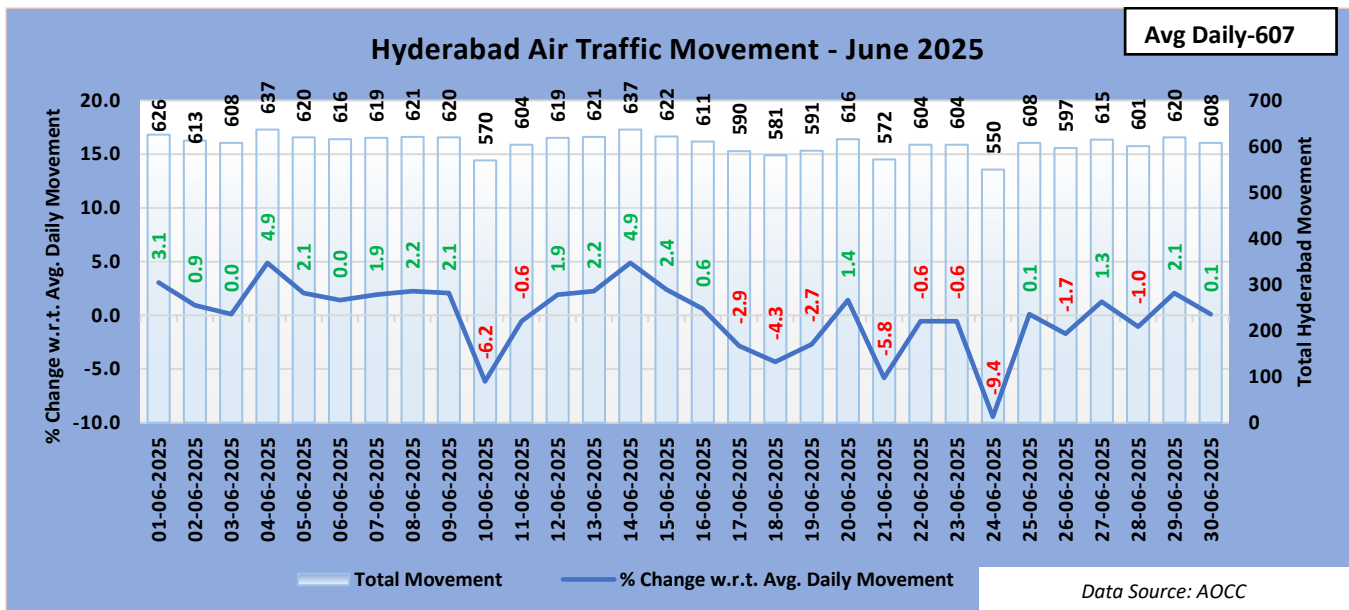


Figure 6: Air Traffic Movement for Hyderabad – June'25

It can be concluded from the above charts that the ATM at Delhi, Mumbai, Bengaluru and Hyderabad exceeds the average daily movement for 9 days, 13 days, 16 days and 19 days respectively in the month of June 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 June 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.

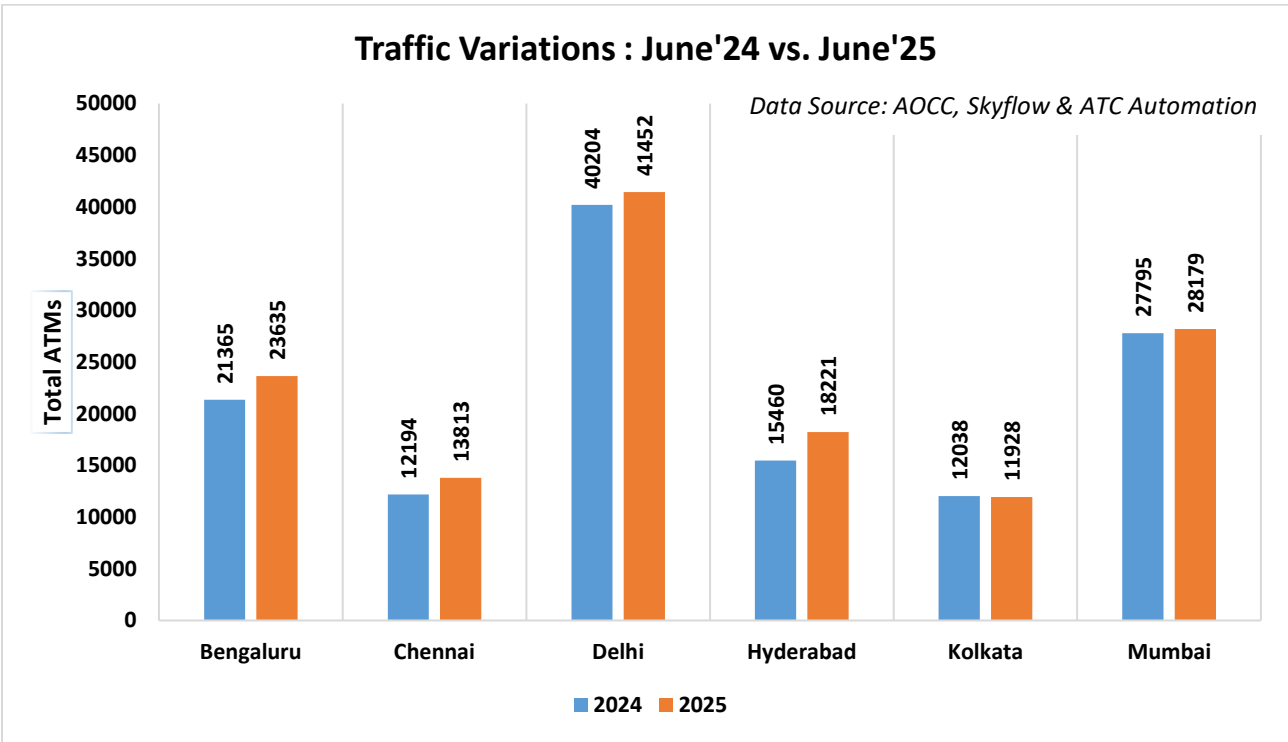


Figure 7: Traffic Variation (YoY)

III. उड़ान संचालन - एयरलाइन अनुसार/Flight Operations – Airlinewise

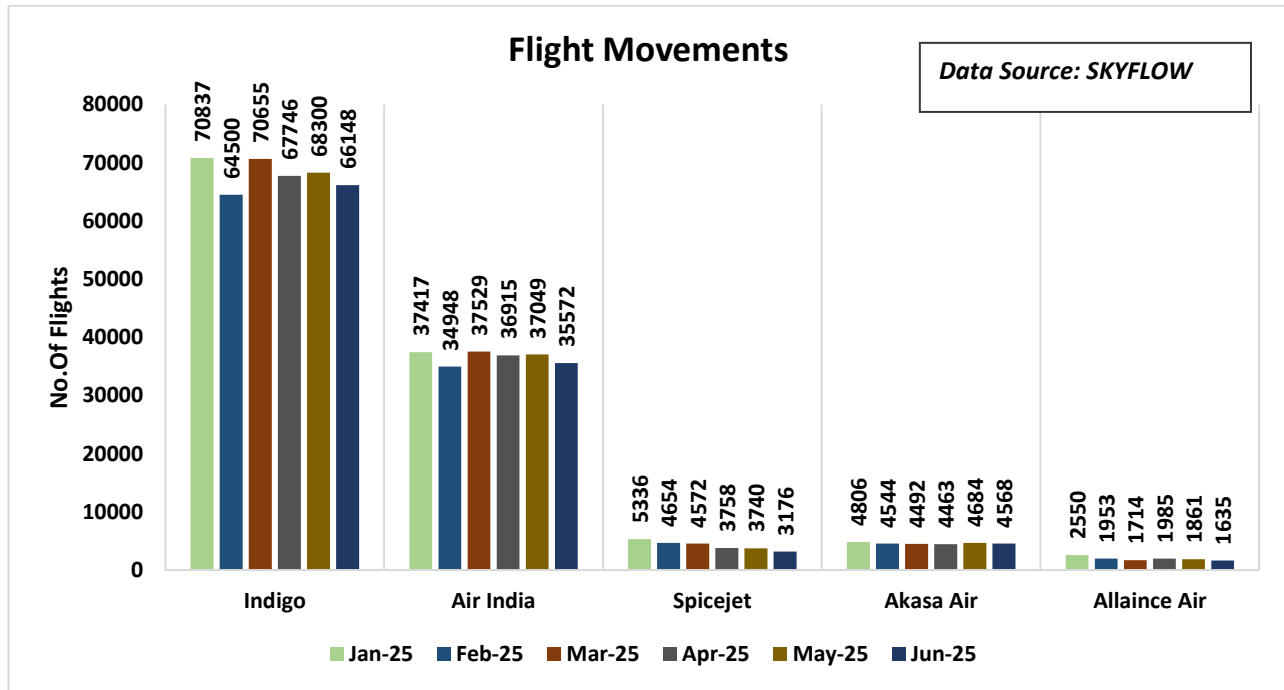


Figure 8: Flight Movements –Airlinewise

Inference:

1. Akasa and Indigo airlines have recorded an increase in the monthly average(30 days) Flight movement in June'25 as compared to May'25 while Alliance air, Air India, Spicejet airlines have recorded a decline during the same period.

C. सी.एटीएफएम पोस्ट ऑपरेशन - सीडीएम विश्लेषण

ATFM Post Operations – CDM Analysis

I. परिचय/Introduction

Analysis Period 1st – 30th June 25

Back Ground During the above mentioned period, **One (01)** ATFM measures were applied for **Bengaluru Airport**, **Eight (08)** ATFM measures were applied for **Chennai Airport**, **Twelve (12)** ATFM measures were applied for **Delhi Airport** and **Thirteen (13)** ATFM measures were applied for **Mumbai Airport** due to the following reasons as illustrated in the bar chart below:–

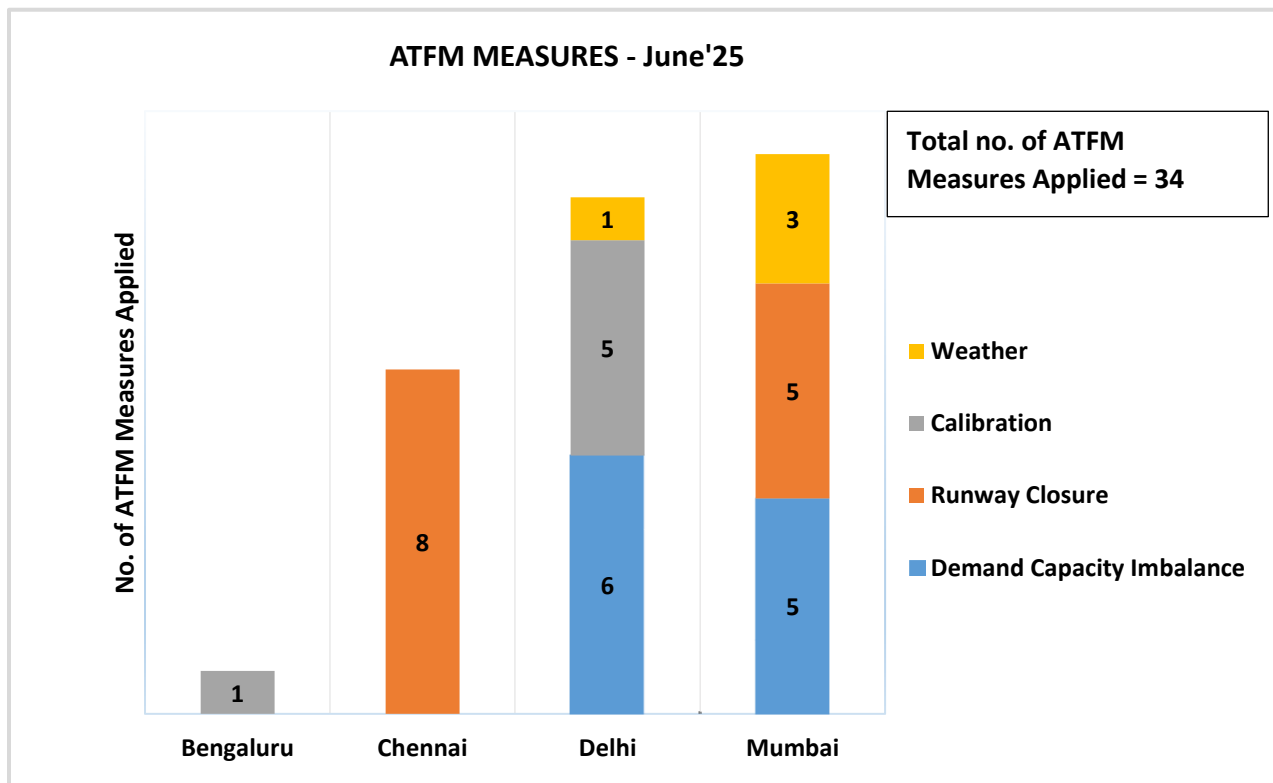


Figure 9: ATFM Measures –June'25

II. एटीएफएम मेजर्स का अवलोकन/ATFM Measures Overview

Constrained Airport	Bengaluru	Chennai	Delhi	Mumbai
Number of ATFM measures applied	1	8	12	13
Average ATFM Ground delay(in min) due to measures*	27.1	27.9	14.6	25.6
Maximum ATFM Ground delay(in min) due to measures	47	65	53	82
% Compliance	92.3	98.6	97.5	99

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

Total Arrivals	2096
Total International Arrivals(exempted)	463
Total affected flights in scenario (Domestic Arrivals)	1633
Total Domestic Arrivals with zero ATFM delay	126
Total Domestic Arrivals with ATFM delay	1507

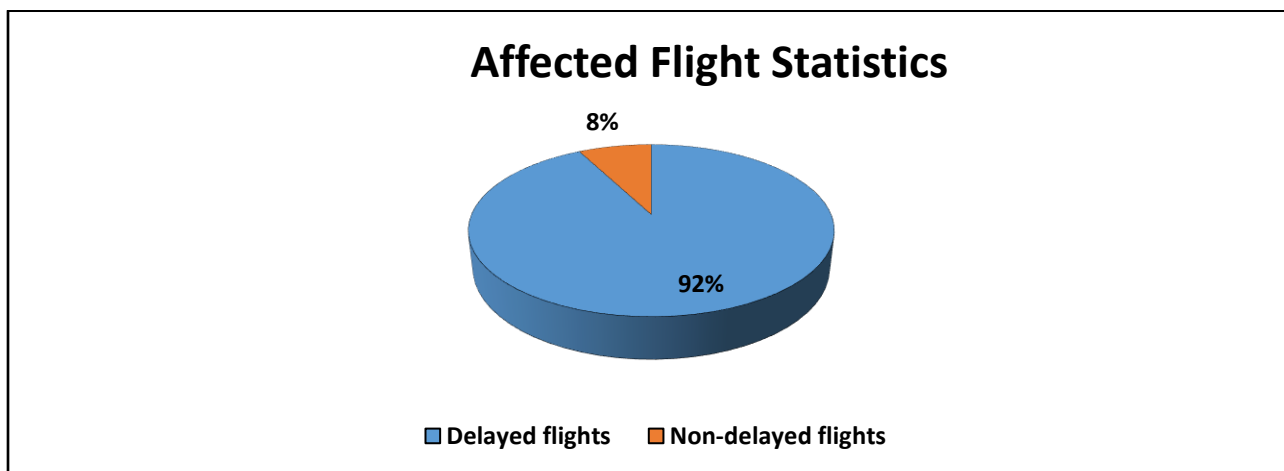


Figure 10: Affected Flight Statistics –June’25

III. समग्र अनुपालन/Overall Compliance

Total arrivals	2096
Domestic arrivals	1633
Flights with complete data (ATOT)	1577
Flights with incomplete data	7
Flights Not Operated	49
Compliant*	1546
Non-Compliant	31

*Total No. of Revised CTOTs issued = 487 (Compliance calculation for flights which were issued revised CTOT is w.r.t. new CTOT issued)

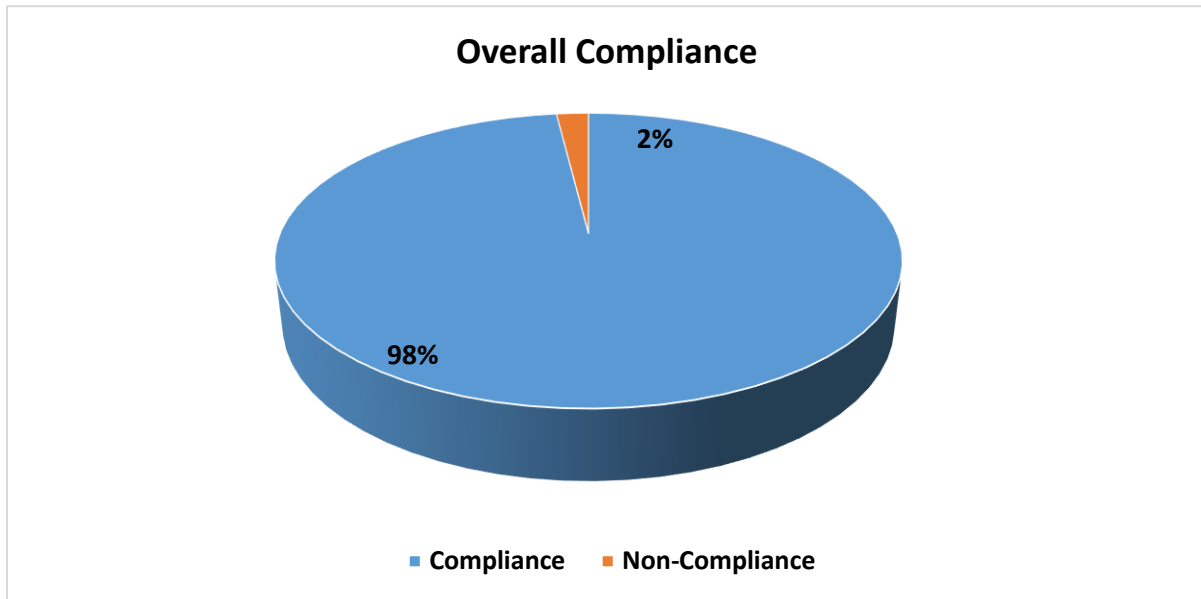


Figure 11: Overall Compliance – June'25

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 June 2025.

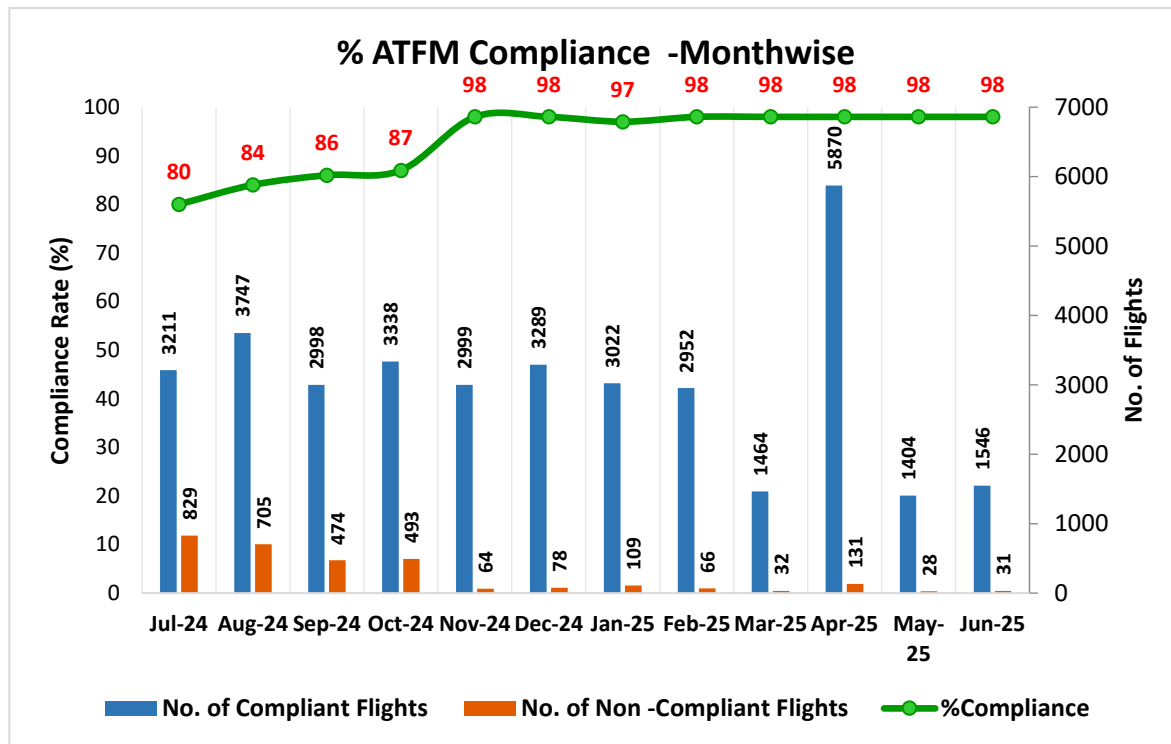


Figure 12: Compliance(Monthwise)

Inference

1. Out of the total arrivals captured(2096 flights) during the CDM scenario for the constrained Airports, 77.9% of flights i.e. domestic arrivals(1633 flights) were candidates for ground delay(participating).
2. Out of these Domestic Arrivals(1633), 92.3% (1507 flights) are assigned ATFM ground delay.
3. Out of the total arrivals captured(2096 flights) to the constrained Airport during the ATFM scenario, 71.9% of flights(1507 flights) were assigned ATFM Ground Delay.



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

MUMBAI FIR (97%)*	Compliant	Non Compliant	% Compliant
Ahmedabad	46	1	98%
Aurangabad	5	0	100%
Mumbai	99	4	96%
Bhuj	7	2	78%
Vadodara	9	0	100%
Bhopal	19	0	100%
Bhavnagar	1	0	100%
Diu	2	0	100%
Hirasar, rajkot	11	0	100%
Indore	19	0	100%
Jabalpur	7	0	100%
Jamnagar	7	0	100%
Kandla	4	0	100%
Kolhapur	2	0	100%
Nagpur	13	0	100%
Nasik	1	0	100%
Pune	23	1	96%
Shirdi	5	0	100%
Surat	11	0	100%
Udaipur	16	0	100%
KOLKATA FIR (98%)*	Compliant	Non Compliant	% Compliant
Prayagraj	6	0	100%
Agartala	4	0	100%
Ayodhya	13	0	100%
Siliguri	43	1	98%
Shillong	0	1	0%
Varanasi	34	0	100%
Bhubaneswar	28	0	100%
Bilaspur	2	0	100%
Kolkata	78	0	100%
Chakeri	1	0	100%



Durgapur	6	0	100%
Darbhanga	13	0	100%
Deoghar	3	0	100%
Gorakhpur	9	1	90%
Guwahati	36	4	90%
Gaya	4	0	100%
Hollongi	2	0	100%
Imphal	2	0	100%
Jharsuguda	5	0	100%
Aizawl	2	1	67%
Dibrugarh	6	0	100%
Dimapur	3	0	100%
Patna	37	0	100%
Ranchi	24	0	100%
Raipur	14	0	100%
DELHI FIR (97%)*	Compliant	Non Compliant	% Compliant
Amritsar	17	0	100%
Bikaner	5	0	100%
Bakshi Talab,Lucknow	1	0	100%
Bhuntar	1	0	100%
Bathinda	1	0	100%
Bareilly	1	0	100%
Chandigarh	36	0	100%
Dehradun	21	1	95%
Delhi	111	1	99%
Kangra	5	1	83%
Gwalior	4	0	100%
Jodhpur	5	0	100%
Jaipur	21	0	100%
Jammu	11	1	92%
Kota	1	0	100%
Leh	19	5	79%
Lucknow	31	0	100%
Pithoragarh	0	1	0%
Srinagar	33	1	97%
Sirsa	1	0	100%



CHENNAI FIR (99%)*	Compliant	Non Compliant	% Compliant
Hal Bangalore	4	0	100%
Bangalore	126	1	99%
Vijayawada	18	0	100%
Coimbatore	25	0	100%
Kochi	44	1	98%
Calicut	2	0	100%
MOPA Goa	28	0	100%
Gulbarga	1	0	100%
Goa	43	0	100%
Hubli	2	0	100%
Shamsabad, Hyderabad	87	0	100%
Begumpet Hyderabad	3	0	100%
Vijaynagar	0	1	0%
Kannur	9	0	100%
Madurai	18	0	100%
Mangalore	9	0	100%
Chennai	58	0	100%
Port Blair	10	0	100%
Rajahmundry	5	0	100%
Shivamogga	4	0	100%
Tuticorin	8	0	100%
Tirupati	1	0	100%
Tiruchirappally	9	1	90%
Thiruvananthapuram	17	0	100%
Visakhapatnam	7	0	100%

*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

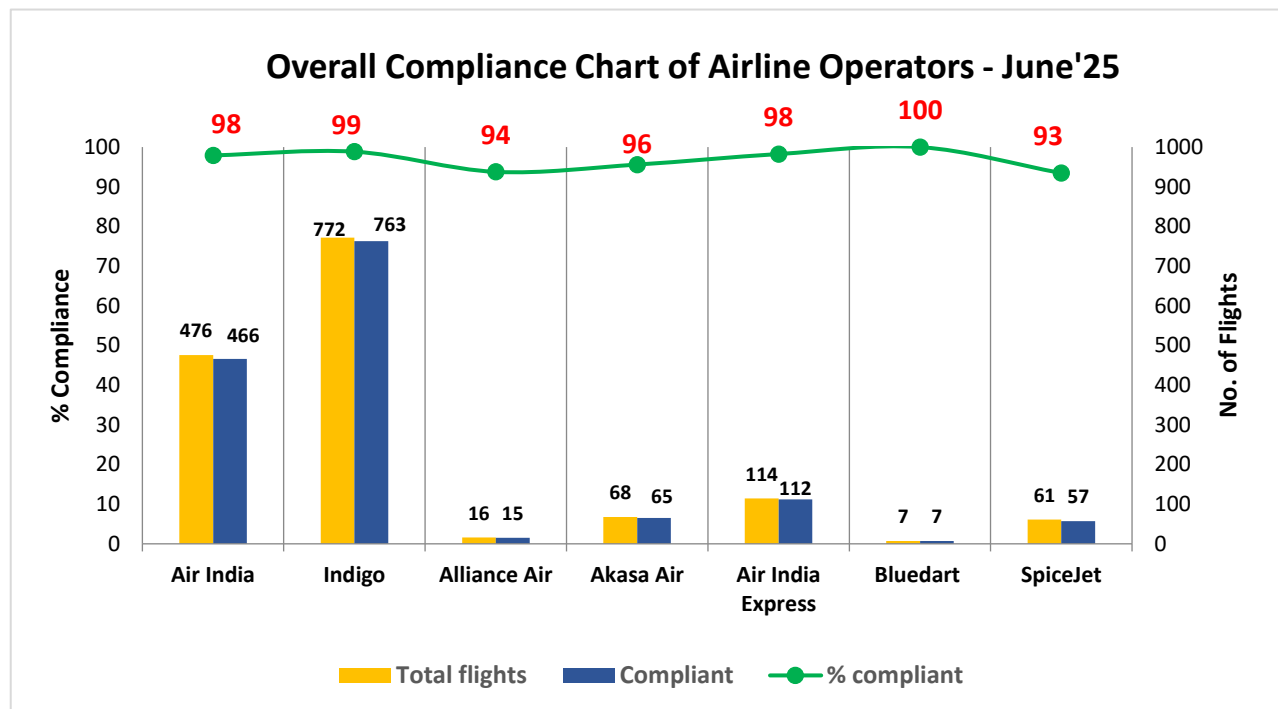


Figure 13: Airline wise Compliance –June'25

Inference

- Chennai region record the highest compliance of 99% whereas Delhi and Mumbai region has the lowest percentage compliance of 97%.
- Air India, Air India Express, Blue dart and Indigo have a CTOT compliance higher than or equal to the average recorded compliance for the month of June'25.

VI. गैर-अनुपालन का कारण/Reason For Non Compliance

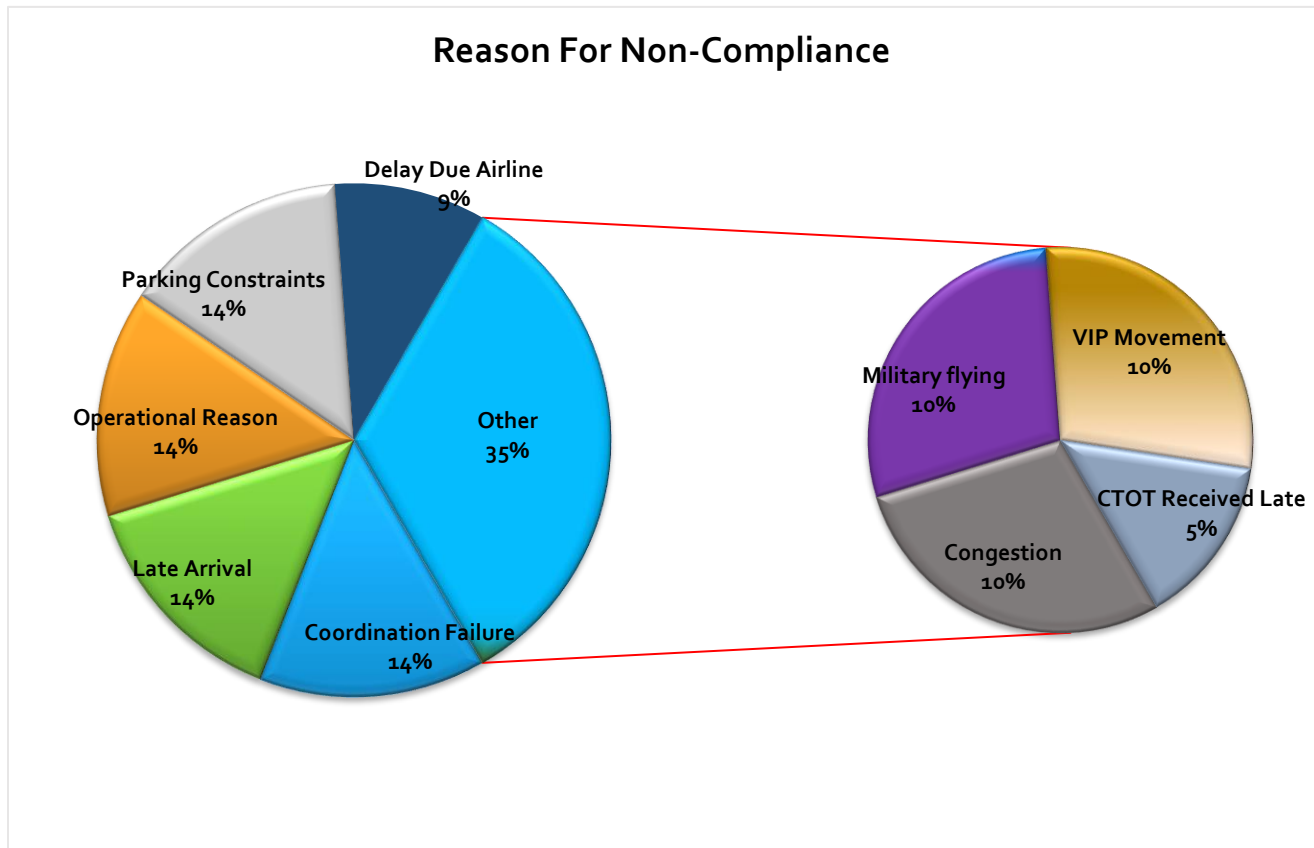


Figure 14: Reason for Non-Compliance as provided by FMPs

Inference:

1. 14 % of the CTOT Non- compliance was reported by concerned FMPs to be due to late arrivals from previous station.
2. 14 % of the CTOT Non- compliance was due to operational reasons (due to Bird Activity on Runway, ATC handling emergency etc) and 14 % of CTOT Non- Compliance was reported by concerned FMPs to be due to coordination failure.
3. 14% due to parking constarints at various airports and 10 % of the CTOT Non- compliance was due to ground traffic congestion at airports.
4. 9 % of the CTOT Non- compliance was reported by concerned FMPs to be due airline delay & 10% of the CTOT Non- compliance due to VIP Movement and Military flying at the concerned stations.

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 Bengaluru, Chennai, Delhi and Mumbai was 6.5, 8.9, 12.3 and 17.5 minutes respectively.

*Note: Only calculated for domestic arrivals with both ATOT and ALDT information

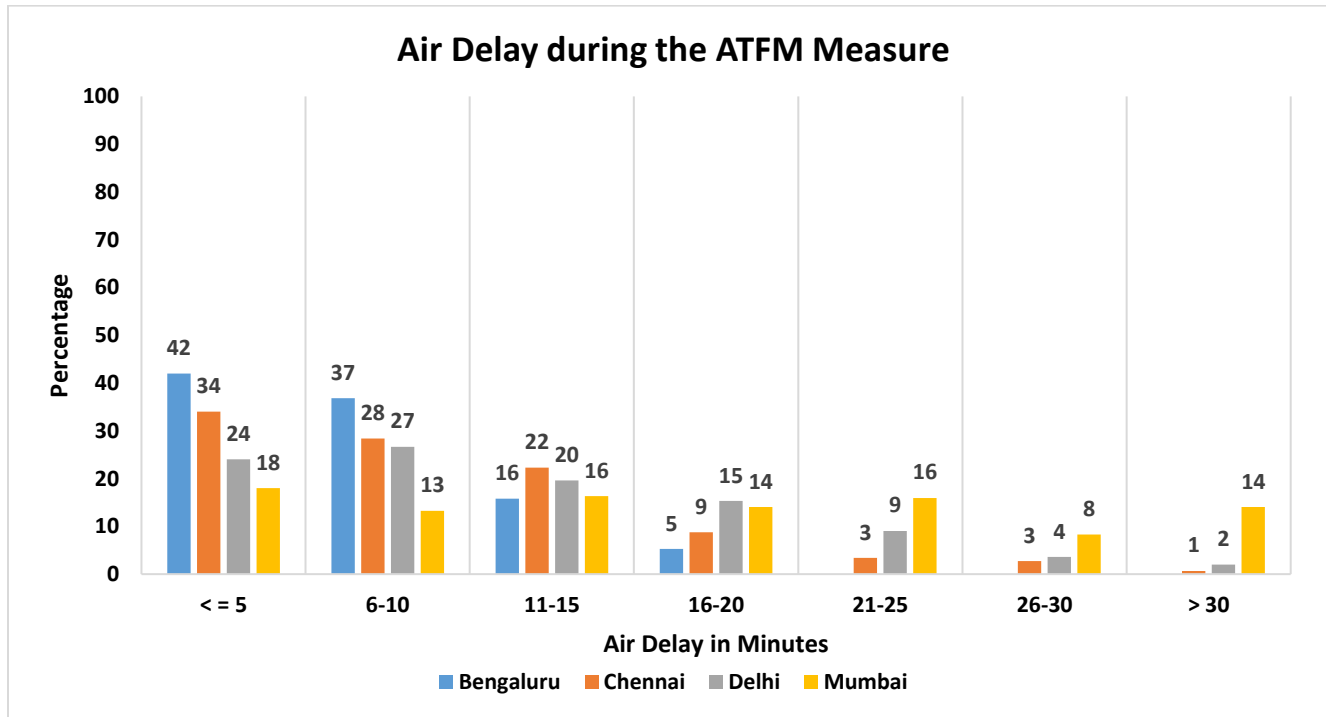


Figure 15: Air Delay distribution during the CDM period

Inference

1. 79% of domestic arriving flights to Bengaluru had an Air delay of equal to or less than 10 minutes during the CDM period.
2. 62% of domestic arriving flights to Chennai had an Air delay of equal to or less than 10 minutes during the CDM period.
3. 51% of domestic arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period.
4. 31% of domestic arriving flights to Hyderabad 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 = $\sum$ (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) = $\sum$ (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)= 24675 mins

Total Air Delay (with no ATFM measures) = 33954 mins

Reduction in Air delay due to ATFM measures= (33954-24675) = **9279 mins**

Fuel Saving Calculation:

Total Fuel saved during the ATFM Measure: **7,04,716.3 Kg**

Total reduction in CO₂ emission : 3.16(KgCO₂/kg fuel)* 7,04,716.3 Kg = 22,26,903.5 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
<i>Affected Flight statistics</i>	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	<i>$\frac{\text{Total monthly ATFM delay (in minutes)}}{\text{Total Domestic Arrivals}}$</i>
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 the ATFM 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, where AET(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: <i>Average Air Delay</i> <i>$= \frac{\text{Total Air Delay to domestic arrivals (with values greater than zero)}}{\text{Total Domestic Arrivals}}$</i> 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 - जून 2025

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



I. परिचय/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 –

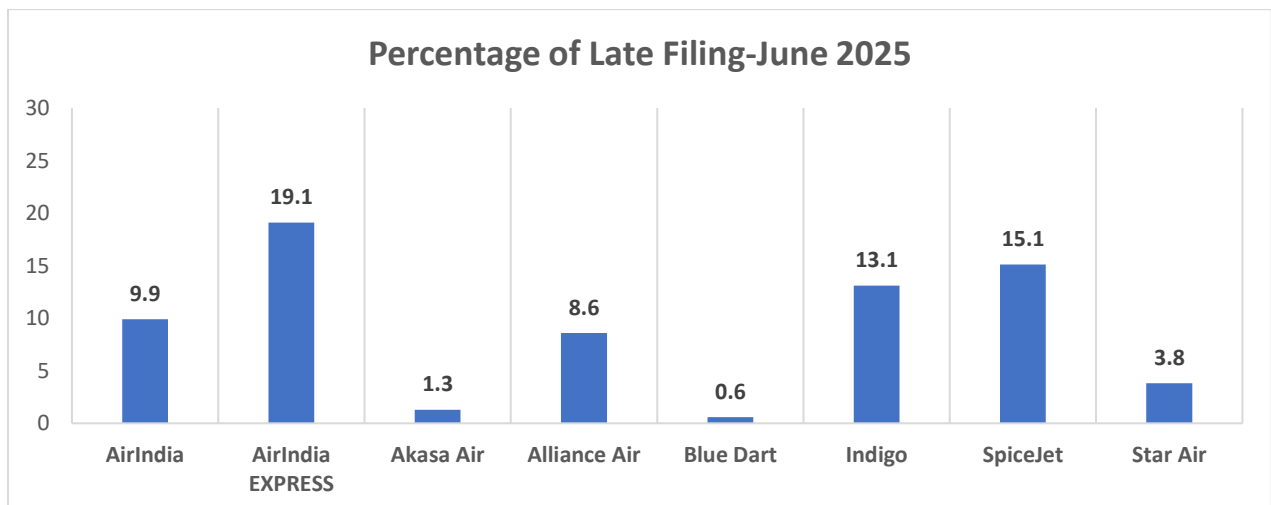
- a) Flight plans shall be submitted at least 3 hours before the estimated off block time (EOBT);
- b) The window for filing FPL is between 3 Hours and 120 Hours (Five days) before the EOBT. Earlier filing of FPL will give a realistic demand data to the CCC and hence the requirement of ATFM measures 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. विश्लेषण/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 June 2025 to 30th June 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.





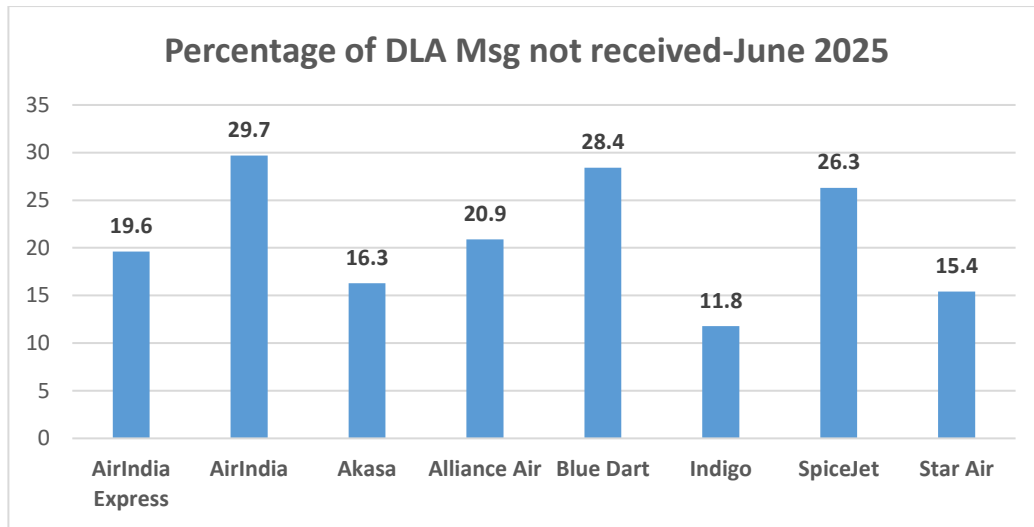
The table below lists number of filed flight plans (FPLs) with less than 3 Hours prior to EOBT:

Name of Airline	Late Filed FPL	Total No. Of FPL	% Delayed Filing
AirIndia	2085	21057	9.9
AirIndia EXPRESS	3002	15658	19.1
Akasa Air	60	4556	1.3
Alliance Air	149	1720	8.6
Blue Dart	4	626	0.6
Indigo	8739	66520	13.1
SpiceJet	516	3405	15.1
Star Air	51	1326	3.8
Total no. of FPLs for Scheduled Airlines	14606	114868	12.7

- 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 June 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 Express	1948	9899	19.6
AirIndia	4600	15470	29.7
Akasa	536	3275	16.3
Alliance Air	146	698	20.9
Blue Dart	144	507	28.4
Indigo	5813	48995	11.8
SpiceJet	476	1810	26.3
Star Air	70	453	15.4



- C. For analysis of non-receipt of CNL (cancel) messages for June 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 June 2025:

Name of Airline	CNL message not received	No. of flights annulled
AirIndia Express	80	88
AirIndia	115	128
Akasa	11	11
Alliance Air	223	223
Blue Dart	4	4
Indigo	170	173
SpiceJet	83	87
Star Air	16	19

-End OF Report-