# पोस्ट ऑपरेशन **विश्लेषण** रिपोर्ट

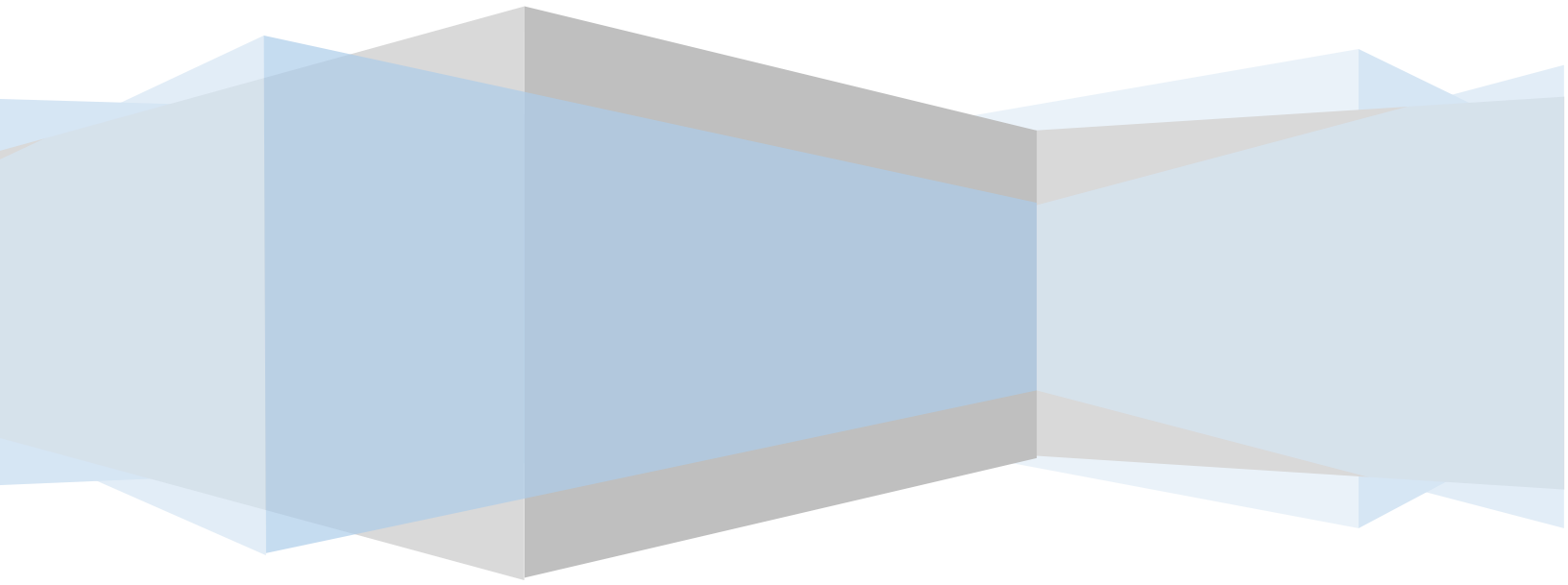
## जुलाई, 2025

सेंट्रल कमांड सेंटर, सी ए टी एफ एम, दिल्ली

# POST OPERATIONS ANALYSIS REPORT

## July, 2025

CENTRAL COMMAND CENTER, C-ATFM, DELHI



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# A. कार्यकारी सारांश/Executive Summary

Average Domestic air traffic (31 days) has recorded a decrease of 9% whereas the average international air traffic has increased by 0.86 % in the month of July 2025 as compared to June '25.

On average, the Indian Airports in the ATFCM area saw 4512 IFR flights per day in the month of July 2025. The peak days were on 25th July 2025 (4641 IFR flights). Friday's were the busiest days throughout this month with an average of 4605 IFR flights per day.

Total Twenty Four (24) ATFM measures were applied this month during periods of congestion at Chennai, Delhi and Mumbai Airport.

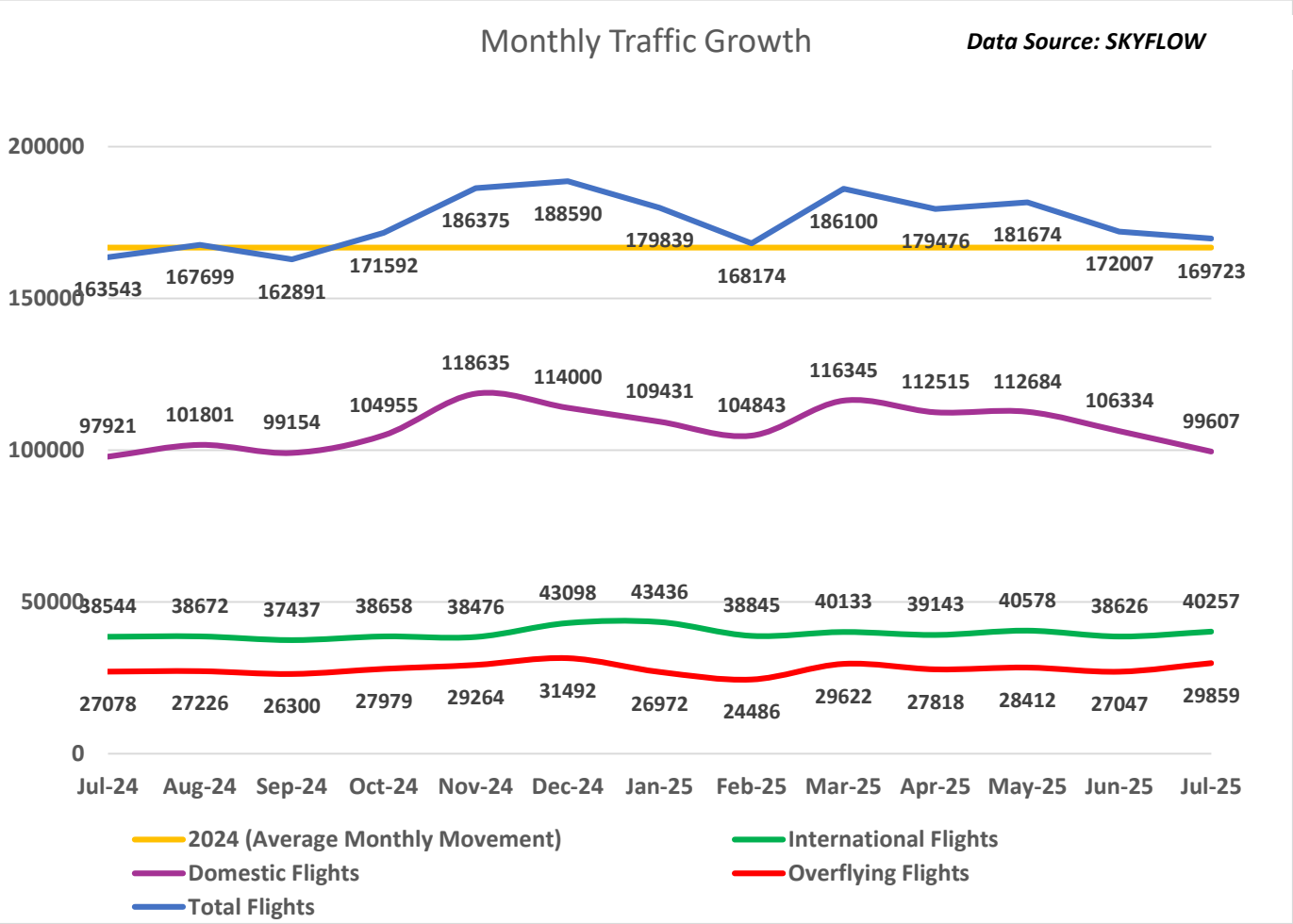



**Figure 1: Monthly Traffic Growth**

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

# B. यातायात वश्लेषण/Traffic Analysis

## I. भारत के प्रमुख हवाई अड्डों पर हवाई यातायात गति व ध /Air Traffic Movement at Major Airports in India

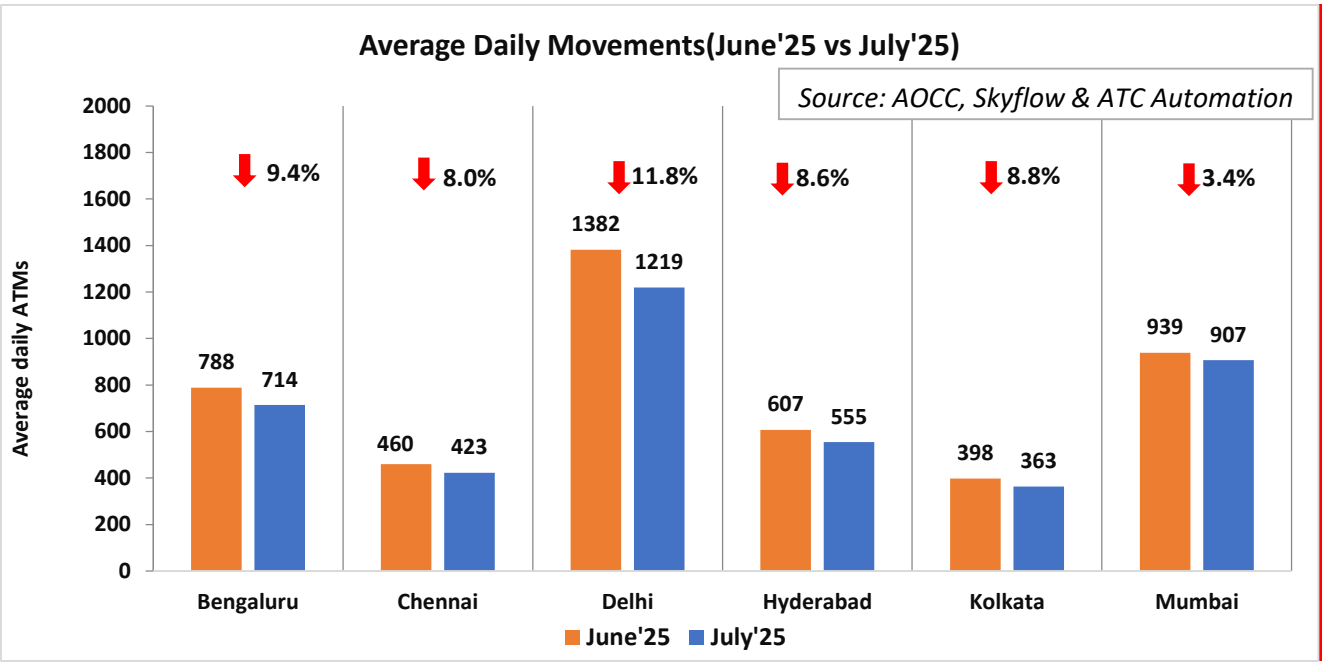



**Figure 2: Average Daily Movements (June'25 vs July'25)**

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

| Airports\Year | Avg. Daily ATMs (YoY) for six major airports | | | | |
|---|---|---|---|---|---|
| | July'21 | July'22 | July'23 | July'24 | July'25 |
| **Bengaluru** | 314 | 525 | 636 | 694 | 714 |
| **Chennai** | 200 | 353 | 383 | 403 | 423 |
| **Delhi** | 728 | 1171 | 1231 | 1315 | 1219 |
| **Hyderabad** | 265 | 405 | 451 | 511 | 555 |
| **Kolkata** | 203 | 356 | 376 | 391 | 363 |
| **Mumbai** | 395 | 712 | 886 | 928 | 907 |

Air Traffic Movement for each day in July 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.

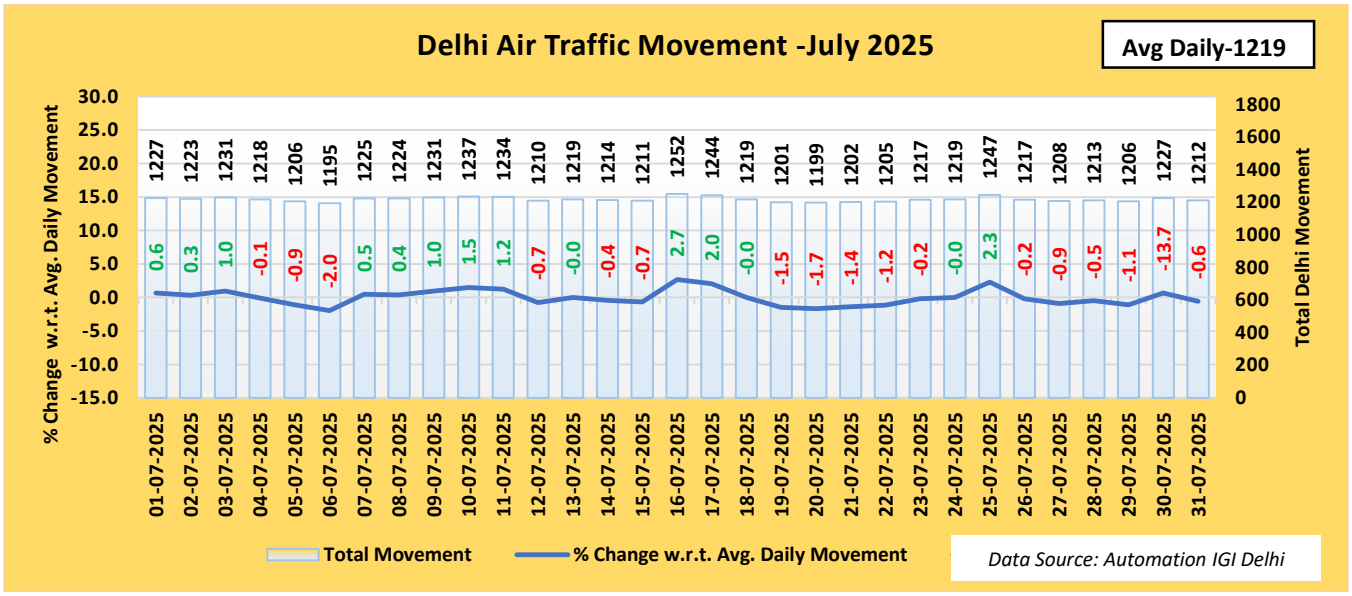



**Figure 3: Air Traffic Movement for Delhi –July'25**

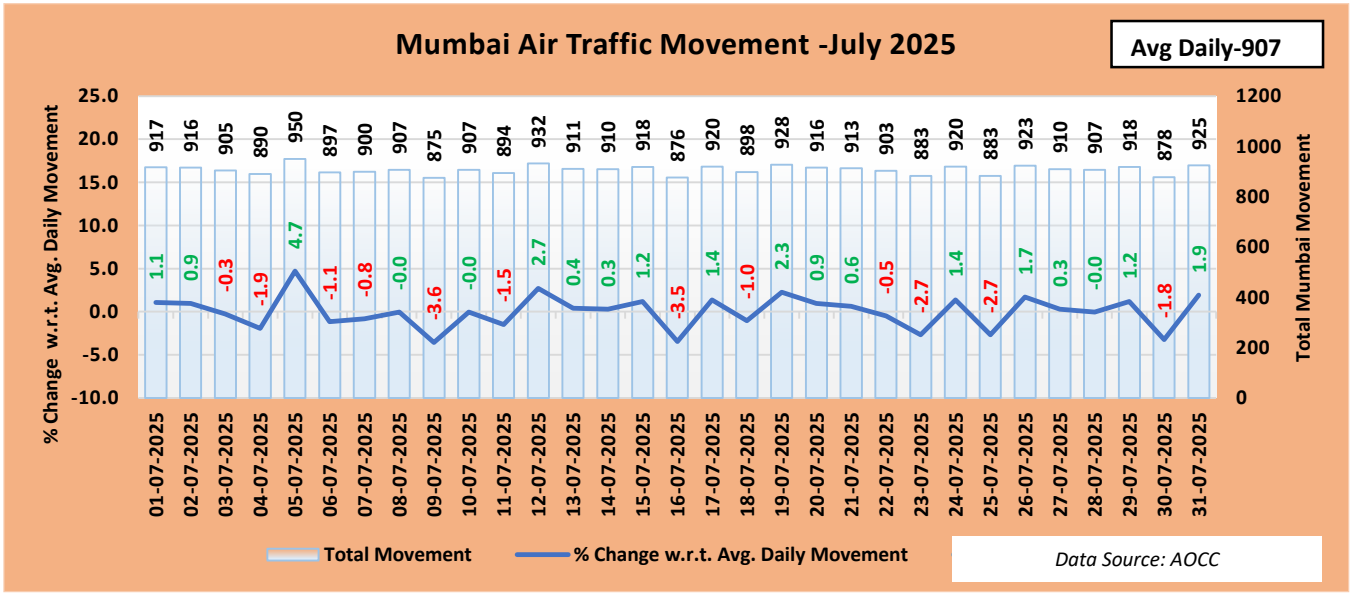



**Figure 4: Air Traffic Movement for Mumbai – July'25**

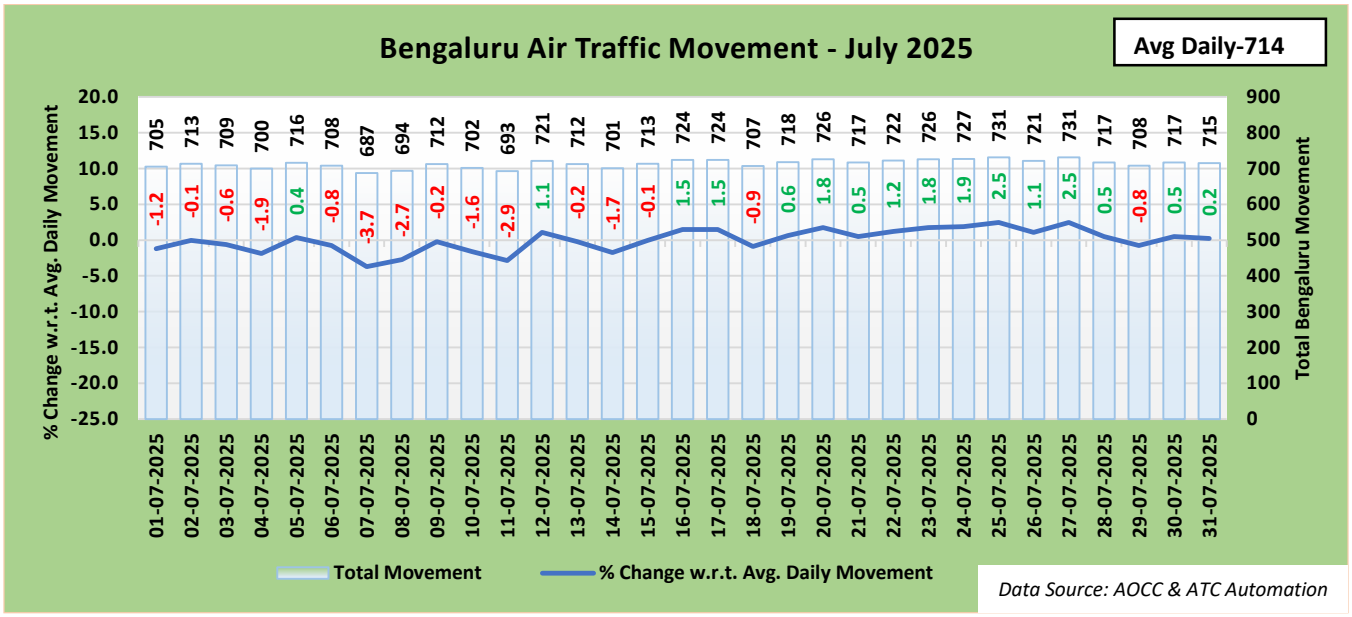



**Figure 5: Air Traffic Movement for Bengaluru – July'25**

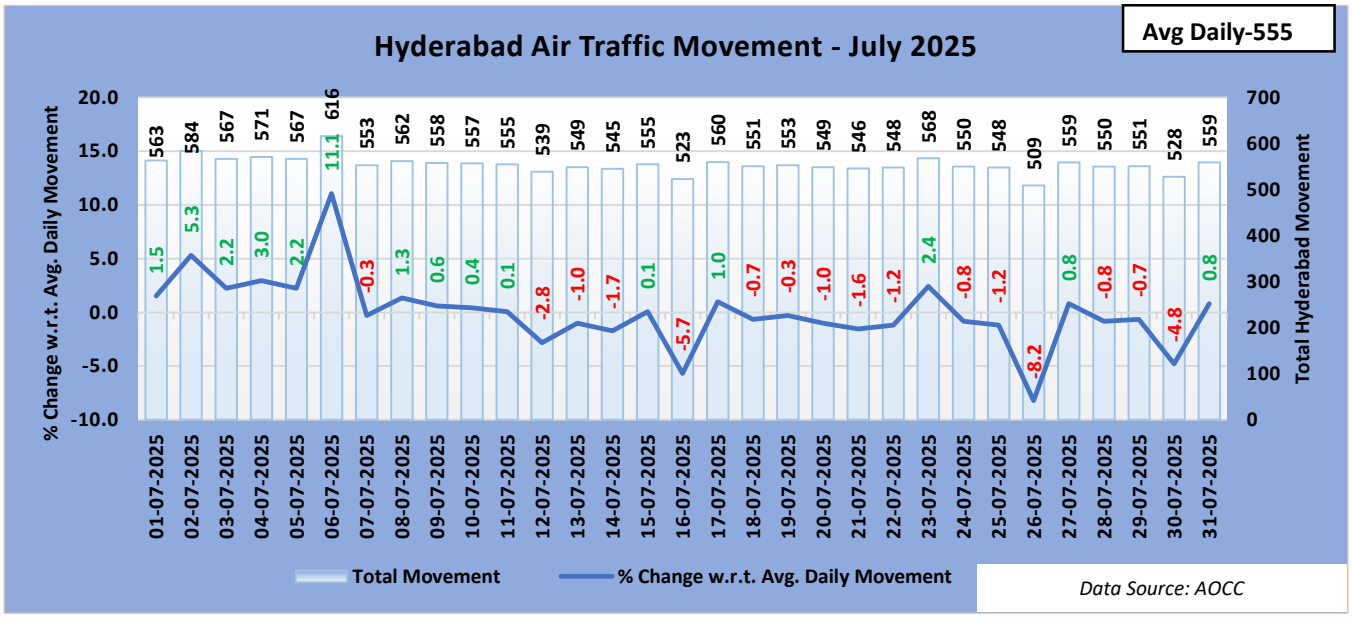



**Figure 6: Air Traffic Movement for Hyderabad – July'25**

It can be concluded from the above charts that the ATM at Delhi, Mumbai, Bengaluru and Hyderabad exceeds the average daily movement for 14 days, 19 days, 16 days and 15 days respectively in the month of July 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 July 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.

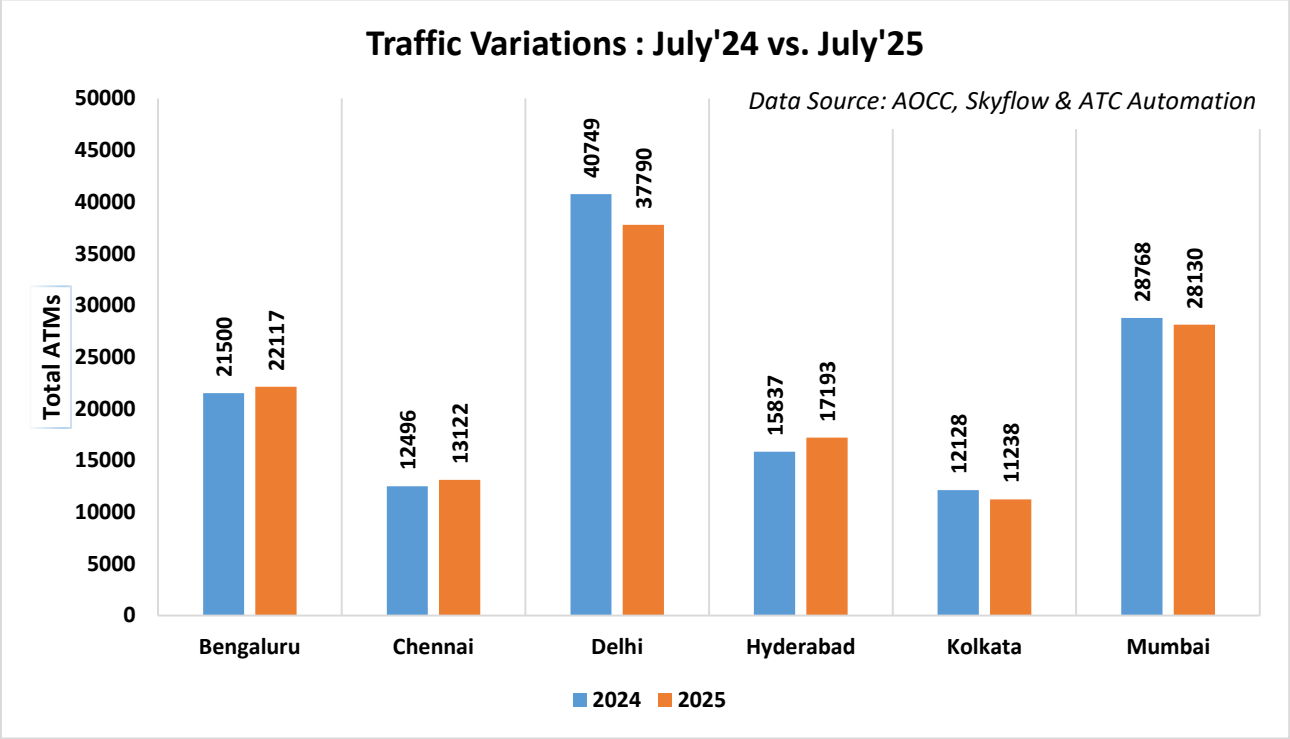



**Figure 7: Traffic Variation (YoY)**

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

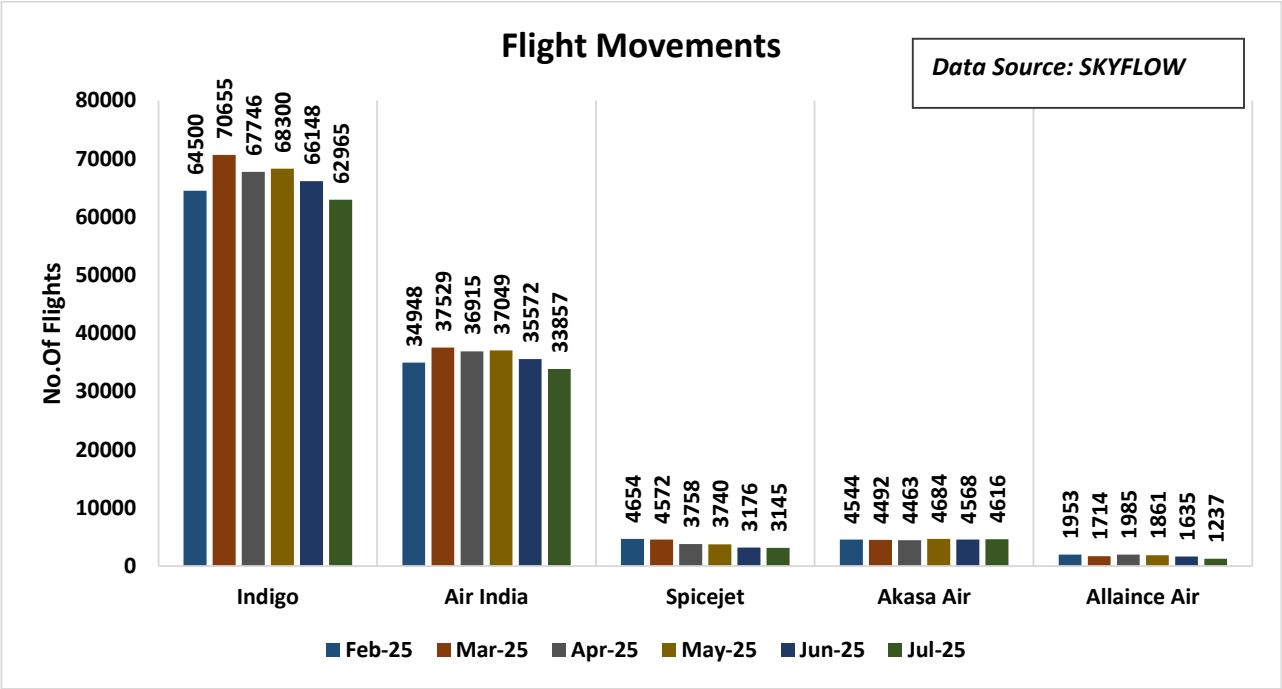



**Figure 8: Flight Movements –Airlinewise**

**Inference:**

1. Indigo, Air India, Spicejet ,Akasa and Alliance Air airlines have recorded a decrease in the monthly average( 31 days) Flight movement in July'25 as compared to June'25.

# C. सी.एटीएफएम पोस्ट ऑपरेशन - सीडीएम वश्लेषण

# ATFM Post Operations – CDM Analysis

## I. परिचय/Introduction

**Analysis Period** **1st – 31st July 25**

**Back Ground** During the above mentioned period, **Nine (09)** ATFM measures were applied **for Chennai Airport, Five (05)** ATFM measures were applied **for Delhi Airport and Ten (10)** ATFM measures were applied **for Mumbai Airport** due to the following reasons as illustrated in the bar chart below:–

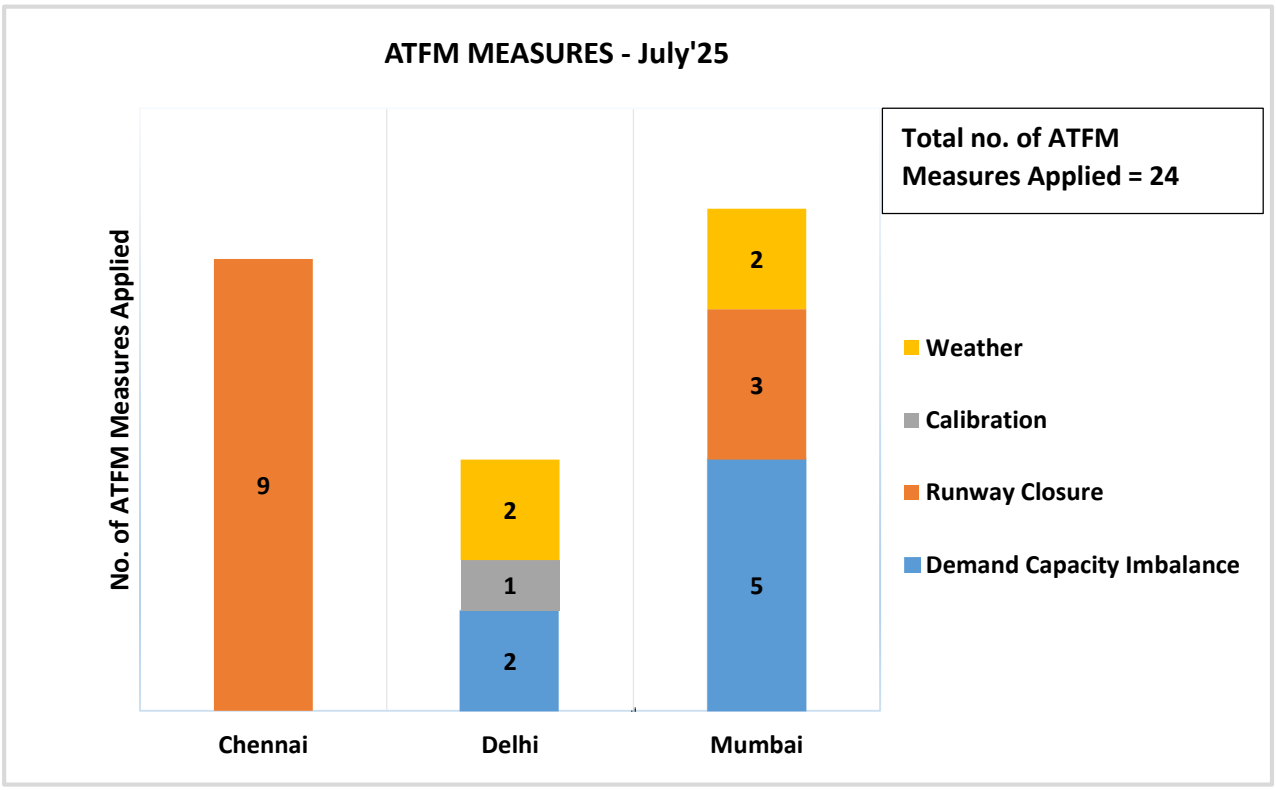



**Figure 9: ATFM Measures –July'25**

## II. एटीएफएम मेजर्स का अवलोकन/ATFM Measures Overview

| Constrained Airport | Chennai | Delhi | Mumbai |
|---|---|---|---|
| Number of ATFM measures applied | 9 | 5 | 10 |
| Average ATFM Ground delay(in min) due to measures* | 28.7 | 15.9 | 25.7 |
| Maximum ATFM Ground delay(in min) due to measures | 47 | 40 | 55 |
| % Compliance | 95.2 | 99 | 97.3 |

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

| | |
|---|---|
| Total Arrivals | 1208 |
| Total International Arrivals(exempted) | 293 |
| Total affected flights in scenario (Domestic Arrivals) | 915 |
| Total Domestic Arrivals with zero ATFM delay | 35 |
| Total Domestic Arrivals with ATFM delay | 880 |

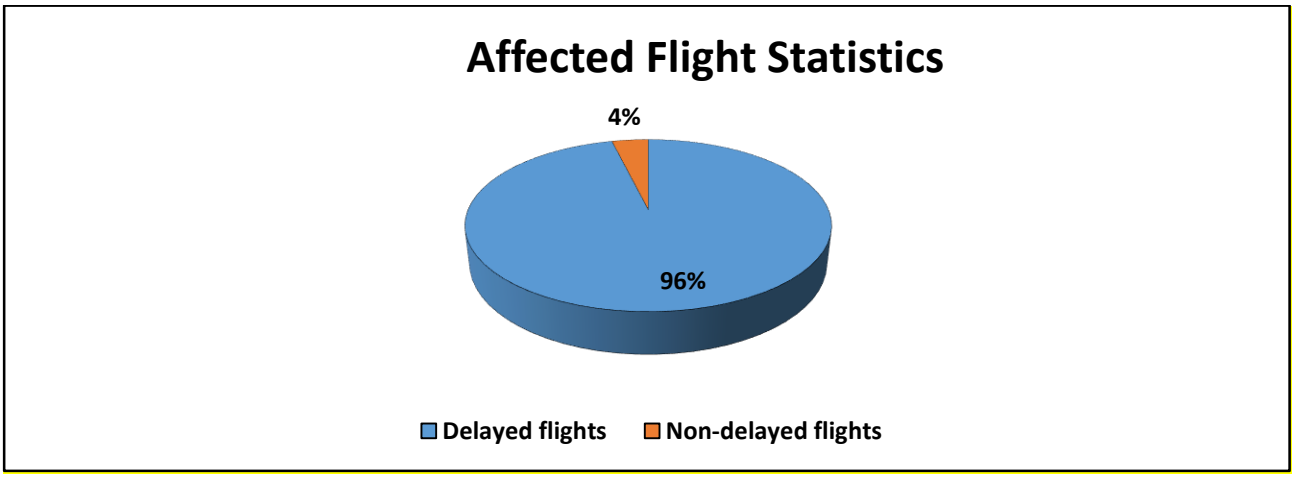



**Figure 10: Affected Flight Statistics –July'25**

## III. समग्र अनुपालन/Overall Compliance

| | |
|---|---|
| **Total arrivals** | 1208 |
| **Domestic arrivals** | 915 |
| **Flights with complete data (ATOT)** | 882 |
| **Flights with incomplete data** | 9 |
| **Flights Not Operated** | 24 |
| **Compliant*** | 860 |
| **Non-Compliant** | 22 |

*Total No. of Revised CTOTs issued = 236 (Compliance calculation for flights which were issued revised CTOT is w.r.t. new CTOT issued)

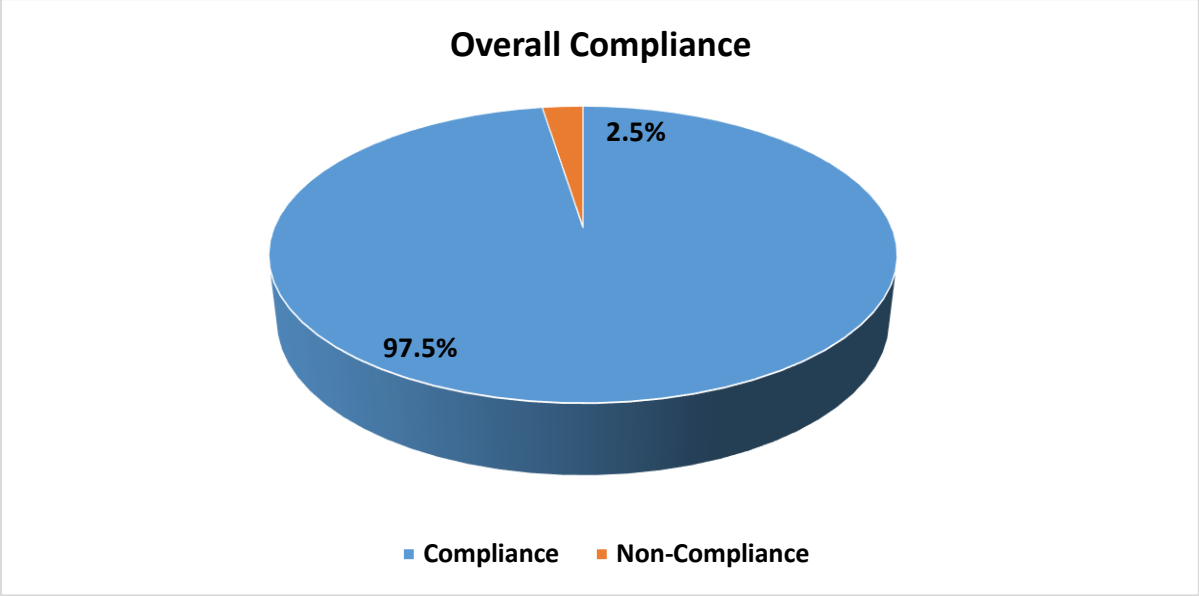



***Figure 11*: Overall Compliance – July'25**

*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, 97.5% arrivals are compliant for the month of July 2025.**

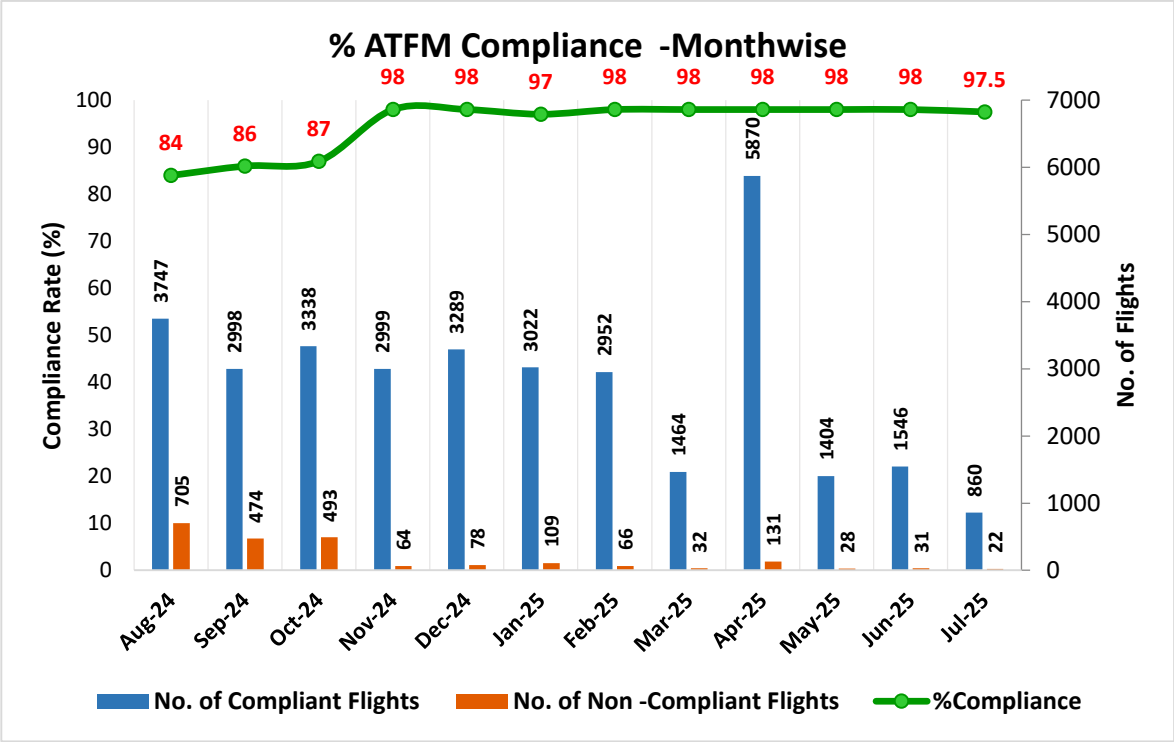



**Figure 12: Compliance(Monthwise)**

## Inference

1. Out of the total arrivals captured(1208 flights) during the CDM scenario for the constrained Airports, 75.7% of flights i.e. domestic arrivals(915 flights) were candidates for ground delay(participating).
2. Out of these Domestic Arrivals(915), 96.2% (880 flights) are assigned ATFM ground delay.
3. Out of the total arrivals captured(1208 flights) to the constrained Airport during the ATFM scenario, 72.8% of flights(880 flights) were assigned ATFM Ground Delay.

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

| MUMBAI FIR (97%)* | Compliant | Non Compliant | % Compliant |
|---|---|---|---|
| Ahmedabad | 29 | 0 | 100% |
| Aurangabad | 3 | 0 | 100% |
| Mumbai | 47 | 1 | 98% |
| Bhuj | 3 | 0 | 100% |
| Vadodara | 4 | 0 | 100% |
| Bhopal | 10 | 0 | 100% |
| Diu | 2 | 0 | 100% |
| Hirasar, rajkot | 6 | 0 | 100% |
| Indore | 9 | 1 | 90% |
| Jabalpur | 6 | 0 | 100% |
| Jalgaon | 2 | 0 | 100% |
| Jamnagar | 4 | 0 | 100% |
| Kandla | 2 | 0 | 100% |
| Kolhapur | 4 | 0 | 100% |
| Nagpur | 15 | 0 | 100% |
| Nasik | 0 | 1 | 0% |
| Pune | 12 | 2 | 86% |
| Porbandar | 1 | 0 | 100% |
| Shirdi | 3 | 0 | 100% |
| Surat | 7 | 0 | 100% |
| Udaipur | 3 | 0 | 100% |
| **KOLKATA FIR (98%)*** | **Compliant** | **Non Compliant** | **% Compliant** |
| Prayagraj | 1 | 0 | 100% |
| Agartala | 3 | 0 | 100% |
| Siliguri | 19 | 0 | 100% |
| Varanasi | 16 | 0 | 100% |
| Bhubaneswar | 10 | 1 | 91% |
| Kolkata | 41 | 0 | 100% |
| Durgapur | 5 | 0 | 100% |
| Darbhanga | 9 | 0 | 100% |
| Deoghar | 1 | 0 | 100% |

| | | | |
|---|---|---|---|
| Gorakhpur | 4 | 0 | 100% |
| Guwahati | 15 | 2 | 88% |
| Hollongi | 2 | 0 | 100% |
| Imphal | 1 | 0 | 100% |
| Jharsuguda | 1 | 0 | 100% |
| Aizawl | 1 | 0 | 100% |
| Dibrugarh | 2 | 0 | 100% |
| Dimapur | 1 | 0 | 100% |
| Patna | 19 | 0 | 100% |
| Ranchi | 9 | 0 | 100% |
| Raipur | 8 | 0 | 100% |
| DELHI FIR (95%)* | Compliant | Non Compliant | % Compliant |
| Agra | 1 | 0 | 100% |
| Amritsar | 9 | 0 | 100% |
| Bareilly | 1 | 0 | 100% |
| Chandigarh | 10 | 0 | 100% |
| Dehradun | 4 | 0 | 100% |
| Delhi | 88 | 5 | 95% |
| Hindon | 1 | 1 | 50% |
| Kangra | 2 | 0 | 100% |
| Gwalior | 3 | 0 | 100% |
| Jodhpur | 3 | 2 | 60% |
| Jaipur | 20 | 2 | 91% |
| Jammu | 2 | 0 | 100% |
| Leh | 4 | 0 | 100% |
| Lucknow | 20 | 0 | 100% |
| Srinagar | 14 | 0 | 100% |
| CHENNAI FIR (99%)* | Compliant | Non Compliant | % Compliant |
| Hal Bangalore | 2 | 0 | 100% |
| Bangalore | 72 | 1 | 99% |
| Belgaum | 0 | 1 | 0% |
| Vijayawada | 9 | 1 | 90% |
| Coimbatore | 22 | 0 | 100% |
| Kochi | 26 | 1 | 96% |
| Calicut | 1 | 0 | 100% |
| MOPA Goa | 18 | 0 | 100% |

| | | | |
|---|---|---|---|
| Goa | 33 | 0 | 100% |
| Hubli | 1 | 0 | 100% |
| Shamsabad, Hyderabad | 55 | 0 | 100% |
| Kannur | 5 | 0 | 100% |
| Madurai | 18 | 0 | 100% |
| Mangalore | 5 | 0 | 100% |
| Chennai | 31 | 0 | 100% |
| Port Blair | 8 | 0 | 100% |
| Rajahmundry | 2 | 0 | 100% |
| Tuticorin | 9 | 0 | 100% |
| Tirupati | 1 | 0 | 100% |
| Tiruchirappally | 6 | 0 | 100% |
| Thiruvananthapuram | 9 | 0 | 100% |
| Visakhapatnam | 5 | 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(97.5%) for the month are highlighted in red.*

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

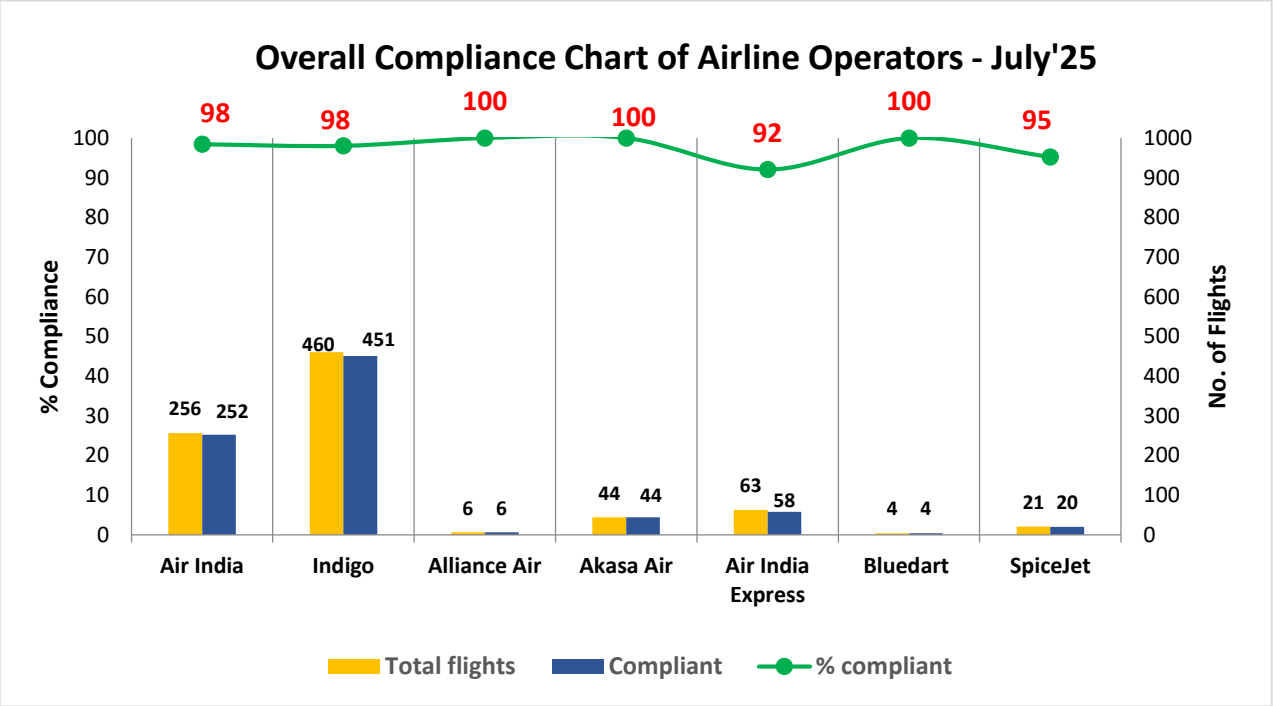



**Figure 13: Airline wise Compliance –July'25**

**Inference**

1. Chennai region record the highest compliance of 99% whereas Delhi region has the lowest percentage compliance of 95%.
2. Air India, Indigo, Alliance Air, Akasa and Blue Dart have a CTOT compliance higher than or equal to the average recorded compliance for the month of July'25.

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

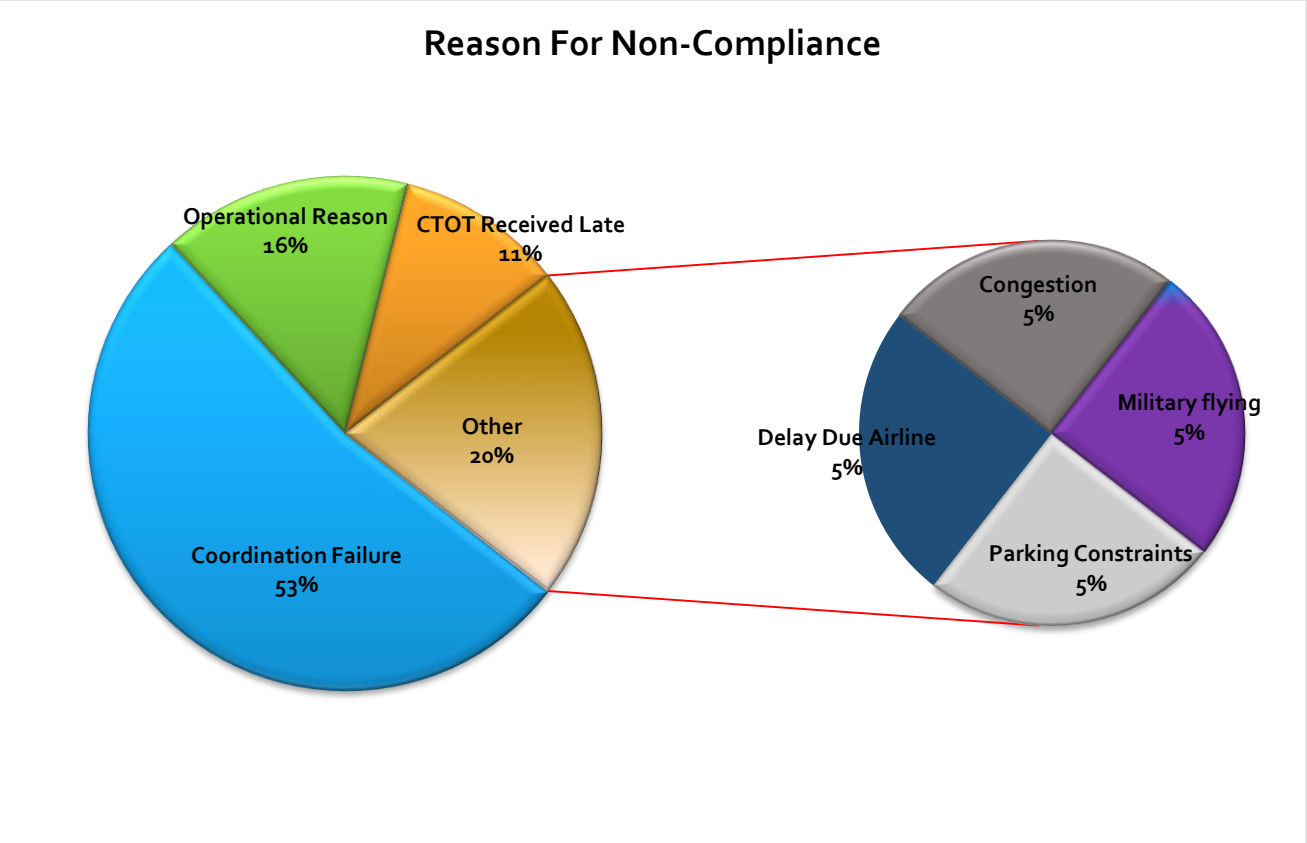



**Figure 14: Reason for Non-Compliance as provided by FMPs**

**Inference:**

1. 53 % of CTOT Non- Compliance was reported by concerned FMPs to be due to coordination failure between FMP and Station.
2. 16 % of the CTOT Non- compliance was due to operational reasons (due to Bird Activity on Runway, ATC handling emergency etc) and 11% due to late receipt of CTOTs and by the time the aircraft had already initiated pushed back or start up .
3. 5% each of the CTOT Non- compliance was due to due to parking constarints at various airports and ground traffic congestion at airports.
4. 5 % of the CTOT Non- compliance was reported by concerned FMPs to be due airline delay & 5% of the CTOT Non- compliance due Military flying at the concerned stations.

## VII.सीडीएम परिदृश्य अव ध के दौरान वायु वलंब/Air Delay during the CDM Scenario period

**Average Air Delay to domestic arrivals* within the CDM Scenario period for Chennai, Delhi and Mumbai was 10.1, 18.2 and 8.4 minutes respectively.**

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

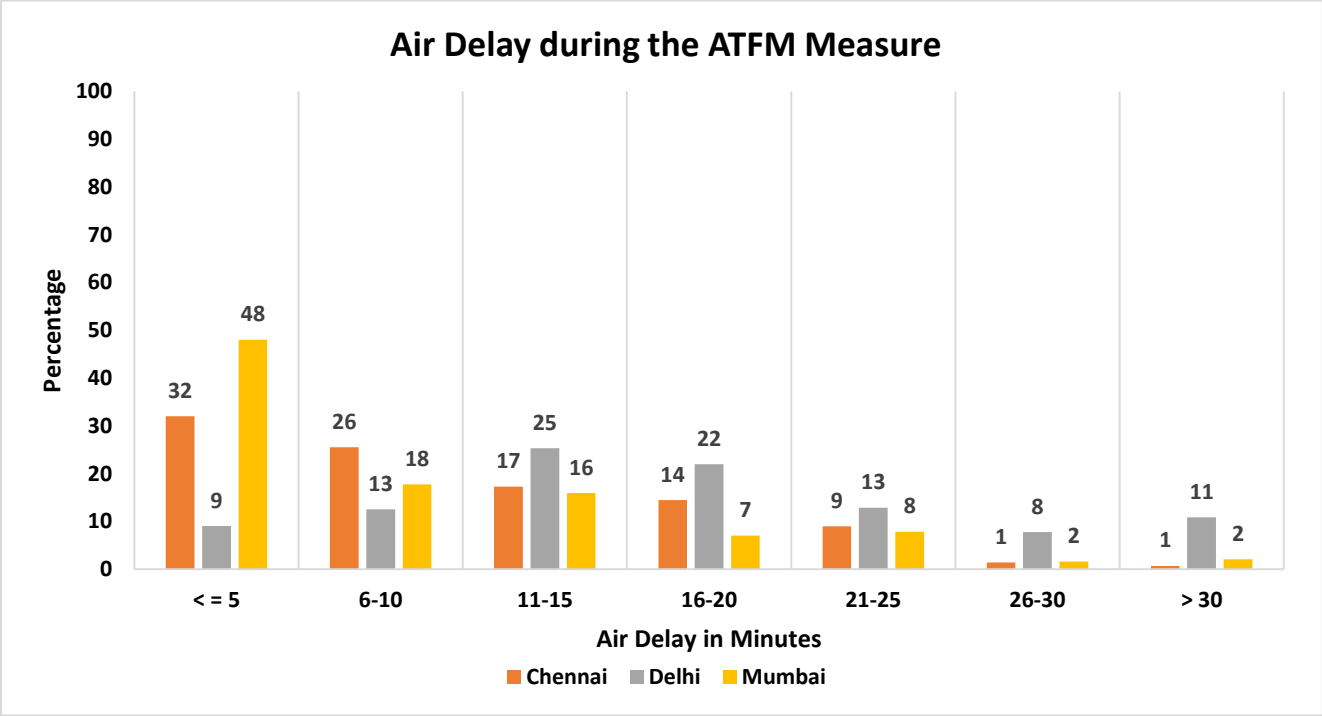



**Figure 15: Air Delay distribution during the CDM period**

**Inference**

1. 58% of domestic arriving flights to Chennai had an Air delay of equal to or less than 10 minutes during the CDM period.
2. 21% of domestic arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period.
3. 66% 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)= 11870 mins

Total Air Delay (with no ATFM measures) = 19198 mins

Reduction in Air delay due to ATFM measures= (19198-11870) = **7328 mins**

**Fuel Saving Calculation:**

Total Fuel saved during the ATFM Measure: ***5,37,286.75 Kg***

***Total reduction in $CO_2$ emission : 3.16(Kg$CO_2$/kg fuel)* 5,37,286.75*** **Kg** ***= 16,97,826.1 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<br>(Calculated take off time – Estimated take off time) |
| *Average ATFM delay* | $\frac{\boldsymbol{Total\ monthly\ ATFM\ delay\ (in\ minutes)}}{\boldsymbol{Total\ Domestic\ Arrivals}}$ |
| *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**<br><br>Average Air Delay is calculated as:<br><br>$\boldsymbol{Average\ Air\ Delay} = \frac{\boldsymbol{Total\ Air\ Delay\ to\ domestic\ arrivals\ (with\ values\ greater\ than\ zero)}}{\boldsymbol{Total\ Domestic\ Arrivals}}$<br><br>*CLDT: Calculated Landing Time*<br>*CTOT: Calculated Take off Time*<br>*ALDT: Actual Landing Time*<br>*ATOT: Actual Take off Time* |

Annexure-A

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

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

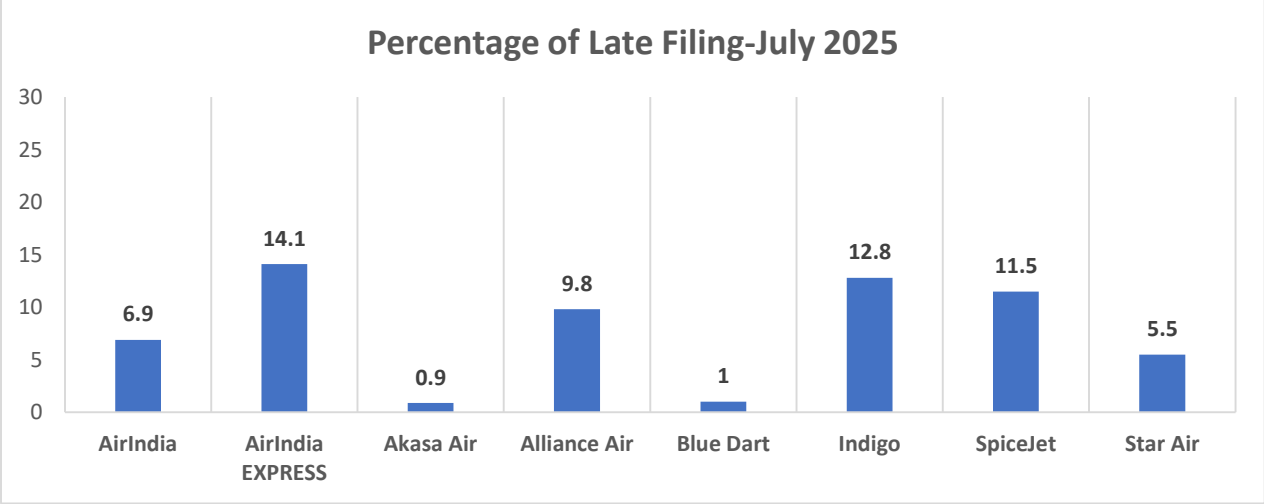
AIP India, ENR 1.9 section 4 on Flight Planning in the context of ATFM recommends Flight Planning requirements for all Airline Operators –

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 July 2025 to 31 st July 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.



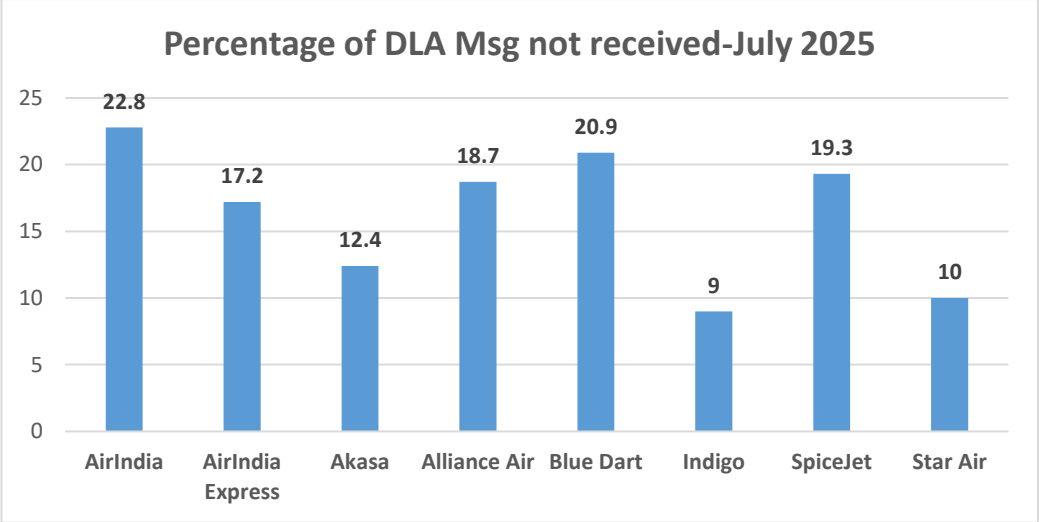
The table below lists number of filed flight plans (FPLs) with less than 3 Hours prior to EOBT:

| Name of Airline | Late Filed FPL | Total No. Of FPL | % Delayed Filing |
|---|---|---|---|
| AirIndia | 1373 | 19662 | 6.9 |
| AirIndia Express | 2103 | 14870 | 14.1 |
| Akasa | 44 | 4608 | 0.9 |
| Alliance Air | 133 | 1359 | 9.8 |
| Blue Dart | 8 | 747 | 1 |
| Indigo | 8039 | 62751 | 12.8 |
| SpiceJet | 389 | 3363 | 11.5 |
| Star Air | 73 | 1320 | 5.5 |
| **Total no. of FPLs for Scheduled Airlines** | **12162** | **108680** | **11.2** |

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 July 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 | 3688 | 16139 | 22.8 |
| AirIndia Express | 1738 | 10084 | 17.2 |
| Akasa | 455 | 3668 | 12.4 |
| Alliance Air | 118 | 630 | 18.7 |
| Blue Dart | 124 | 593 | 20.9 |
| Indigo | 4603 | 50938 | 9 |
| SpiceJet | 371 | 1921 | 19.3 |
| Star Air | 49 | 486 | 10 |




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

| Name of Airline | CNL message not received | No. of flights annulled |
|---|---|---|
| AirIndia | 59 | 70 |
| AirIndia Express | 95 | 102 |
| Akasa | 23 | 24 |
| Alliance Air | 159 | 161 |
| Blue Dart | 1 | 1 |
| Indigo | 156 | 160 |
| SpiceJet | 74 | 78 |
| Star Air | 17 | 18 |

**-End OF Report-**