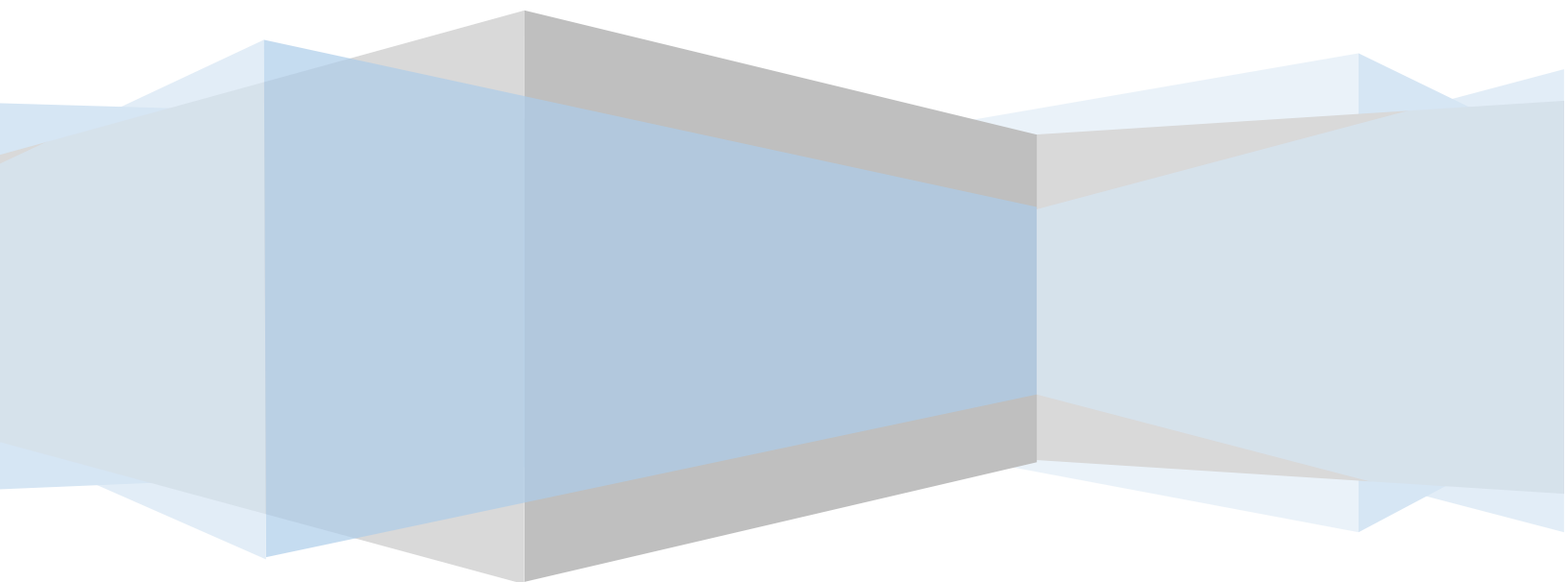


POST OPERATIONS ANALYSIS REPORT

JANUARY, 2024

CENTRAL COMMAND CENTER, C-ATFM, DELHI







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A. Executive Summary

Average monthly domestic IFR air traffic has recorded an increase of 3% whereas the average monthly international air traffic has risen by 5.8% in the month of Jan'24 as compared to Dec'23.

On average, the Indian Airports in the ATFCM area saw 4299 IFR flights per day in the month of January 2024. The peak day was on 16th January 2024 (4662 IFR flights). Tuesday's were the busiest days throughout this month with an average of 4375 IFR flights per day.

Total Twenty Nine (90) ATFM measures were applied this month during identified periods of congestion at Ayodhya, Chennai, Delhi and Mumbai Airport.

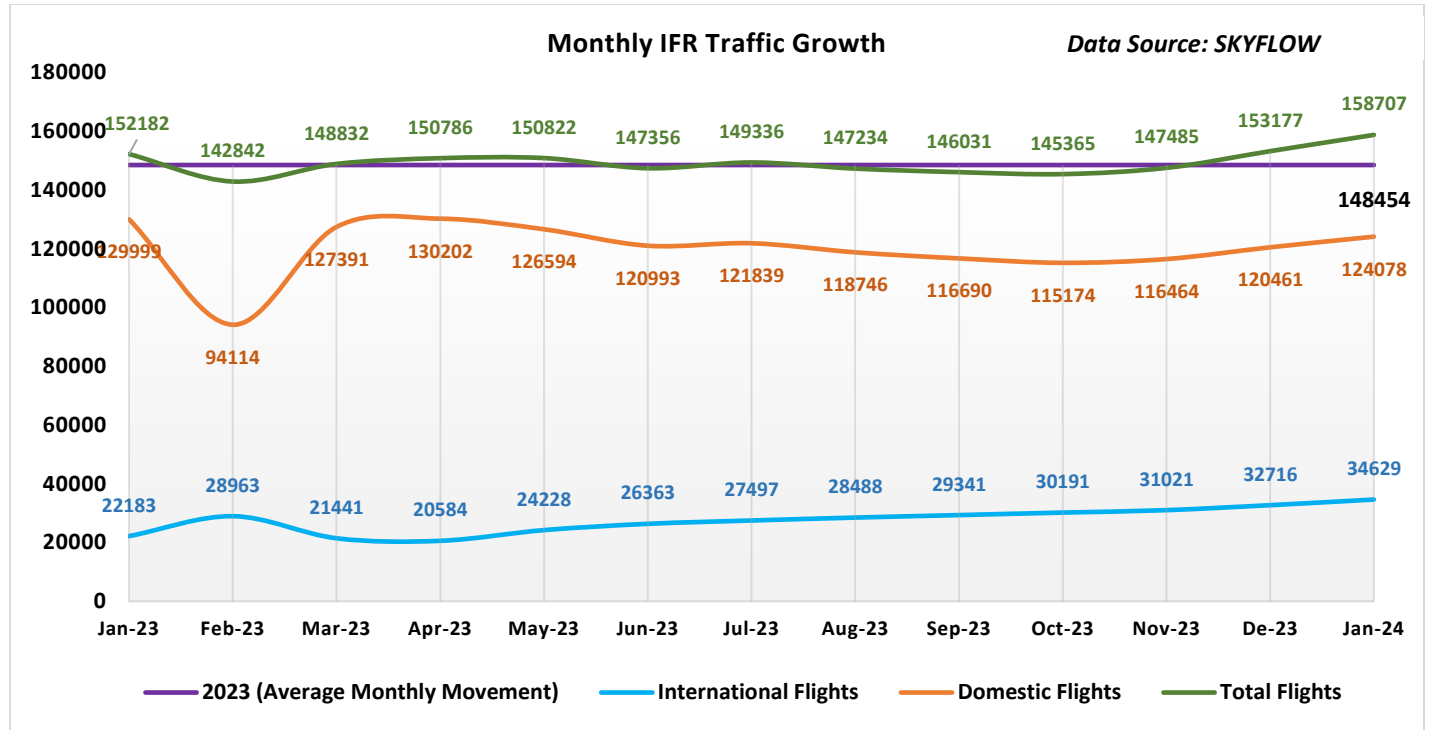


Figure 1: Monthly Traffic Growth

The graph above depicts the Domestic and international Air traffic in Indian ATFCM Area during the last 13 months (Jan'2023 to Jan'2024).



B. Traffic Analysis

I. Air Traffic Movements at Major Airports in India

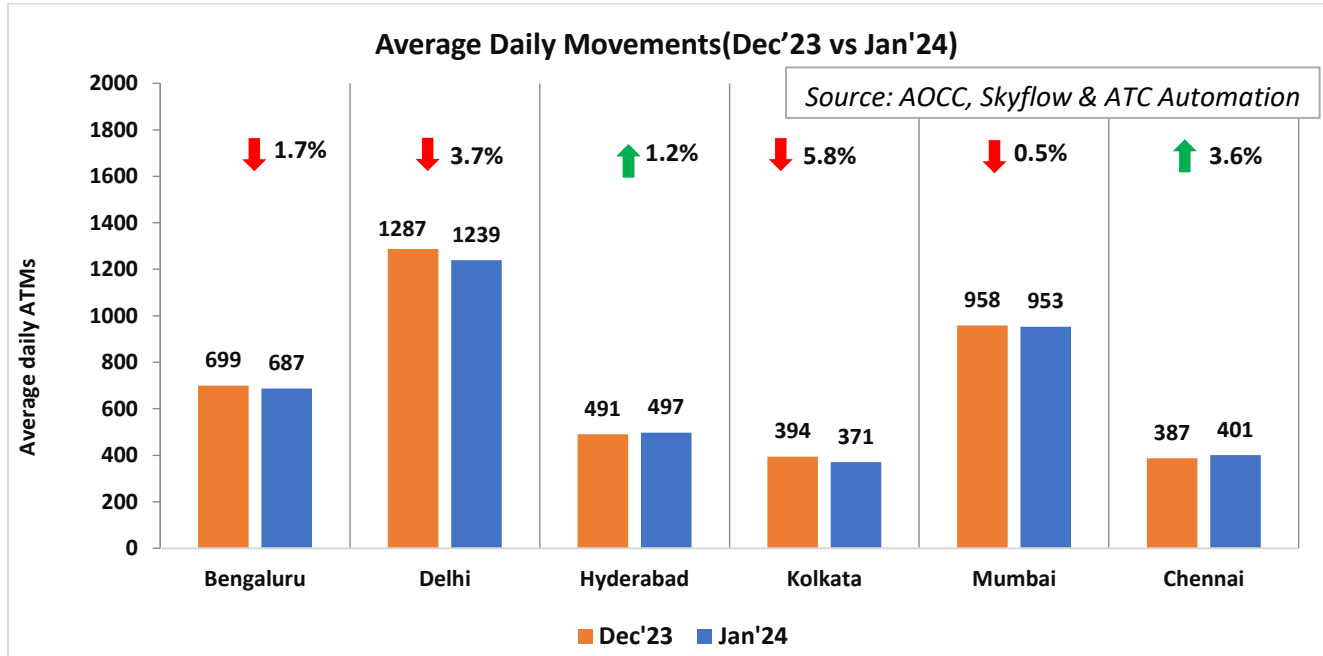


Figure 2: Average Daily Movements (Dec '23 vs Jan '24)

The above chart depicts the percentage change in average daily ATMs at six major Airports in Jan'24 as compared to the previous month Dec'23.

Airports\Year	Avg. Daily ATMs (YoY) for six major airports					
	Jan'20 (Pre-Covid)	Jan'21	Jan'22	Jan'23	Jan'24	% Recovery since Covid-19
Bengaluru	681	493	394	689	687	+0.9
Delhi	1363	921	921	1255	1239	-9.1
Hyderabad	546	364	327	460	497	-8.9
Kolkata	499	315	286	391	371	-25.7
Mumbai	899	558	569	919	953	+6.0
Chennai	506	301	278	390	401	-20.8



Air Traffic Movement for each day in Jan'24 is plotted for Delhi, Mumbai, Bengaluru and Hyderabad Airport along with the percentage change w.r.t. Avg. Daily Movements for the same month.

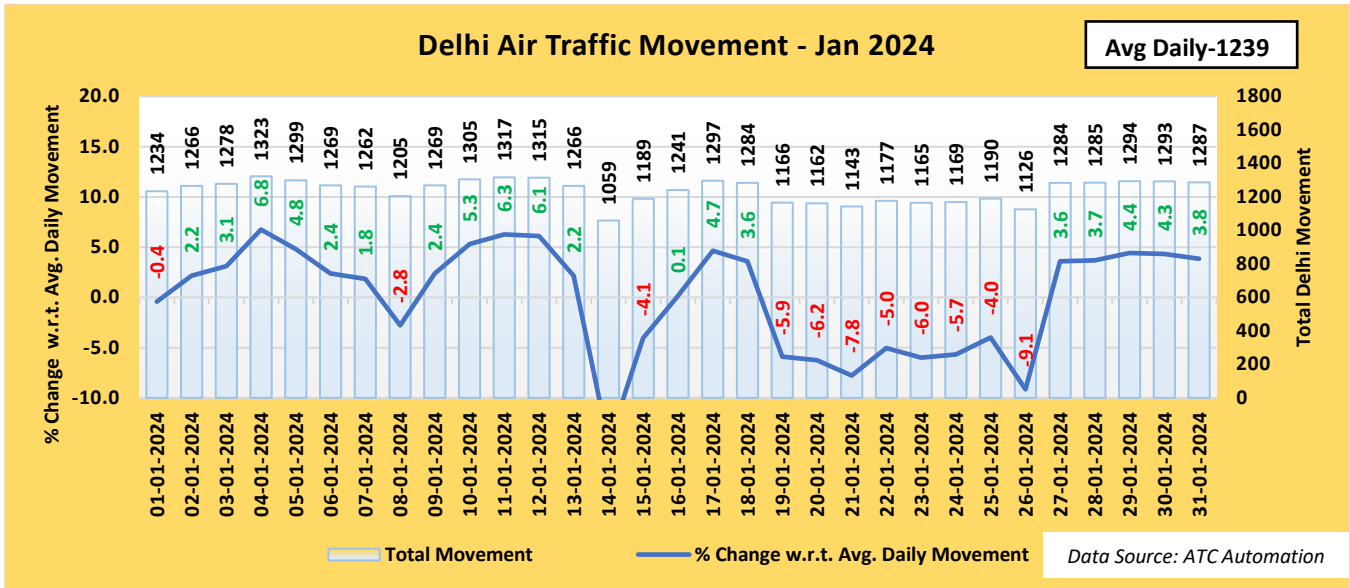


Figure 3: Air Traffic Movement for Delhi -Jan 2024

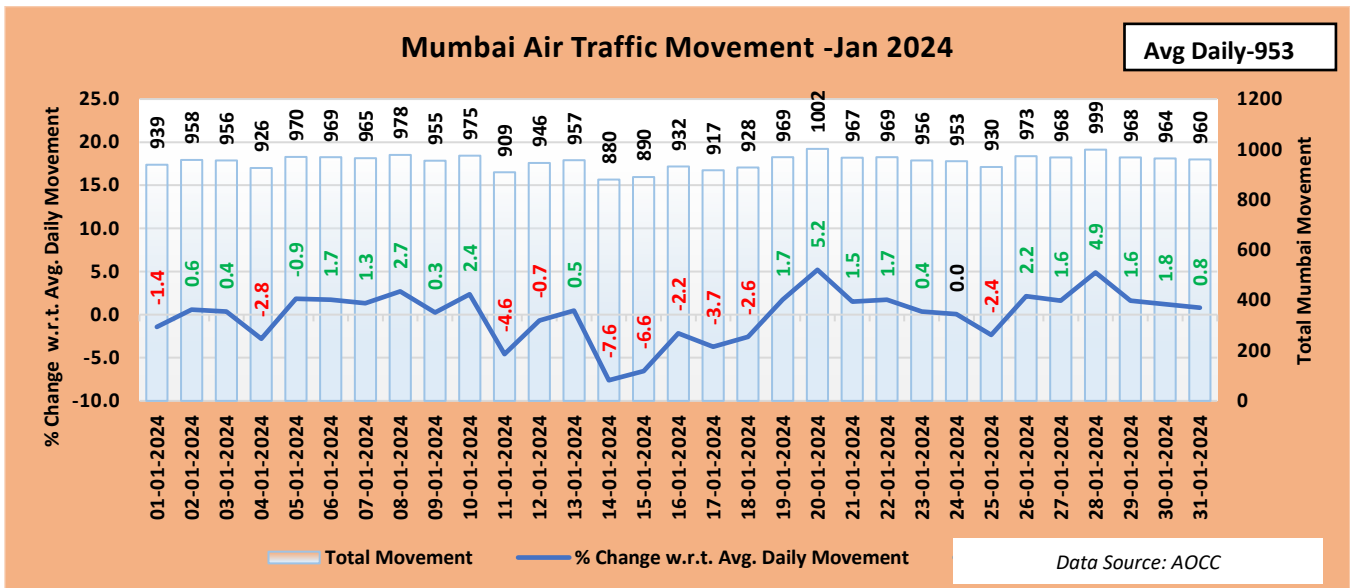


Figure 4: Air Traffic Movement for Mumbai - Jan 2024

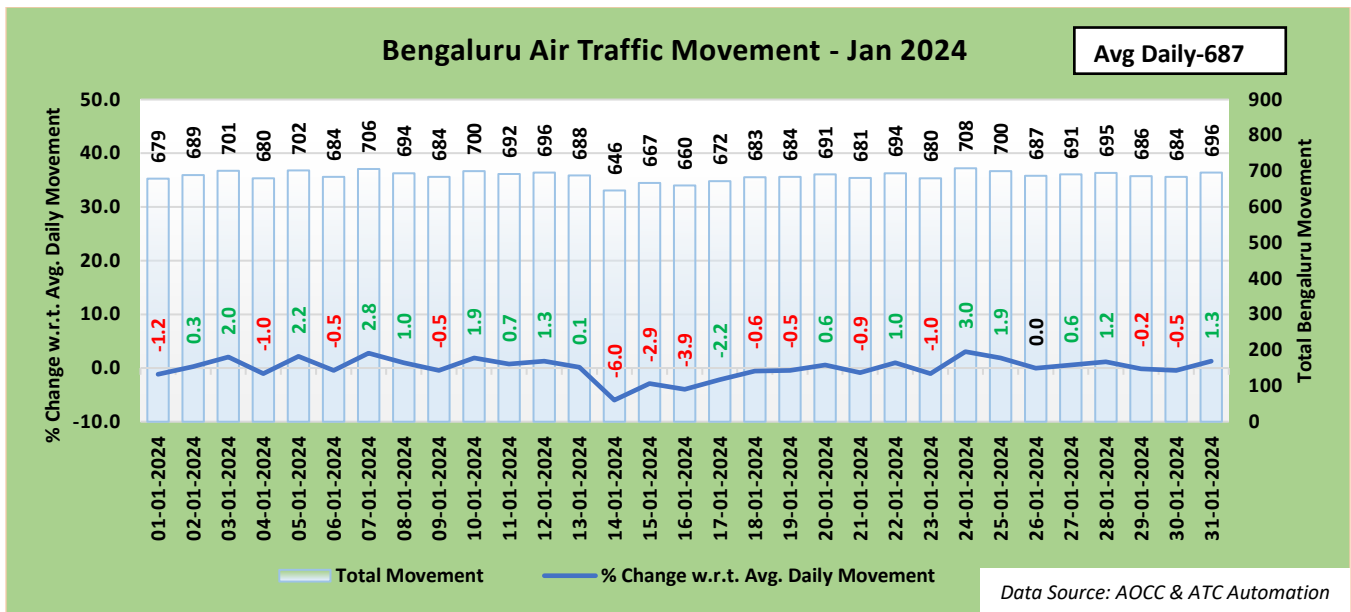


Figure 5: Air Traffic Movement for Bengaluru – Jan 2024

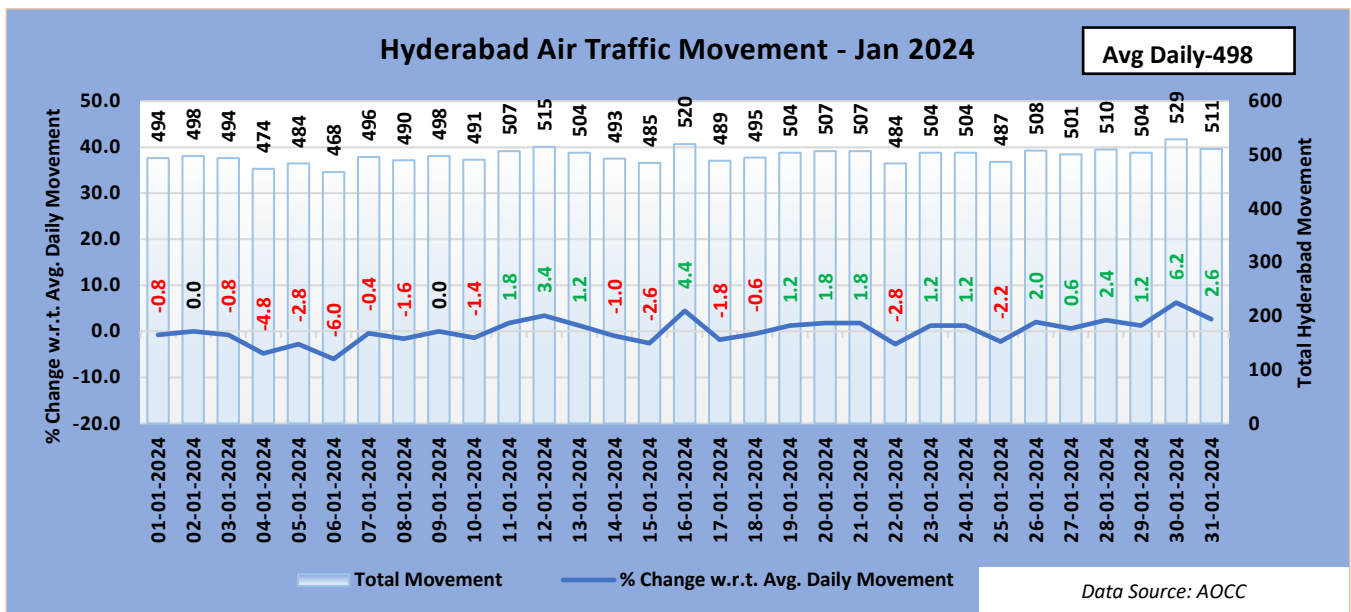


Figure 6: Air Traffic Movement for Hyderabad - Jan 2024

*Low traffic on 14.01.2024 was due to heavy Fog at Delhi Airport and Airspace closure at Mumbai Airport due IAF exercise.



It can be concluded from the above charts that on 31st Jan 2024 (month end), the ATMs at Delhi, Mumbai, Bengaluru and Hyderabad saw an increase of 3.8%, 0.8%, 1.3% & 2.6% respectively in comparison to the average daily movement for Jan'24.

II. 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 January for two consecutive years 2023 and 2024 respectively. Air Traffic movement is also plotted Airline wise for the last six months for the major Scheduled Operators.

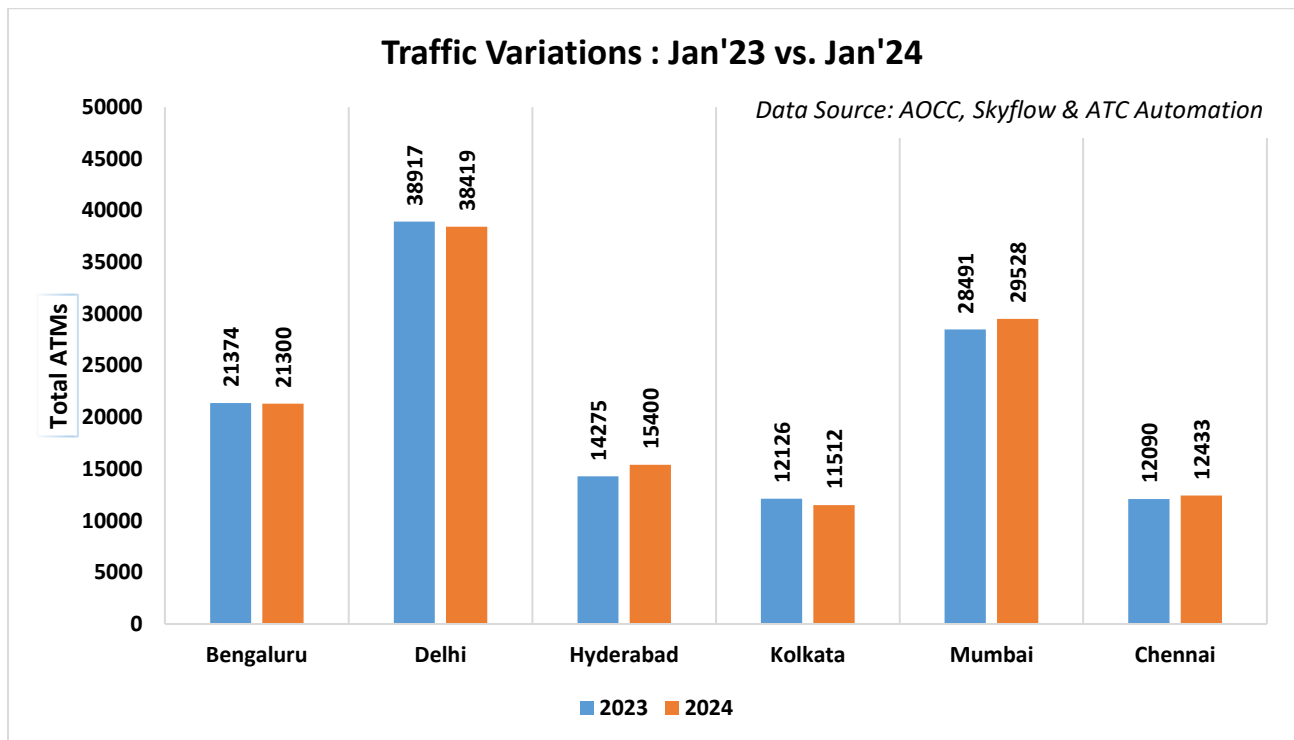


Figure 7: Traffic Variation (YoY)



III. Flight Operations – Airlinewise

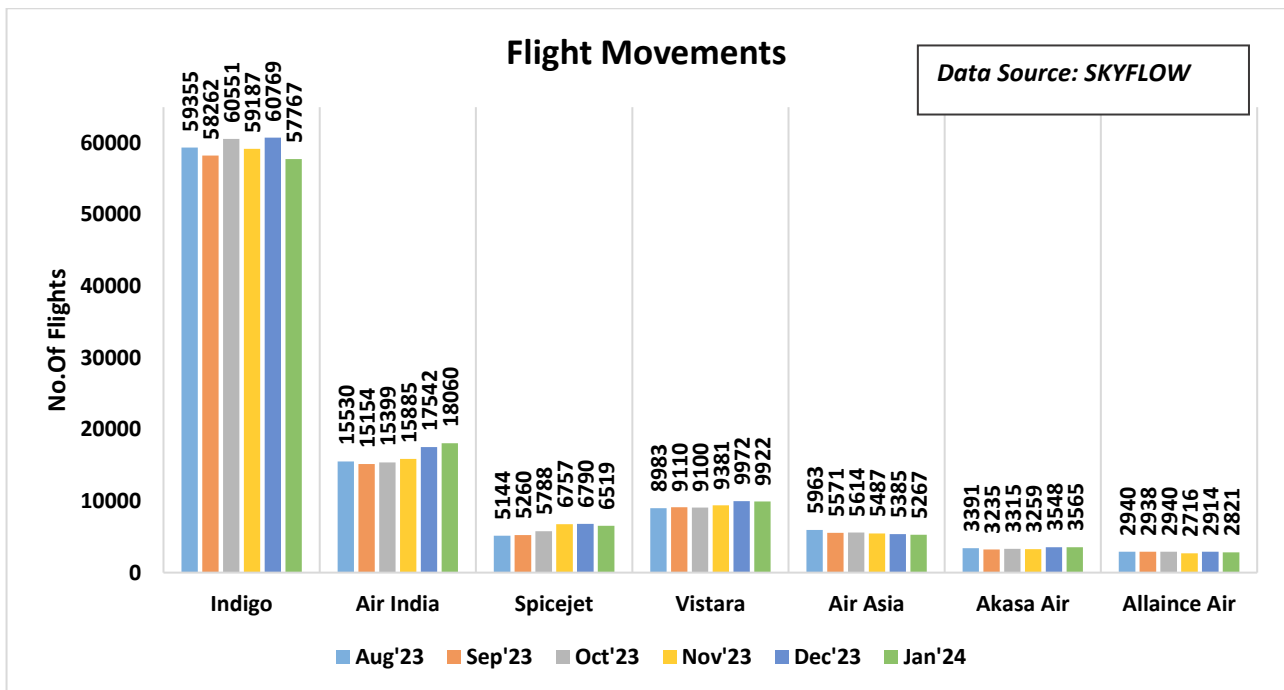


Figure 8: Flight Movements –Airlinewise

Inference:

1. Air India and Akasa Airlines have recorded an increase in the monthly average flight movement in Jan'24 as compared to Dec'23 while Indigo, Spicejet, Vistara, Allaince air and Air Asia Airlines have recorded a decline during the same period.



C. ATFM Post Operations – CDM Analysis

I. Introduction

Analysis Period 1st – 31st January 24

Back Ground During the above mentioned period, **Twenty one (21)** ATFM measures were applied for **Delhi Airport**, **Sixty three (63)** ATFM measures were applied for **Mumbai Airport**, **Five (05)** ATFM measures were applied for **Chennai** and **One (01)** ATFM measures was applied for **Ayodhya airport** due to the following reasons as illustrated in the bar chart below:-

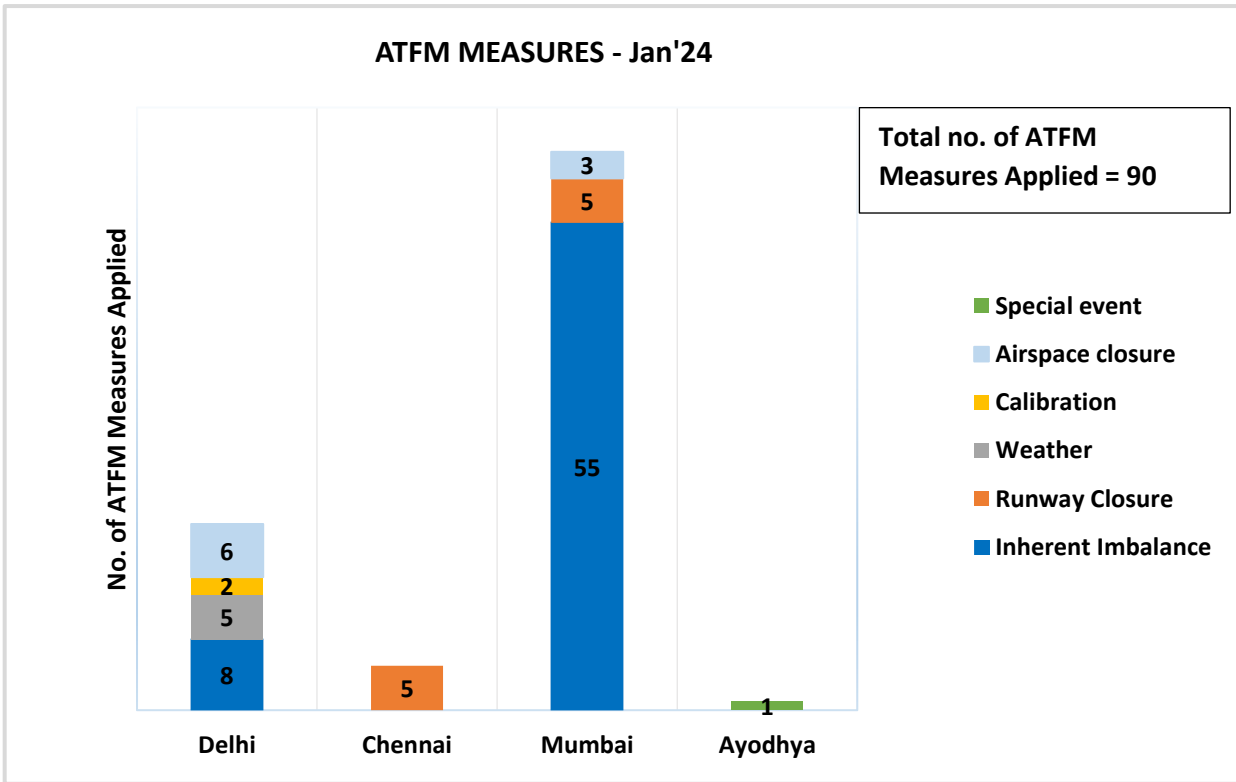


Figure 9: ATFM Measures –Jan'24



II. ATFM Measures Overview

Constrained Airport	Delhi	Mumbai	Chennai	Ayodhya
Number of ATFM measures applied	21	63	5	1
Average ATFM Ground delay(in min) due to measures*	29.4	25	31.4	95
Maximum ATFM Ground delay(in min) due to measures	200	90	49	179
% Compliance	73	80.1	72.7	48

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

Total Arrivals	6927
Total International Arrivals(exempted)	1548
Total affected flights in scenario (Domestic Arrivals)	5379
Total Domestic Arrivals with zero ATFM delay	430
Total Domestic Arrivals with ATFM delay	4949

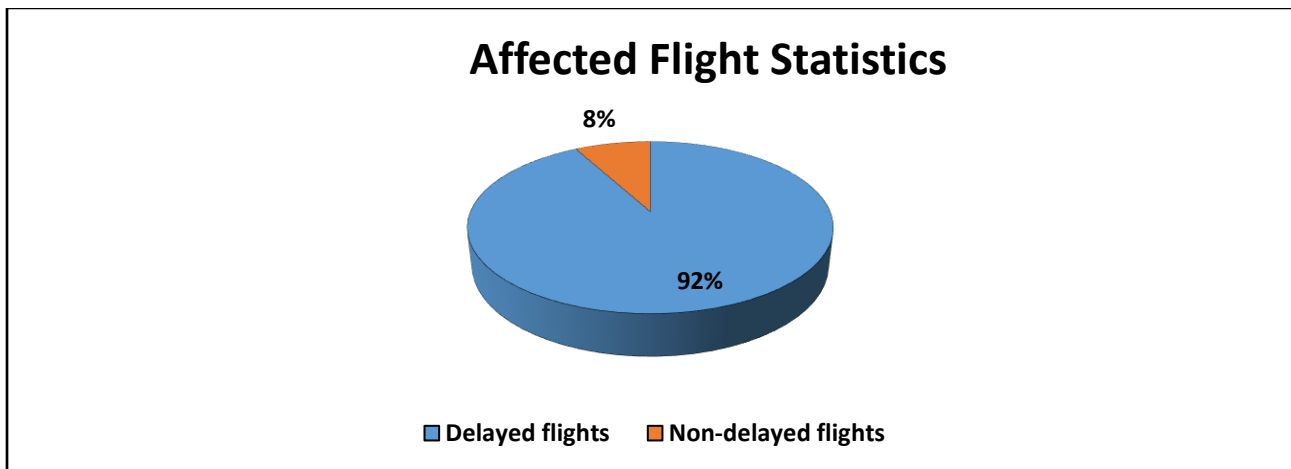


Figure 10: Affected Flight Statistics –Jan'24



III. Overall Compliance

Total arrivals	6927
Domestic arrivals	5379
Flights with complete data (ATOT)	5174
Flights with incomplete data	41
Flights Not Operated	164
Compliant*	4015
Non-Compliant	1159

*Total No. of Revised CTOTs issued = 1792 (Compliance calculation for flights which were issued revised CTOT is w.r.t. new CTOT issued)

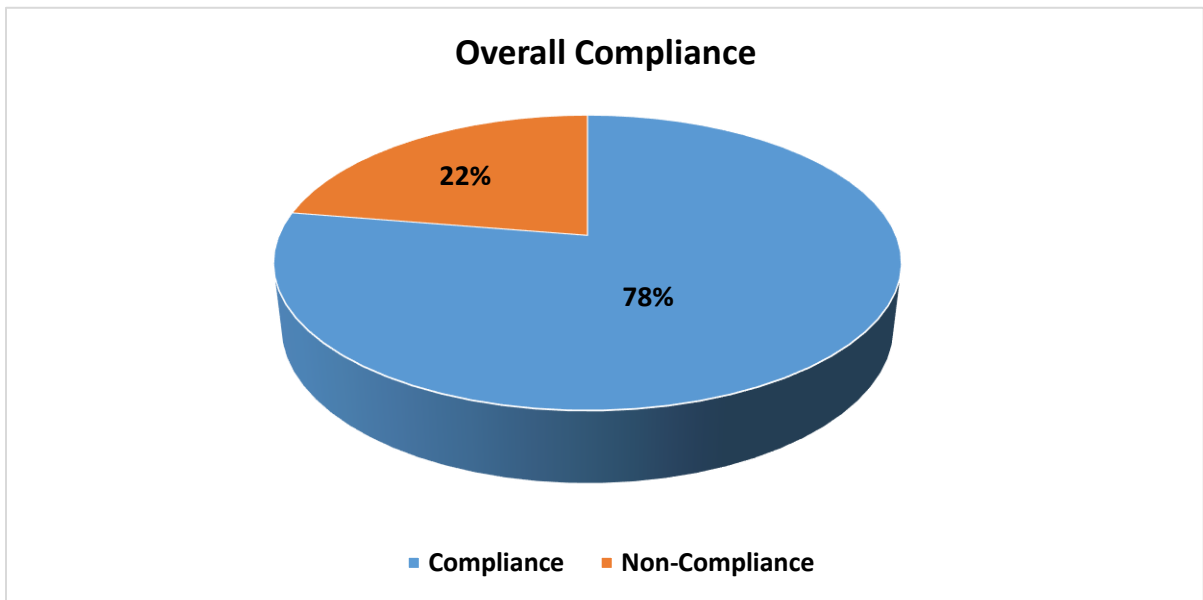


Figure 11: Overall Compliance – Jan’24

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

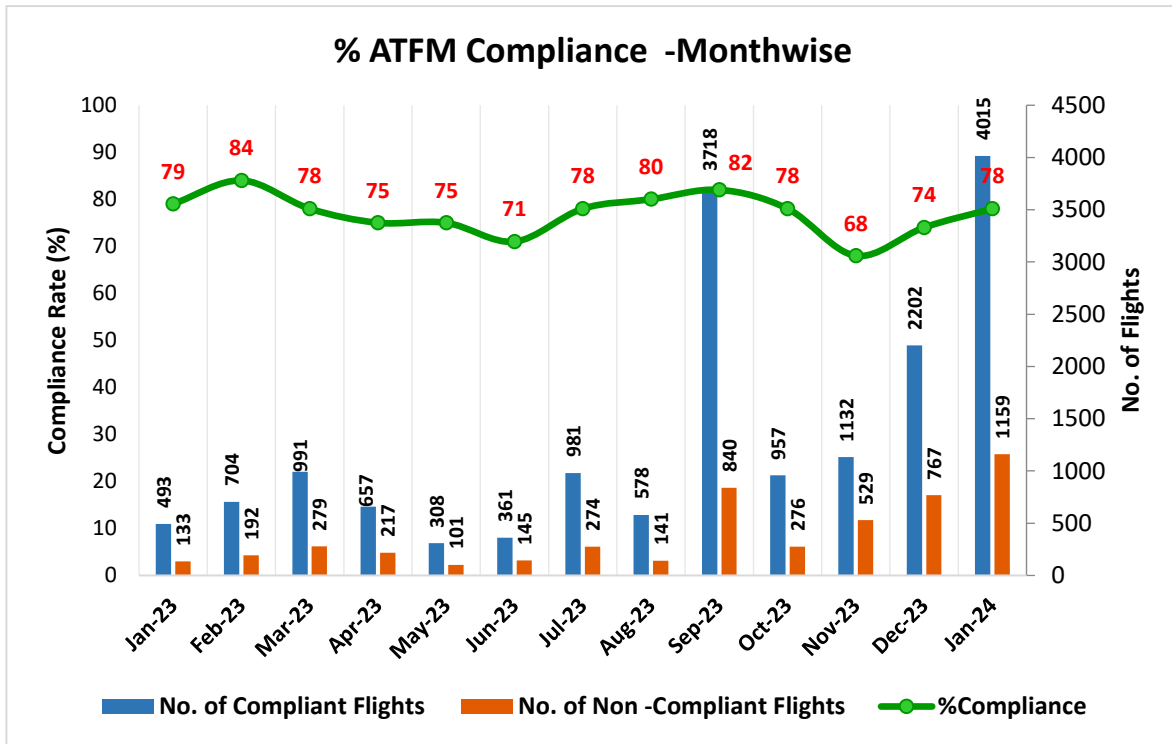


Figure 12: Compliance(Monthwise)

Inference

1. Out of the total arrivals captured(6927 flights) during the CDM scenario for the constrained Airports, 77.6% of flights i.e. domestic arrivals(5379 flights) were candidates for ground delay(participating).
2. Out of these Domestic Arrivals(5379), 92% (4949 flights) are assigned ATFM ground delay.
3. Out of the total arrivals captured(6927 flights) to the constrained Airport during the ATFM scenario, only 71.4% of flights(4949 flights) were assigned ATFM Ground Delay.



IV. CTOT Compliance rate – Airportwise

MUMBAI FIR (78%)*	Compliant	Non Compliant	% Compliant
Ahmedabad	193	21	90%
Aurangabad	18	5	78%
Mumbai	144	51	74%
Bhuj	1	0	100%
Vadodara	16	17	48%
Bhopal	36	10	78%
Bhavnagar	7	0	100%
Diu	4	3	57%
Hirasar	37	8	82%
Indore	74	16	82%
Jabalpur	9	1	90%
Jamnagar	22	17	56%
Kandla	5	2	71%
Kolhapur	1	3	25%
Mundra	1	0	100%
Nagpur	75	16	82%
Nasik	0	3	0%
Pune	34	15	69%
Shirdi	9	3	75%
Surat	11	2	85%
Udaipur	46	13	78%
KOLKATA FIR (78%)*	Compliant	Non Compliant	% Compliant
Prayagraj	5	6	45%
Angul	0	1	0%
Agartala	5	0	100%
Ayodhya	8	12	40%
Siliguri	61	12	84%
Shillong	3	1	75%
Varanasi	54	17	76%
Bhubaneswar	81	10	89%
Kolkata	186	39	83%
Chakeri	14	3	82%



Durgapur	1	2	33%
Darbhanga	6	3	67%
Deoghar	1	1	50%
Gorakhpur	19	12	61%
Hollongi	82	23	78%
Gaya	7	3	70%
Hollongi	1	1	50%
Uttar Satali	0	1	0%
Imphal	5	0	100%
Jharsuguda	5	0	100%
Khajuraho	3	0	100%
Aizawl	1	1	50%
Dibrugarh	7	4	64%
Raigarh	2	3	40%
Patna	64	19	77%
Ranchi	36	16	69%
Raipur	56	12	82%
DELHI FIR (72%)*	Compliant	Non Compliant	% Compliant
Agra	1	0	100%
Amritsar	25	13	66%
Adampur	0	1	0%
Bikaner	1	0	100%
Bhuntar	0	1	0%
Bathinda	0	1	0%
Bareilly	2	3	40%
Chandigarh	49	35	58%
Dehradun	27	12	69%
Delhi	437	137	76%
Hindon	1	1	50%
Kangra	8	2	80%
Gwalior	3	6	33%
Jodhpur	12	13	48%
Jaipur	126	22	85%
Jaisalmer	8	6	57%
Jammu	28	10	74%
Ajmer	1	0	100%
Leh	20	16	56%



Lucknow	97	24	80%
Pathankot	1	0	100%
Suratgarh	0	2	0%
Shimla	7	1	88%
Srinagar	53	46	54%
Uttarlai	0	1	0%
CHENNAI FIR (81%)*	Compliant	Non Compliant	% Compliant
Hal Bangalore	3	5	38%
Bangalore	388	76	84%
Belgaum	2	2	50%
Vijayawada	11	3	79%
Coimbatore	74	8	90%
Kochi	117	19	86%
Calicut	24	4	86%
MOPA Goa	92	31	75%
Goa	150	64	70%
Hubli	4	3	57%
Nanded	236	62	79%
Begumpet Hyderabad	2	1	67%
Vijaynagar	0	2	0%
Kannur	5	4	56%
Madurai	19	8	70%
Mangalore	49	10	83%
Chennai	254	39	87%
Port Blair	13	7	65%
Sindhudurg	6	1	86%
Tiruchirappally	16	10	62%
Thiruvananthapuram	53	4	93%
Visakhapatnam	20	9	69%

**FIR wise compliance rate*

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(78%) for the month are highlighted in red.



V. CTOT Compliance rate – Airlinewise

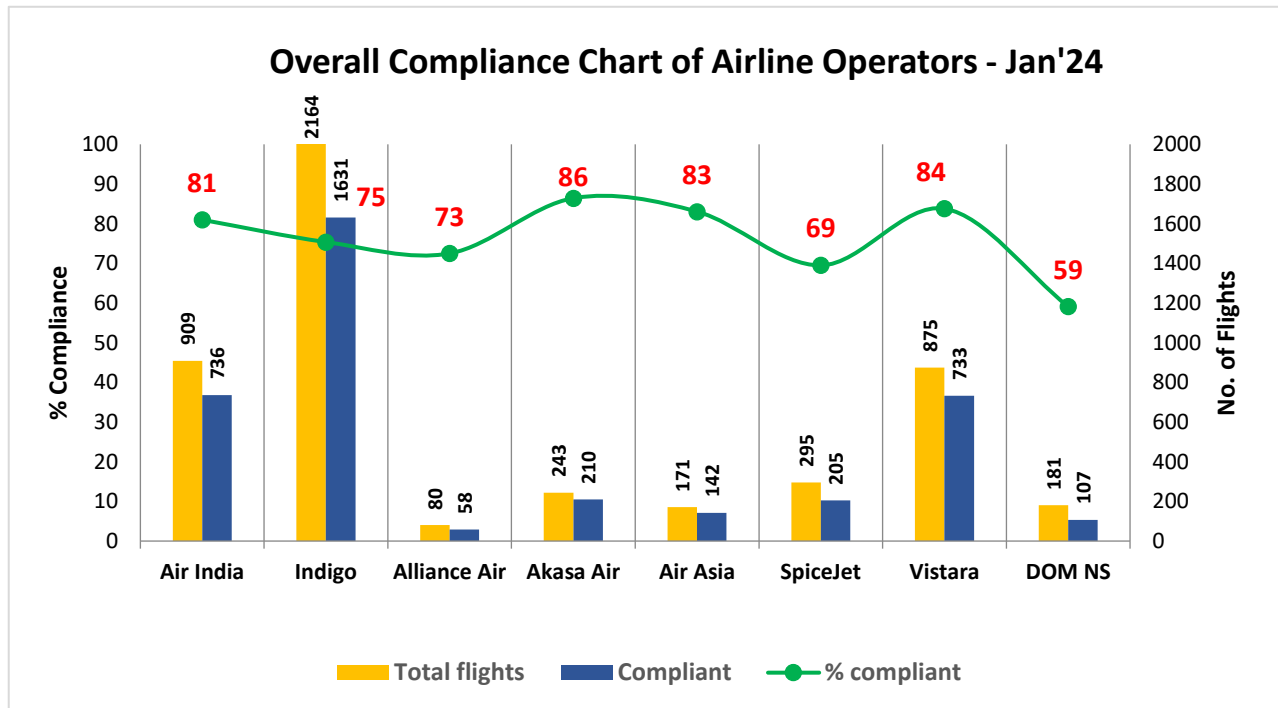


Figure 13: Airline wise Compliance –Jan’24

Inference

1. Out of the total domestic arrivals with complete data in the CDM scenario, 78% arrivals are compliant.
2. Chennai region record the highest compliance of 81% whereas Delhi region has the lowest compliance of 72%.
3. Air India, Akasa Air, Air Asia and Vistara Airlines have a CTOT compliance higher than the average recorded compliance for the month of Jan’24.

VI. Reason For Non Compliance

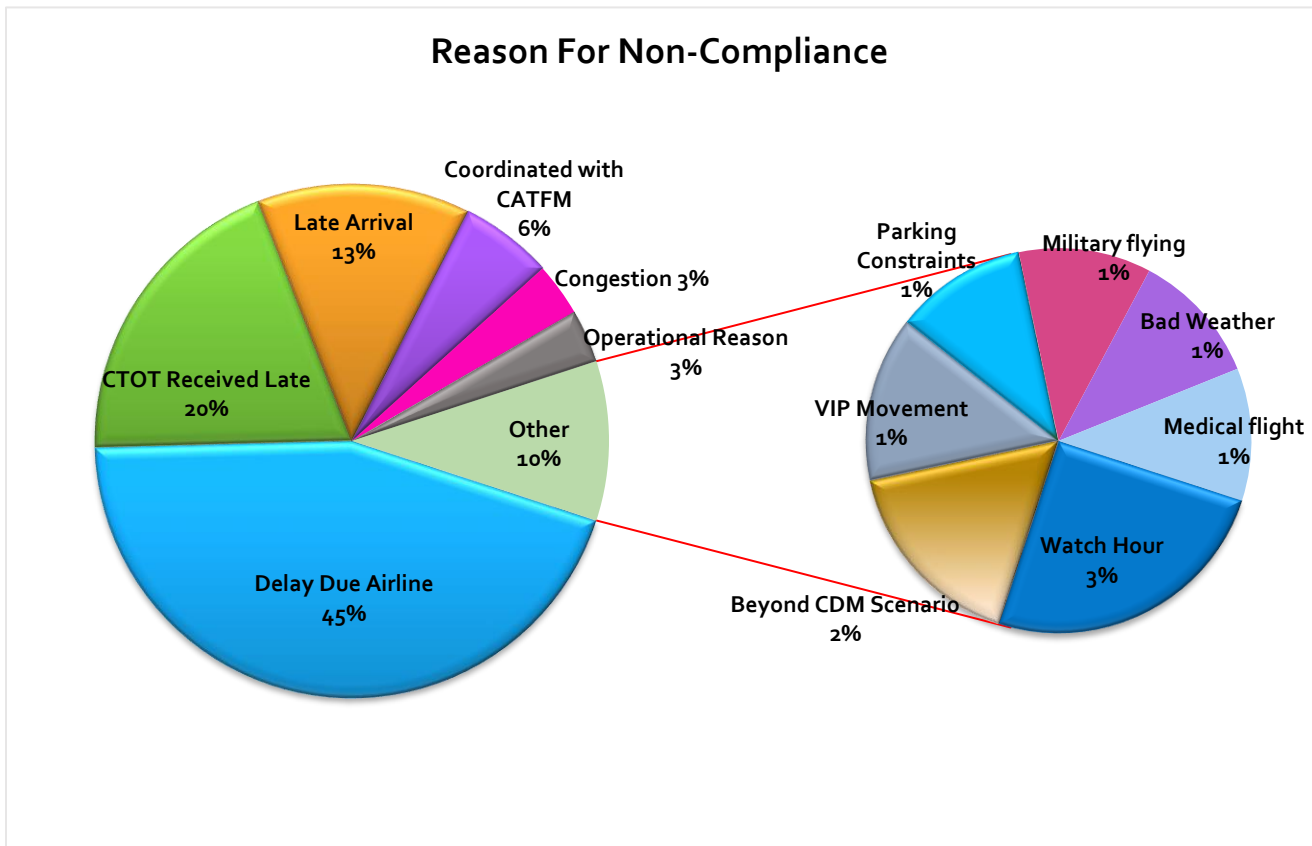


Figure 14: Reason for Non-Compliance as provided by FMPs

Inference:

1. 45 % of CTOT Non- Compliance was reported by concerned FMPs to be due to delay by Airlines. The ATC stations didn't receive delay message
2. 20% of the CTOT Non- compliance was reported by concerned FMPs to be due to late receipt of CTOTs and by the time the aircraft had already initiated pushed back or startup.
3. 13 % of the CTOT Non- compliance was reported to be due to late arrival from previous station. Updated EOBTs of such flights was not available to ATFM unit leading to wastage of unused slots.
4. 3 % of CTOT Non- Compliance was reported by concerned FMPs to be due to congestion at the departure airport.



VII. Air Delay during the CDM Scenario period

Average Air Delay to domestic arrivals* within the CDM Scenario period for Delhi, Mumbai and Chennai was 13.5, 11.0 and 9.3 minutes respectively.

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

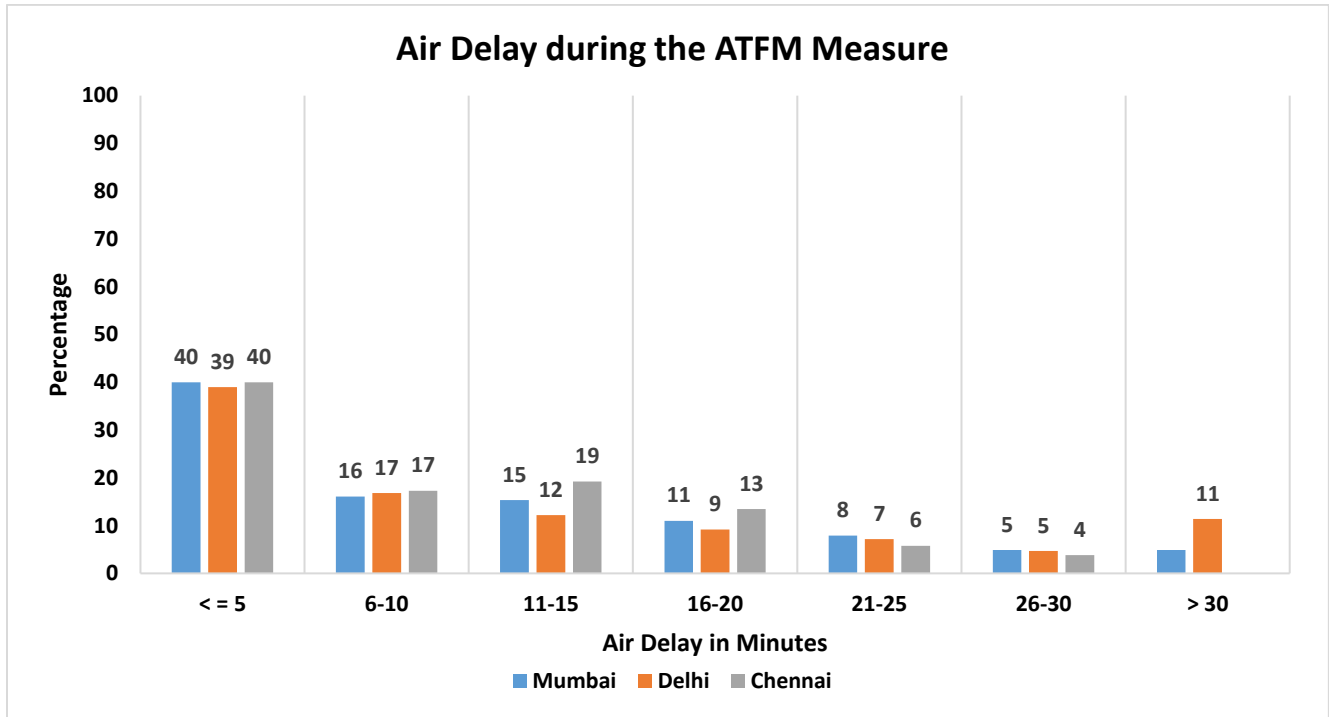


Figure 15: Air Delay distribution during the CDM period

Inference

1. 56% of domestic arriving flights to Mumbai had an Air delay of equal to or less than 10 minutes during the CDM period.
2. 56% of domestic arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period.
3. 57% of domestic arriving flights to Chennai had an Air delay of equal to or less than 10 minutes during the CDM period.



VIII. 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)= 70515 mins

Total Air Delay (with no ATFM measures) = 131645 mins

Reduction in Air delay due to ATFM measures= (131645-70515) = **61130 mins**

Fuel Saving Calculation:

Total Fuel saved during the ATFM Measure: **37,25,042.76 Kg**

Total reduction in CO₂ emission : 3.16(KgCO₂/kg fuel)* 37,25,042.76 Kg = 11,771,135.11 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. 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)
<i>Average ATFM delay</i>	$\frac{\text{Total monthly ATFM delay (in minutes)}}{\text{Total Domestic Arrivals}}$
<i>Maximum ATFM delay</i>	Maximum ATFM delay (in minutes) assigned in the month
<i>Overall compliance rate</i>	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
<i>CTOT Compliance rate of Airline operators</i>	An overview of CTOT compliance rate of various Airline operators
<i>CTOT Compliance rate of Airports within different Regions</i>	An overview of CTOT compliance rate of Airports within 4 FIRs
Air delay statistics	<p>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</p> <p>Average Air Delay is calculated as:</p> $\text{Average Air Delay} = \frac{\text{Total Air Delay to domestic arrivals (with values greater than zero)}}{\text{Total Domestic Arrivals}}$ <p>CLDT: Calculated Landing Time CTOT: Calculated Take off Time ALDT: Actual Landing Time ATOT: Actual Take off Time</p>



Annexure-A

CASE STUDY

Republic Day Airspace Closure(2024)

A. Introduction:

Due to the Republic Day celebrations, Delhi Airport/Airspace was closed as specified vide NOTAM no. A0062/24, A0063/24 & A0073/24. Restrictions were also imposed on domestic non-scheduled movements vide A0067/24.

Later on, the exercise was called off on 22nd Jan'24 in the light of the non-scheduled movements anticipated due to Ram temple inauguration at Ayodhya.

(A0062/24 NOTAMN

Q) VIDF/QRACA/IV/NBO/W/000/200/2834N07707E050

A) VIDF B) 2401190500 C) 2401260715

D) 19-26 0500-0715

E) AIRSPACE WI A RADIUS OF 50NM AROUND DELHI VOR (DPN), EXCLUDING AREAS OF 10NM RADIUS AROUND SIKANDRABAD VOR (SSB) AND 10NM AROUND SAKRAS VOR (SKA), NOT AVBL DUE REPUBLIC DAY CELEBRATIONS.

F) GND G) FL200)

(A0063/24 NOTAMN

Q) VIDF/QFAXX/IV/BO/A/000/999/2834N07707E005

A) VIDP B) 2401190450 C) 2401260715

D) 19-26 0450-0715

E) NO LDG AND TKOF PERMITTED AT IGI AP, NEW DELHI (VIDP) DUE REPUBLIC DAY CELEBRATIONS.)

**(A0073/24 NOTAMN**

Q) VIDF/QRACA/IV/NBO/W/000/999/2834N07707E162

A) VIDF B) 2401260300 C) 2401291330

D) 26 0300-0730 0930-1230,

29 0930-1330

E) 1. IN CONNECTION WITH REPUBLIC DAY CELEBRATIONS, NO FLT PERMITTED TO TKOF/LAND, AT INDIRA GANDHI INTERNATIONAL AP (VIDP), NEW DELHI AND SUBSIDIARY AIRPORTS WI A RADIUS OF 300KM AROUND DELHI (WI DELHI FIR) , EXC FLW FLT:

I. SKED FLT BY THE SKED FLT OPR.

II, INDIAN AIR FORCE(IAF), BSF AND AVIATION RESEARCH CENTRE(ARC) FLTS.

III. ARMY AVIATION HEL FLT UNDERTAKING AIRBORNE QRT MISSIONS AND CASUALTY/ IMMEDIATE MEDICAL EVACUATION.

IV. STATE OWNED ACFT/ HEL FLYING THE GOVERNOR OR CHIEF MINISTER OF A STATE.

2. SKED FLT BY SKED OPR ON ATS RTE PERMITTED

A) TO OVERFLY A ZONE OF 300KM RADIUS AROUND IGI AIRPORT (DELHI) ABOVE F290.

B) TO TKOF OR LAND FM/AT A SUBSIDIARY AIRFIELD LOCATED BEYOND 300KM FM DELHI PROVIDED WHILE CMB SHALL ATTAIN F290 BY 200KM TO DELHI AND WHILE DESCENDING SHALL COMMENCE DESCEND FM F290 AT A DIST OF 200KM OR MORE FM DELHI.

3. SAFDARJUNG AP (VIDD) SHALL REMAIN CLSD DRG THE ABV MENTIONED DATES AND TIMINGS EXCEPT FOR IAF HELICOPTERS, WHICH MAY BE DEPLOYED FOR EMERG DUTY OR VVIP DUTY, FLY PAST ACTIVITIES AND FOR BSF/IAF HEL UTILISED BY THE NSG.

4. ROHINI HLP (284507N0770331E) SHALL REMAIN CLSD DRG ABV MENTIONED DATES AND TIMINGS.

F) GND G) UNL)

(A0067/24 NOTAMN

Q) VIDF/QFAXX/IV/NBO/A/000/999/2834N07707E005

A) VIDP B) 2401190430 C) 2401250745

D) DLY 0430-0745

E) IN VIEW OF AIRSPACE CLOSURE AND EXP TFC CONGESTION, DOM NON-SKED FLT NOT PERMITTED TO OPR AT IGI AP.)



B. Executive Summary

A virtual meeting was conducted on 17th Jan'24 with all FMP ATC stations to discuss and reiterate the ATFM processes. All ATS in-charges/FMPs were informed about the latest NOTAM w.r.t. republic day celebration and requested to ensure manning of the FMP position by SKYFLOW trained staff. This was followed by a physical meeting on 18th Jan'24 with senior ATC officers from IGI Airport, Airlines, DIAL team and IMD to apprise the stakeholders regarding the upcoming airspace closure and share the plan for addressing the anticipated demand capacity imbalance.

Based on IMD's prediction of heavy fog on the initial days of the exercise, It was unanimously agreed that unlike previous years, ATFM measures may be required to be applied pre-closure also.

Revised schedule as approved by DIAL, was already available with ATFM team. Airlines had also shared their updated flight intent and the same was uploaded in the SKYFLOW system on 17th Jan'24.

A representative from Air India & Indigo Airlines was present in CCC for all days of the Republic Day Airspace closure. Their presence helped in timely and effective coordination with the Flight dispatch and operations.

In view of the number of non-scheduled movements to Ayodhya for Ram Temple inauguration, the exercise was called off for 22nd Jan'24. The exercise was also cancelled for 24th and 25th Jan'24 by Indian Airforce.

C. Challenges:

1. Few Airlines informed cancellations after the CTOTs were issued. This resulted in undersupply and wastage of unused slots.
2. Few domestic non-scheduled operators were not aware of the restriction imposed on them and had to be telephonically advised to revise their EOBTs.
3. Fog resulted in diversion of many flights to alternate Airports such as Jaipur, Amritsar and Lucknow on 23rd Jan'24. No prior information was available (arrivals could continue till 0450 UTC before the airspace closure) and the CDM had to be applied at 0400 UTC to provide prior notice to flights subject to ATFM ground delay. These diverted flights were not accounted for and had to be accommodated on priority. This resulted in oversupply of aircraft to the constrained Airport.
4. CTOT dissemination to smaller Airports (under the Regional Connectivity Scheme) still remains a challenge.

D. Highlights:

1. Stakeholder's meeting prior to the closure helped in raising awareness about the applicable NOTAM and proposed ATFM measures both with FMPs and Airlines.
2. Better coordination was effected with Delhi ATC as per the agreed plan.
3. Presence of Airline representatives from two major Airlines helped in communication flow.
4. Regulated flow of Air traffic to Delhi ATC post the reopening of Airspace ensured less airborne holdings on most days.

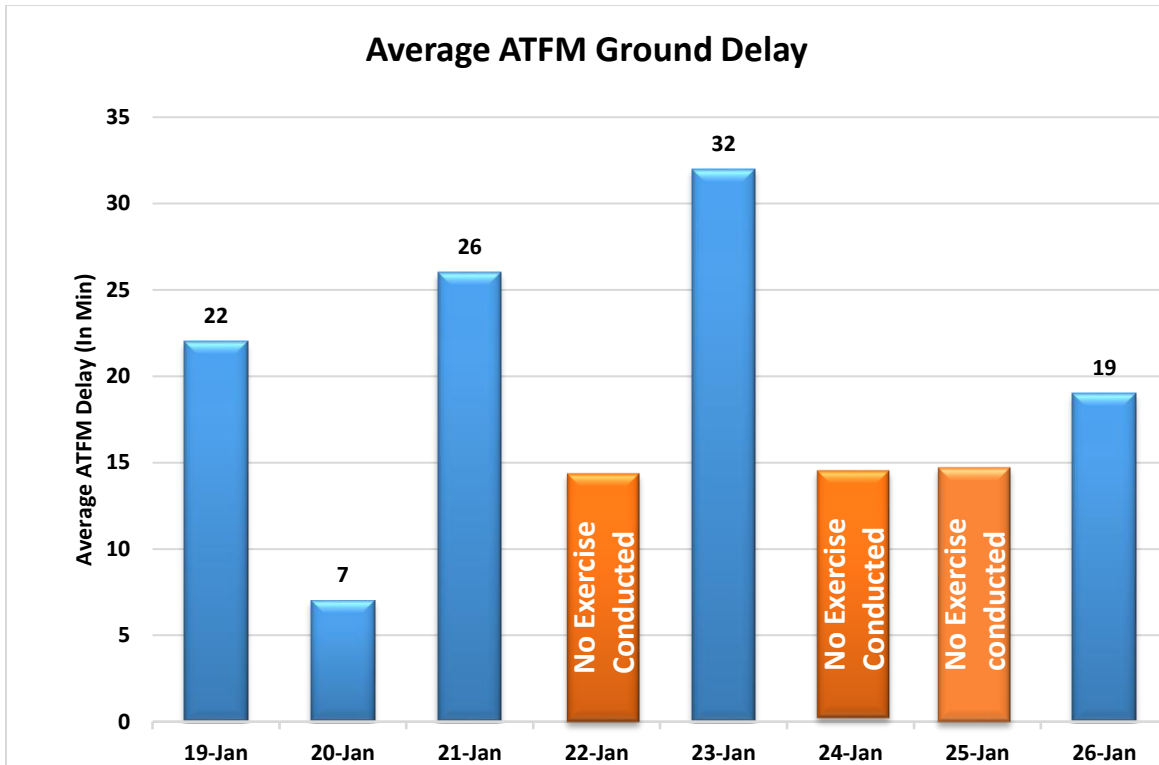


E. Overview:

The data for the period during which ATFM measures were applied in Delhi on 19th, 20th, 21st, 23rd & 26th January 2024 was analyzed for following ATFM parameters.

(Flights with complete data i.e. ATOT, ALDT etc. are only taken into consideration. ATOT was obtained from all concerned airports for verifying CTOT compliance.)

I. Average ATFM Ground Delay

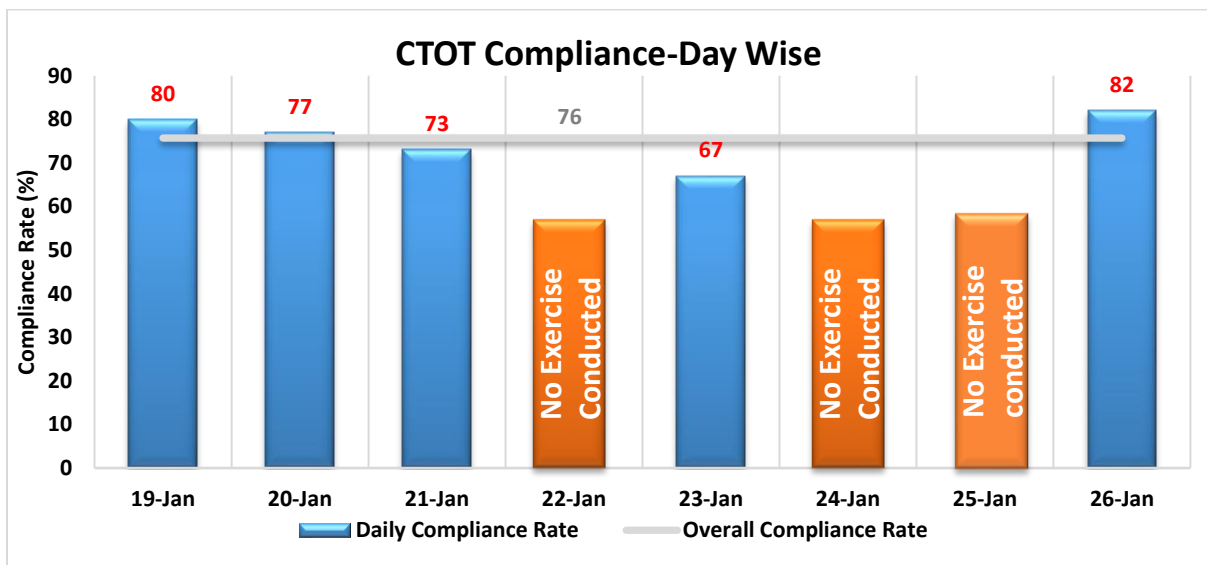


Inference

1. Average ATFM ground delay was large on 23rd Jan'24 as compared to other days due to the anticipated delay in handover of the Airspace after the exercise.



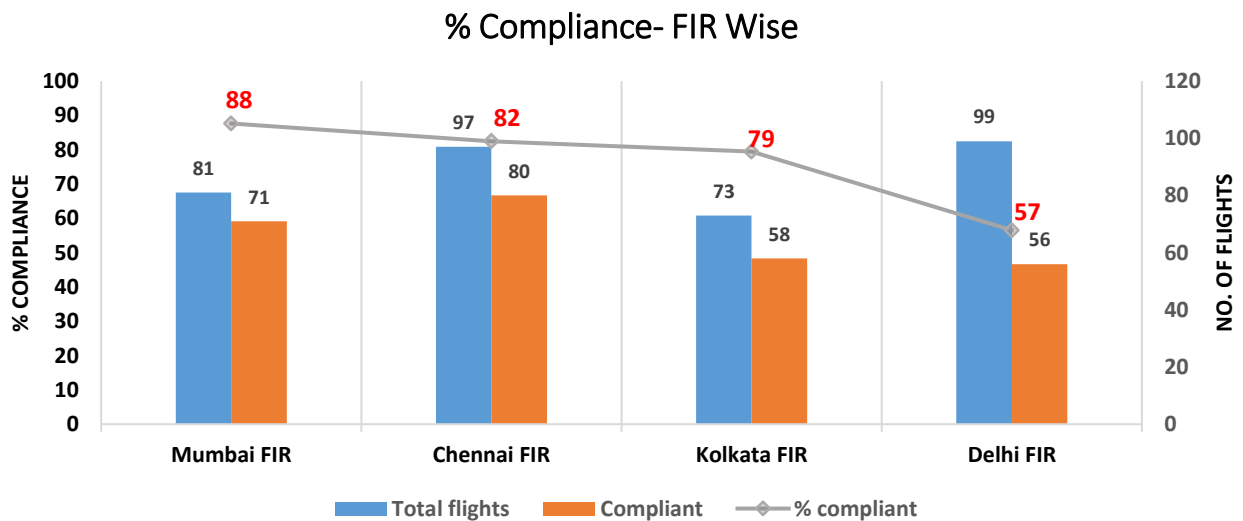
II. CTOT Compliance – Day wise:



Inference:

1. Percentage compliance was consistently above 73 percent on most days of the exercise except 23rd Jan'24 when the airport experienced heavy disruption due fog.

III. CTOT Compliance (FIR-wise)

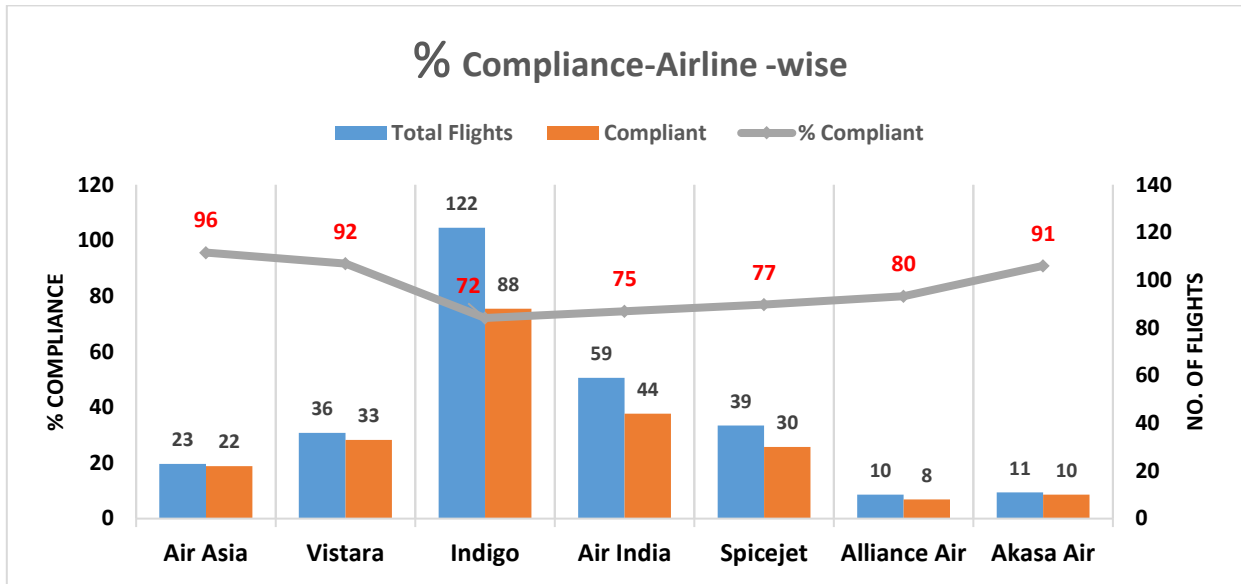


Inference:

1. Mumbai FIR has the highest Compliance of 88% whereas Delhi FIR has the lowest of 57%.

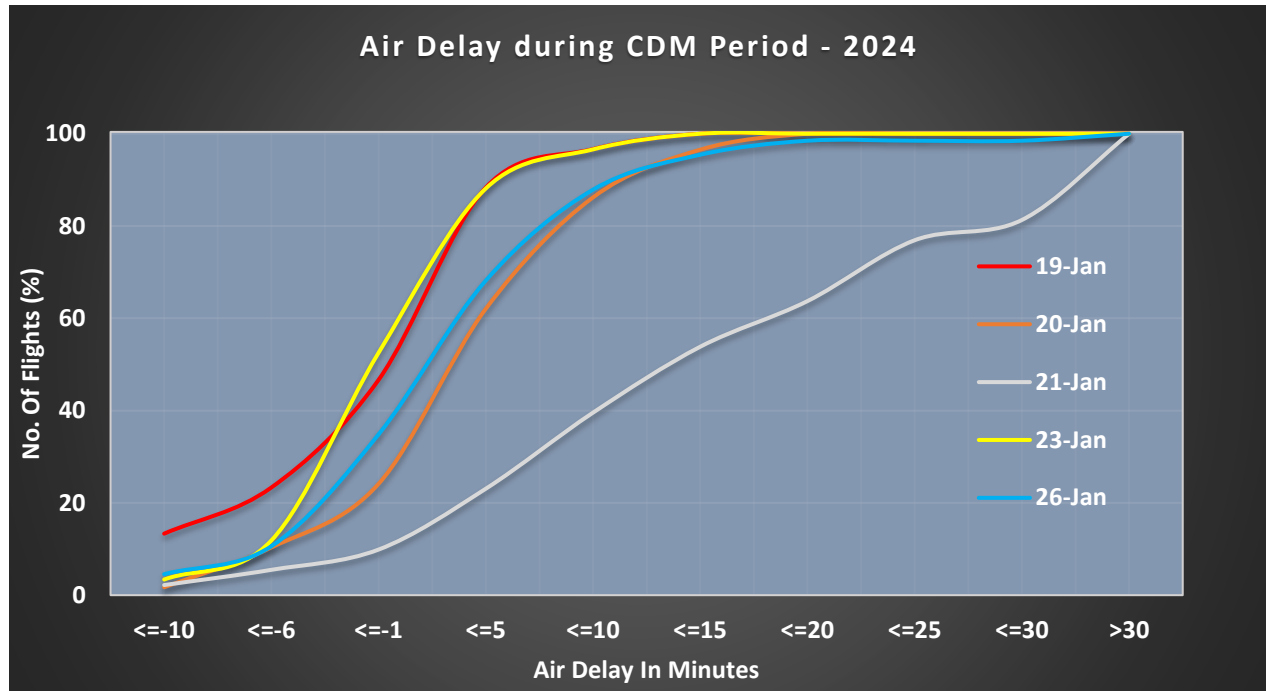


IV. CTOT Compliance (Airline-wise)



Inference

1. Air Asia has the highest compliance of 96% whereas Indigo Airline has the lowest compliance of 72%. Majority of the Airlines have a compliance above 75%.

**V. Cumulative Air Delay during the period when ATFM measures were inforce.****Inference:**

1. 97% of arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period on 19th Jan'24.
2. 86% of arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period on 20th Jan'24.
3. 40% of arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period on 21st Jan'24.
4. 97% of arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period on 23rd Jan'24.
5. 88% of arriving flights to Delhi had an Air delay of equal to or less than 10 minutes during the CDM period on 26th Jan'24.

**F. Fuel Saving due to ATFM Measures during the Republic Day closure:**

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

Total Air delay (with ATFM measures) = **3005 min**

Total Air delay (with no ATFM measures) = **13230 min**

Total amount of Air delay reduced due to ATFM measures= 13230-3005= **10225 min**

Fuel Saving Calculation:

Total Fuel saved during the ATFM Measure: **5,75,489.43 Kgs**

Total reduction in CO₂ emission : 3.16(KgCO₂/kg fuel)* 5,75,489.43 Kgs= 1,818,546.61 Kg

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



Annexure-B

Compliance by Airlines with Flight Planning Requirements of Common Business rules(CBR)- January 2024.



I. Introduction:

Accurate and timely input in respect of flight intent is paramount to the correct traffic demand projection and eventually effective ATFM implementation. Filed Flight plans(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.

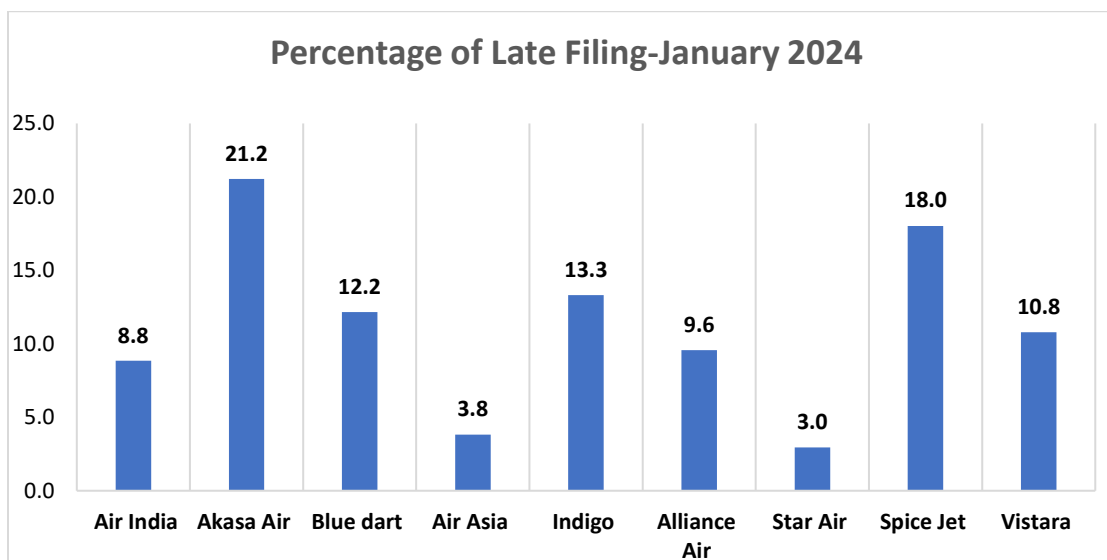
AIP India, ENR 1.9 section 4 on Flight Planning in the context of ATFM recommends Flight Planning requirements for all Airline Operators –

- “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 January 2024 to 31st January 2024. 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 the context of 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:

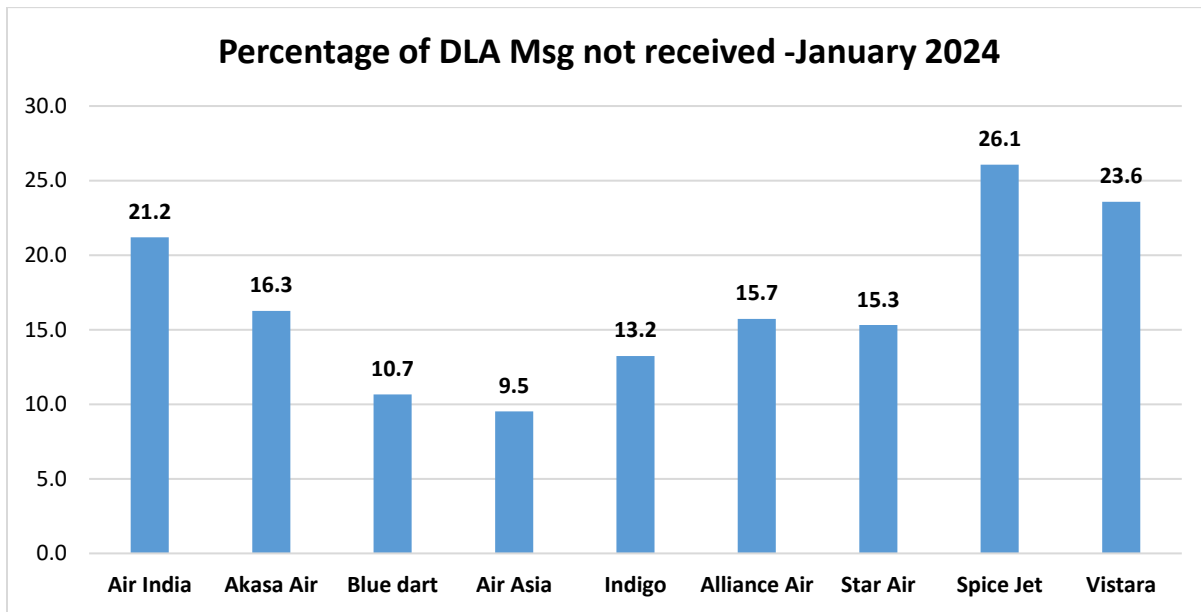
Name of Airline	Late Filed FPL	Total No. Of FPL	% Delayed Filing
AirIndia	1361	14660	9.3
Akasa	658	3572	18.4
Air India Express	1232	6447	19.1
Blue Dart	72	642	11.2
Air Asia	119	5609	2.1
Indigo	7808	58605	13.3
Alliance Air	301	2866	10.5
Star Air	23	1053	2.2
SpiceJet	942	7017	13.42
Vistara	1448	10035	14.4
Total no. of FPLs for Scheduled Airlines	13964	110506	12.6

- 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 were received.

The Table below lists number of flights for which no DLA message was received in January 2024.

{{(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	3919	10005	39.2
Akasa	626	2787	22.5
Air India Express	1000	3507	28.5
Blue Dart	119	448	26.6
Air Asia	889	3705	23.9
Indigo	11531	41381	27.9
Alliance Air	372	1596	23.3
Star Air	101	449	22.5
SpiceJet	1767	4512	39.2
Vistara	2625	7667	34.2



- C. For analysis of non-receipt of CNL (cancel) messages for January 2024, 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 January 2024:

Name of Airline	No. of flights annulled	CNL message not received
AirIndia	127	119
Akasa	3	3
Air India Express	42	33
Blue Dart	7	7
Air Asia	36	30
Indigo	561	556
Alliance Air	205	197
Star Air	5	5
SpiceJet	180	175
Vistara	126	123

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