ANNUAL REPORT
ATFM OPERATIONS
(Jan 2021 to Dec 2021)

CENTRAL COMMAND CENTER, C-ATFM, DELHI

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A. Executive Summary

Months into the pandemic, the year 2021 had all the Scheduled Domestic operators still flying, some augmenting their resources and two brand new airlines—Akasa and Jet Airways set to take off. The key factors determining the pace of recovery in domestic Air travel as believed by the experts was the development and availability of vaccines, people's willingness to undertake leisure travel and recovery in macroeconomic growth

The Increasing trend of Air traffic post the 1st wave of infection was jolted due to the deadly second Covid wave in April-May 2021. The grim situation was short-lived as the contagion subsided after almost two months of devastation. The government pushed the vaccination drive to full throttle and India's air travel again showed some signs of recovery.

In an unprecedented move, the government had imposed both capacity and fare caps. While capacity caps meant that airlines could operate only a certain percentage of the approved schedule and gradually increase it based on the existing state of Covid infections. Fare caps meant the airlines could not price lower than a certain fare (floor) and higher than a particular fare (ceiling). The ministry of civil aviation issued an order which came against the backdrop of business activities returning to normal, allowing all domestic operators to fly with 100 percent capacity from 18thOctober'21.This move coincided with the upcoming festival season and is believed to have further boosted up the steady increase in domestic air travel.

COVID-19 cases of the Omicron variant were detected in India in the 1st week of December prompting the state governments to impose restrictions to curtail its spread. The Air Traffic is also observed to have taken a downswing in the last week of December'21.

The coronavirus induced suspension of scheduled international passenger flights has been extended till 28th February 2022. But special international flights have been operating under the Vande Bharat Mission since May 2020 and under bilateral "air bubble" arrangements with selected countries since July 2020. Under an air bubble pact between two countries, special international flights can be operated by their airlines between their territories. . It also agreed on entry measures and later on reciprocal acceptance of vaccine and vaccination certificates.

While Air traffic has increased, it is still to reach the Pre-Covid levels.

B.Introduction

Air Traffic Flow Management is being implemented in phased manner in India.The operational structure comprises of Central Command Centre(CCC) established in Delhi, at the helm of affairs, supported by Flow Management positions(FMPs) at designated Air Traffic Control Towers, Approach and Area Control Centers. The Phase-I implementation involved activation of 36 Flow Management positions in different ATS units including 8 joint civil-military Airports and application of Ground Delay Program(GDP) and Ground Stop Program(GSt) to regulate traffic (resolve Demand Capacity imbalance) at constrained Airport.

In principle approval for the establishment of Flow Management positions at five New Airports namely Vijayawada, Dehradun, Baroda, Surat and Rajahmundry was granted in February'21. The infrastructure for supporting ATFM operations is being facilitated by the respective ATS in charge and the training to the New FMPs was imparted in Dec'21.

Airport CDM of 4 Major Airports- Mumbai, Kolkata, Chennai and Delhi Airport was already integrated with the ATFM system. The Airport CDM at Jaipur, Guwahati, Trivandrum and Ahmedabad was integrated with the ATFM SKYFLOW system in February'21. The Departure Planning Information(DPI) message exchanges bring airports into the loop of the ATFM decision making process. The Flight Update Message(FUM)/DPI message exchange ensures the punctual updating of flight data, more consistent slot calculation and improved slot adherence.

Despite continuous efforts, the presence of correct and timely flight plan intent in SKYFLOW has been a challenging task. Identifying this constraint, the operational concept of an integrated initial Flight Plan processing system is being implemented as a part of the ATFM system. The training and the site acceptance test of the same have been conducted in mid-2021.

The IFPS system comprises the process of receiving flight plans and associated messages, validating this information against syntactic and semantic rules, identifying the destination addresses based on the aerodromes and route informed and distributing the information to all identified and informed addresses. This centralization of the Flight Plan processing system also ensures that each key player in the ATM process receives the same Flight Plan information.

To enhance the infrastructure for Surveillance over Oceanic Airspace, India has engaged into a contract with a service provider for Space-based ADS-B services over Oceanic Airspace. Integration of Space-based ADS-B surveillance into the automation system of Mumbai, Chennai and Kolkata has increased the flight coverage over the Arabian Sea and Bay of Bengal. The ATFM System uses the processed CAT-62 data from these automation systems to update the current position of the flights. The space-based ADS-B integration has improved the accuracy of demand prediction in the ATFM System

Phase-II which includes addressing the demand capacity imbalance in Airspace through Airspace Flow Program such as Miles/Minutes in-trail, Sequencing Programs (Arrival, Departure, En-route), Fix Balancing, Re-routing etc. Since the Airspace Flow Program requires proactive participation of FMPs and Air traffic controllers, therefore it has been decided to use initially in-trail and Sequencing programs to gain enough expertise without overburdening

all stakeholders and smoothly undertake other Airspace Flow Programs. FMP and ATC training on Airspace flow programs -are being proposed to be undertaken shortly followed by one month of trial operations.

The domestic and international air traffic was badly impacted by Covid-19. The Government of India imposed stringent restrictions to curb the spread of the virus. Aviation authorities maintaining essential services grappled with sick employees to continue the show without jeopardizing safety. Contingency Measures were evoked to function with skeletal staff at the ATFM facility and maximum staff operating from the safety of their homes.

C.Traffic Analysis

I.   Impact of COVID-19 on four major airports
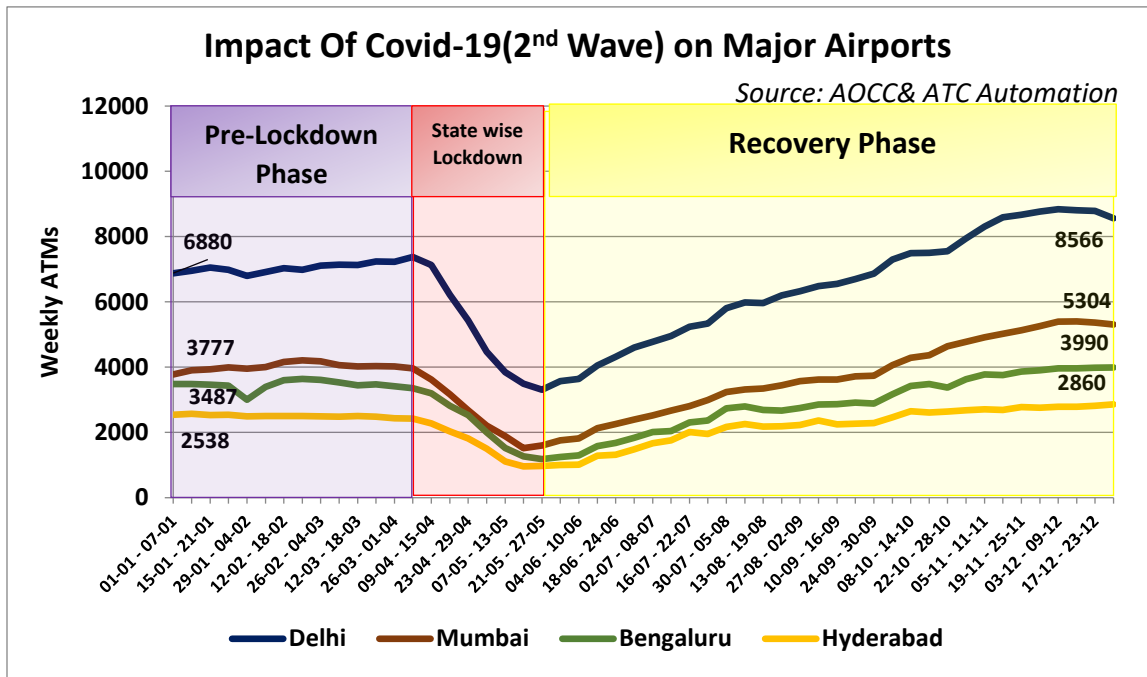
Figure 1: Impact of Covid-19 on 4 Major Airports

The graph above tracks the weekly air traffic movement in the year 2021 at the four major airports - Delhi, Mumbai Bengaluru and Hyderabad during the 2nd Wave of infection. The year started with the weekly movement of 6880, 3777,3487 and 2538 in Delhi, Mumbai, Bengaluru and Hyderabad respectively in week 1 (01.01.2021-07.01.2021).

The traffic showed a steady trend in the initial weeks until week 5 (29.01.2021-04.02.2021) where there was a slight drop in the traffic at Bengaluru Airport. It was due to Airspace/Airport closure at Bengaluru for the Aero India Show.

Air Traffic plummeted to a low in May'21 during the 2nd wave of Covid after initial recovery from the 1st

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Wave.Due to the surge in the number of Covid-19 positive cases, various states-imposed lockdown, initially starting with night curfews and weekend lockdowns and later following it up with a complete lockdown of 42 days. The air traffic showed a subsequent decline. Week 21 (21.05.2021-27.05.2021) saw the air traffic at 48%, 42% , 34% and 38% for Delhi, Mumbai, Bengaluru and Hyderabad respectively compared to traffic in week 1.

The lockdown restrictions started to ease down from 7th June'21 and the traffic has been showing an upward trend. As of week, 52(24.12.2021-31.12.2021) the traffic at Delhi, Mumbai, Bengaluru and Hyderabd stood at 124%,140%,114% and 112 % respectively of week 1 traffic levels.

II.   Comparison of total ATMs (YoY)

The total Air traffic movement including Passenger and Combination of other flights i.e. All-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 year 2019, 2020 & 2021.
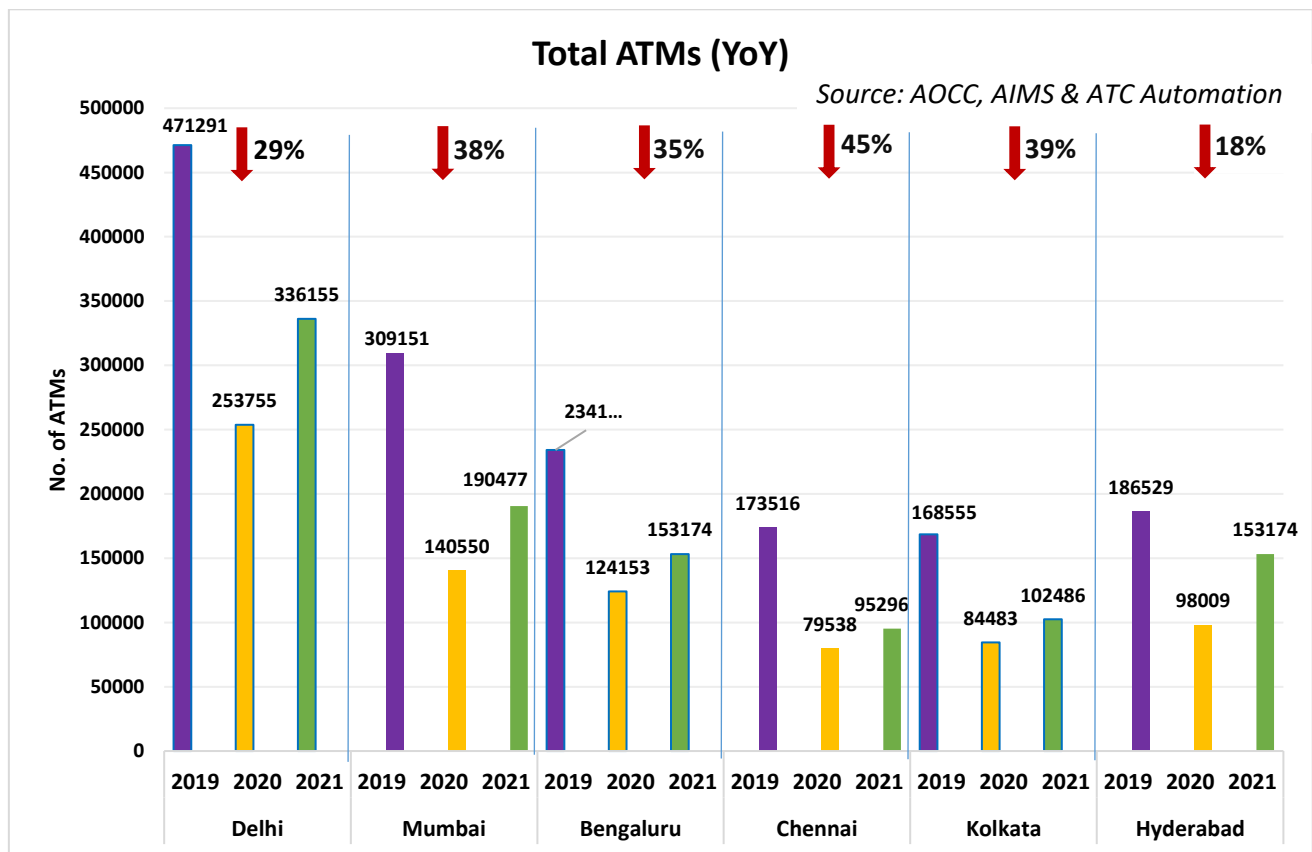
Figure 2: Percentage Traffic Variation (YoY)

III.   Monthly Average Air Traffic Movement
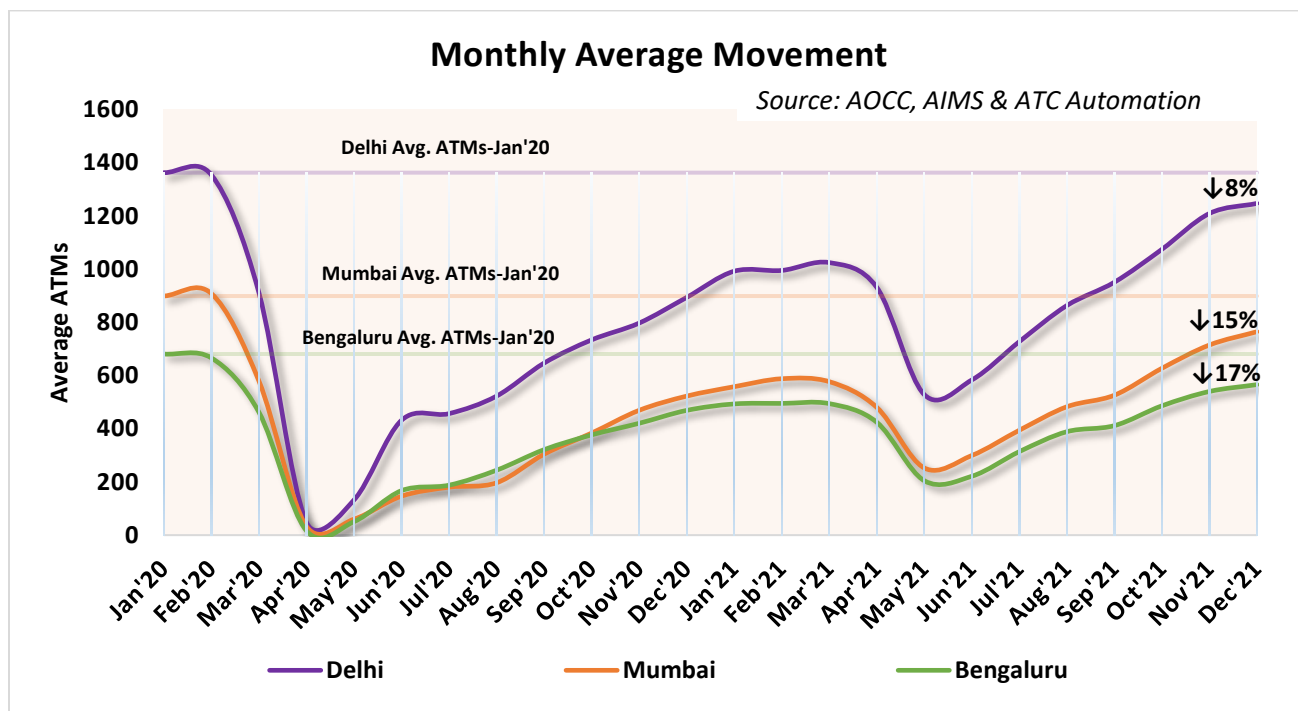
Figure 3:Monthly Average Air Traffic Movement For Three Major Airports

The above graph tracks the Monthly average Air Traffic Movements for three major Airports- Delhi, Mumbai and Bengaluru in India from January'20 to December'21. The Average Monthly ATMs in Delhi, Mumbai and Bengaluru stands at a deficit of 8, 15 and 17 percent respectively than the Average Monthly ATM recorded in Janaury 2020 for the same Airports.

IV. Flight Operations – Airlinewise
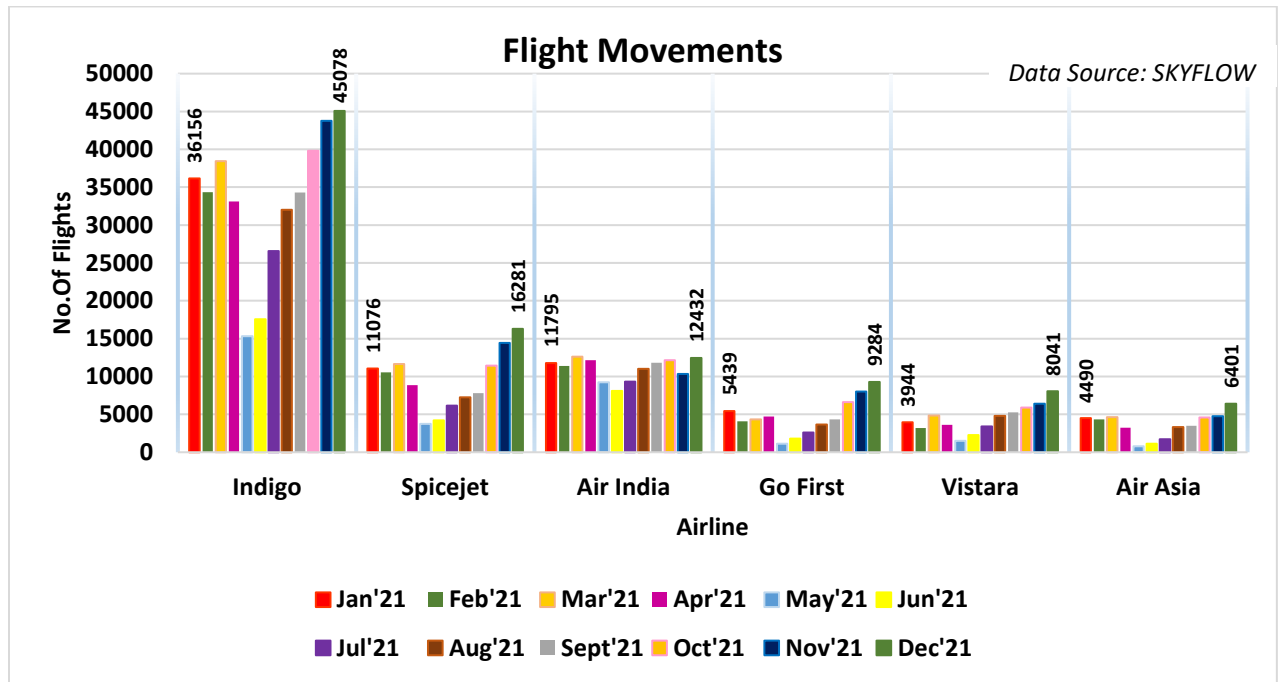
Figure 4: Flight Movements –Airlinewise

D. ATFM Post Operations – CDM Analysis

I. Introduction

Analysis Period   1stJanuary'21– 31stDecember'21

Back Ground   During the above mentioned period, ATFM measures were applied **fifteen (15) times for Delhi Airport, one (1) times for Mumbai Airport, seventeen(17) times for Bengaluru Airport and four(4) times for Kolkata airport** due to the following reasons as illustrated in the bar chart below:–
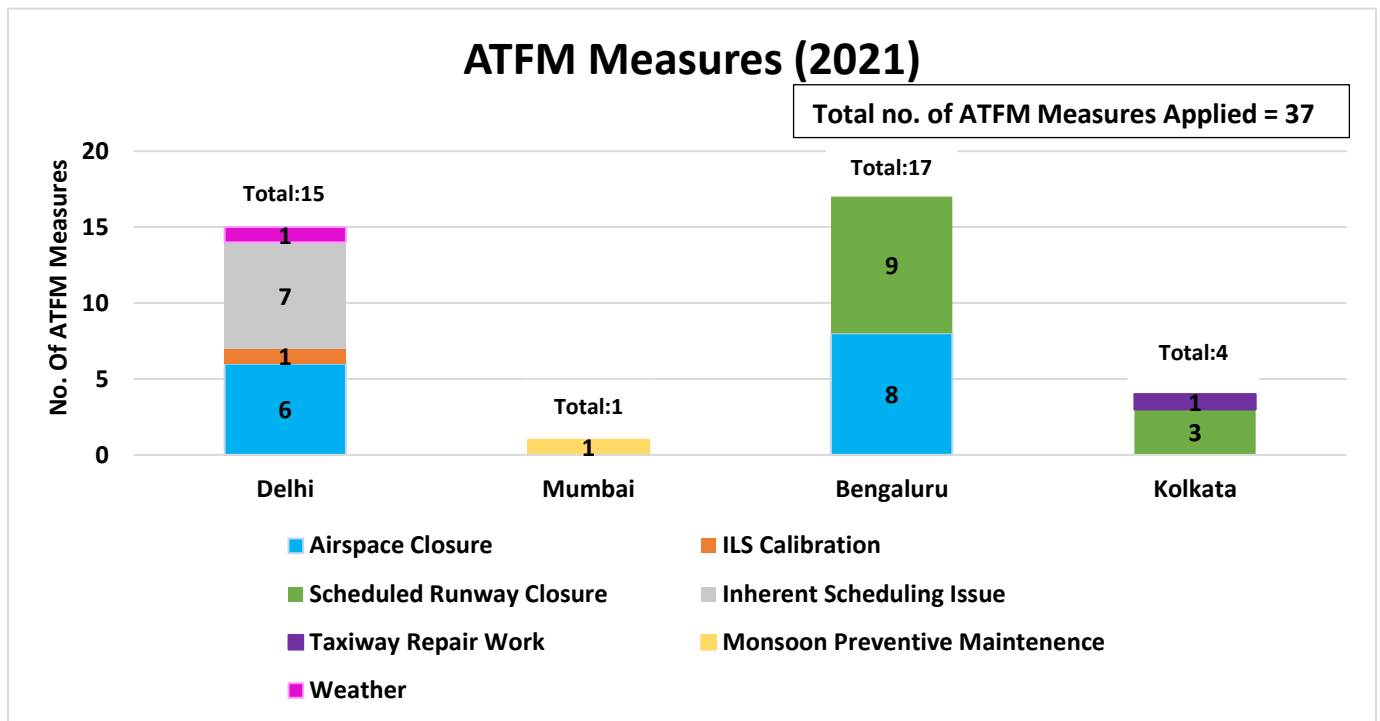
Figure 5: ATFM Measures - 2021

II. ATFM Measures Overview

	Delhi	Mumbai	Bengaluru	Kolkata
Number of ATFM measures applied	15	1	17	4
Average ATFM Ground delay due to measures	11 min	11 min	19 min	14 min
Maximum ATFM Ground delay due to measures	38 min	26 min	45 min	38 min
% Compliance	62%	79%	83%	87%

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

Total affected flights in scenario (Domestic Arrivals)	1556
Total Domestic Arrivals with zero ATFM delay	230
Total Domestic Arrivals with ATFM delay	1326
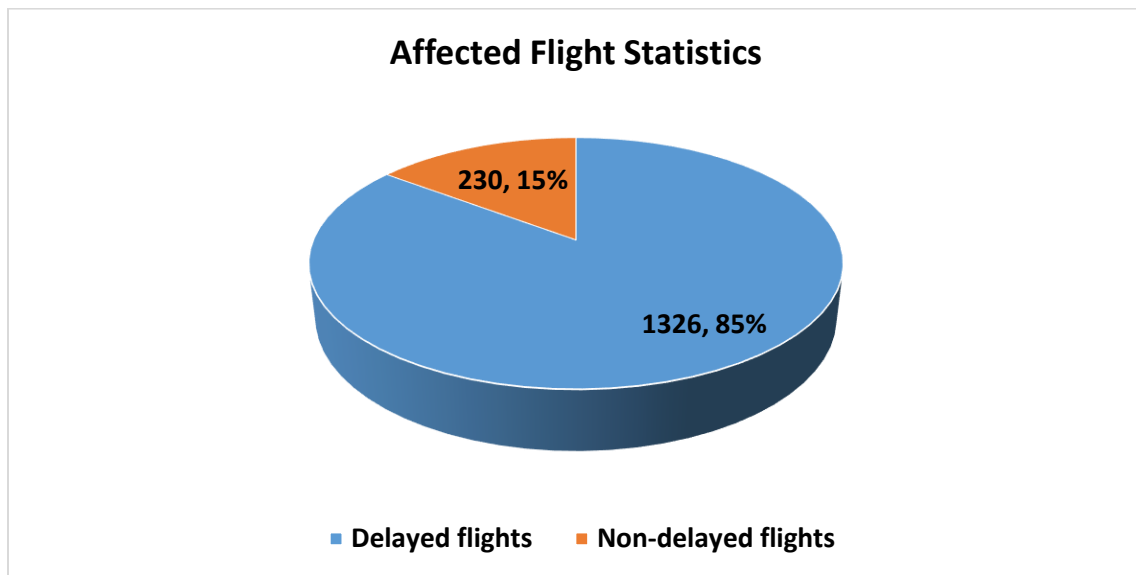
Figure 6: Affected Flight Statistics

III. Overall Compliance

Total Arrivals	1750
Domestic arrivals	1556
Flights with complete data (ATOT)	1512
Flights with incomplete data	13
Flights Not Operated	31
Compliant*	1056
Non-Compliant	456

Total No. of Revised CTOTs issued = 218(Compliance of flights which were issued revised CTOT is measured w.r.t. new CTOT issued)
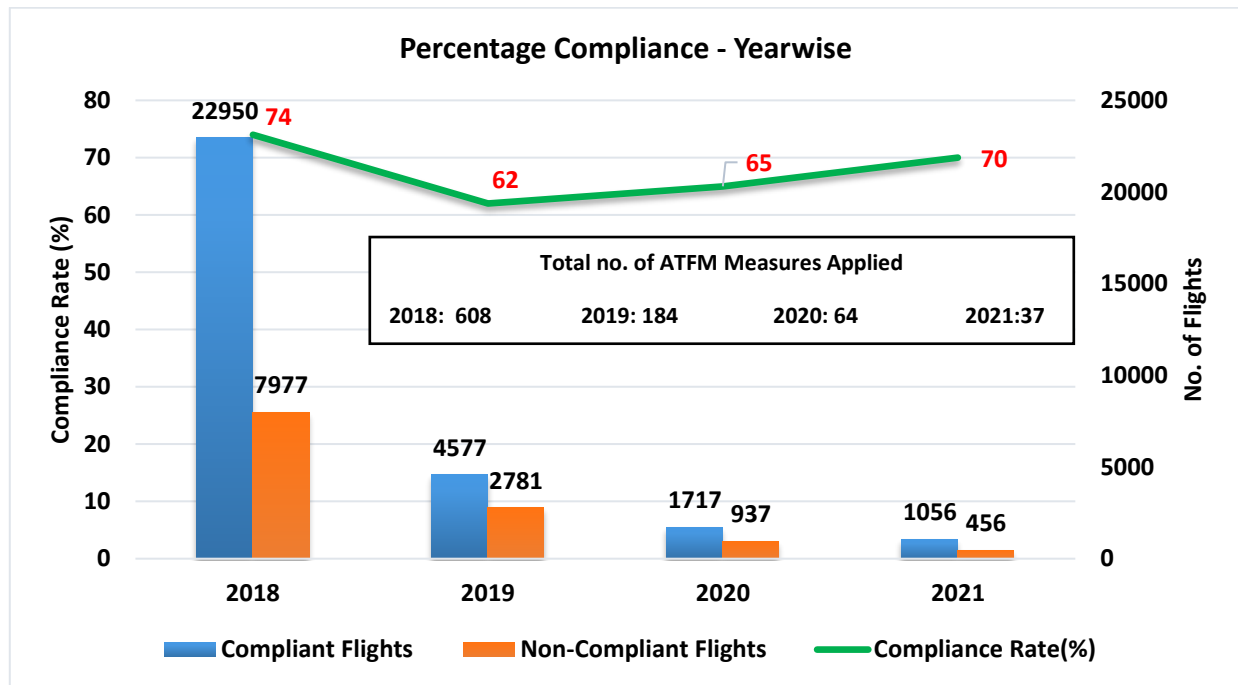
Figure 7: Overall Compliance

NOTE: Flights with required data i.e. ATOT are only considered for compliance measurement
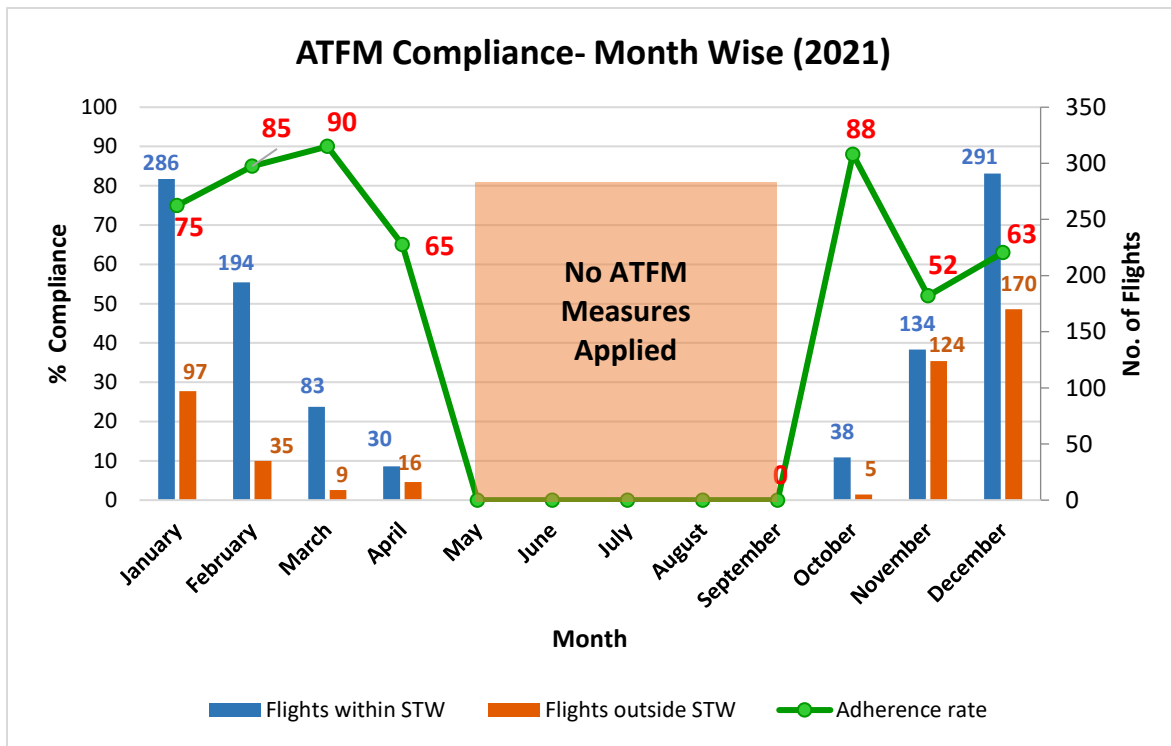
Figure 8: ATFM Compliance –Monthwise

Inference

1. Out of the total arrivals captured for the constrained Airports during the CDM scenario,89% of flights i.e. Domestic arrivals, are participating.

2. Out of these Domestic Arrivals, 85% of arrivals are assigned ATFM ground delay & 15% of flights are without any ATFM ground delay.

3. Out of the total arrivals captured to the constrained Airport during the ATFM scenario, 76% of flights are assigned ATFM Ground Delay.

IV.   CTOT Compliance rate –Airportwise

MUMBAI FIR	2020 (66%)*	2021 (73%)* ⬆
Mumbai	65	66
Aurangabad	59	80
Kandla	-	88
Vadodara**	55	44
Jabalpur	50	82
Bhavnagar	-	0
Nagpur	89	86
Rajkot	45	100
Surat**	92	62
Udaipur	67	86
Shirdi	67	77
Kolhapur	60	50
Ahmedabad	60	75
Pune	58	70
Indore	94	70
Bhopal	81	96
KOLKATA FIR	(70%)*	(74%)* ⬆
Kolkata	68	81
Allahabad	57	67
Agartala	57	85
Bhubhaneshwar	80	80
Lengpui	-	100
Silchar	-	56
Durgapur	-	67
Pakyong	-	67
Gaya	-	100
Rupsi	-	100
Jharsuguda	67	80

Dimapur	75	80
Chakeri**	75	33
Imphal	70	100
Jorhat	-	100
Dibrugarh	75	100
Patna	68	73
Ranchi**	85	74
Darbangha	-	63
Gorakhpur**	69	41
Guwahati	69	72
Varanasi	66	78
Bagdogra	63	74
DELHI FIR	(51%)*	(54%)* ⬆
Delhi	77	71
Chandigarh	45	49
Lucknow	55	47
Agra	25	100
Amritsar**	53	36
Hindon	0	100
Gaggal**	67	50
Phalodi	0	0
Bareilly	-	100
Jodhpur	32	79
Hissar	-	0
Jammu	45	52
Kishangarh	0	67
Leh	26	52
Pathankot	-	50
Jaisalmer**	25	0
Gwalior	0	29
Bikaner	0	0
Dehradun	61	63
Srinagar**	49	30
Jaipur	56	76

CHENNAI FIR	(68%)*	(76%)*
Hyderabad	80	75
Belgaum	100	100
Vijaywada	29	63
Coimbatore	57	89
Calicut**	75	0
Kalaburagi	25	86
Hubli	33	0
Kannur	20	67
Madurai	87	100
Mangalore	76	100
Mysore	0	100
Port Blair**	100	78
Trivandrum	74	67
Visakhapatnam	63	77
Dundigul	-	0
Tirupati	-	50
Tuticorin	-	100
Bengaluru	59	80
Chennai	75	79
Goa**	77	38
Cochin	66	88

Note: This list contains only the airports affected by the CDMs.

*FIR wise compliance rate

** More than 10% reduction in Compliance rate

V.   Reason For Non-Compliance (2021)
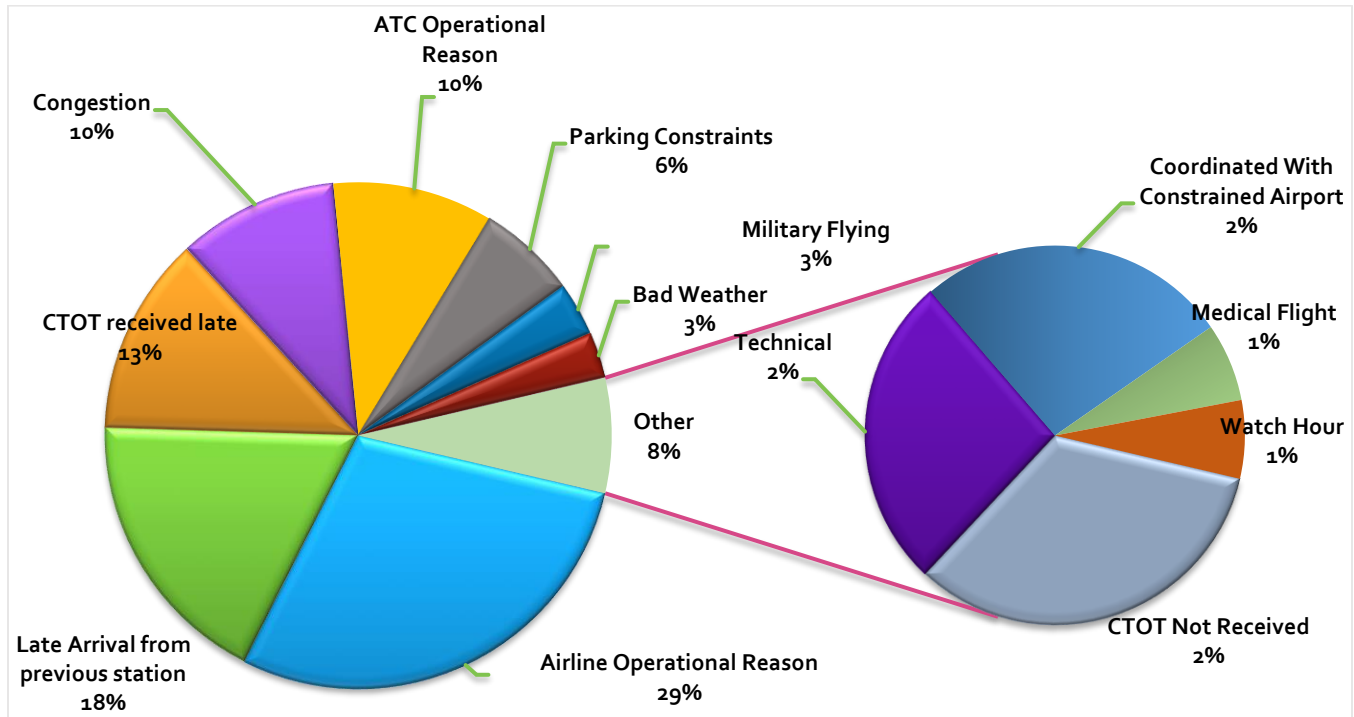
Figure 9: **Reason for Non-Compliance**

VI.   CTOT Compliance rate – Airlinewise
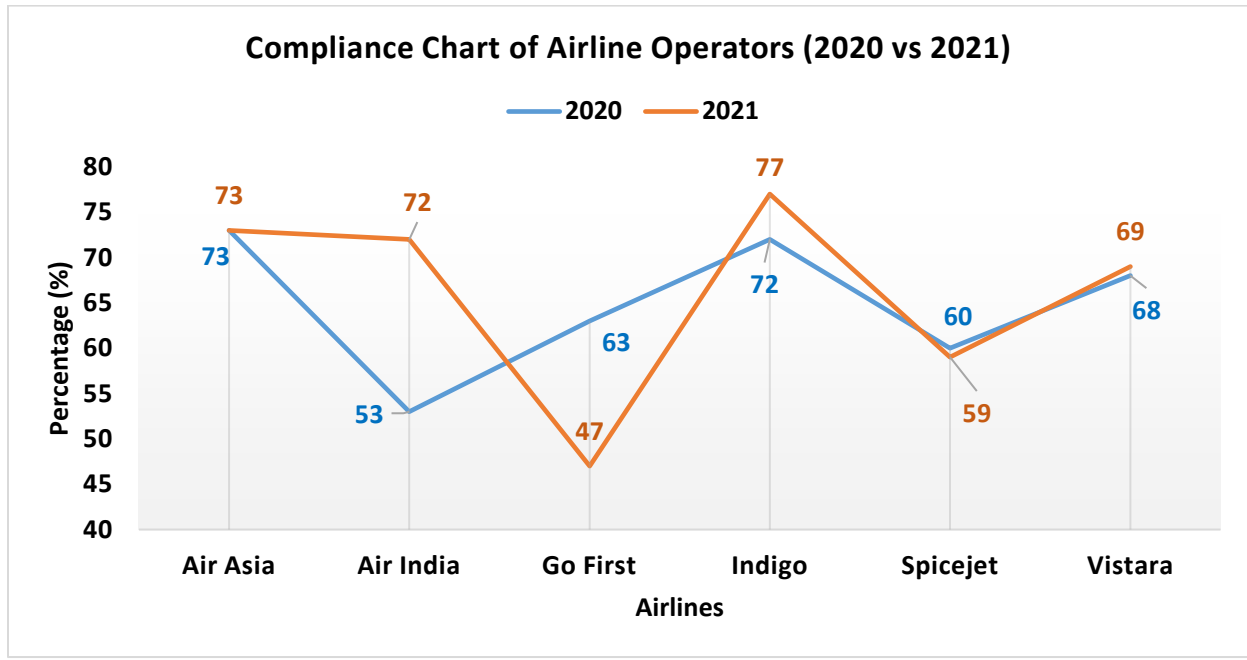
Figure 10: CTOT Compliance-Airlinewise

Inference

1. Out of the total domestic arrivals with complete data in the CDM scenario, 70% arrivals are compliant.

2. For the year 2021 Chennai region has the highest compliance rate of 76% where as Delhi region has the lowest compliance rate of 54%.

3. Indigo,Air India and Air Asia Airlines have a compliance rate above the average recorded 70% compliance for the year.

4. Compliance rate of Go First and SpiceJet Airlines has decreased in year 2021 as compared to 2020.

VII. Air Delay during the CDM Scenario period

Average Air Delay to domestic arrivals* within the CDM Scenario period for Delhi, Mumbai,Kolkata and Bengaluru are 5 min, 5 min, 7 min and 7 min respectively.

*Note: Only calculated for domestic arrivals with both ATOT and ALDT information
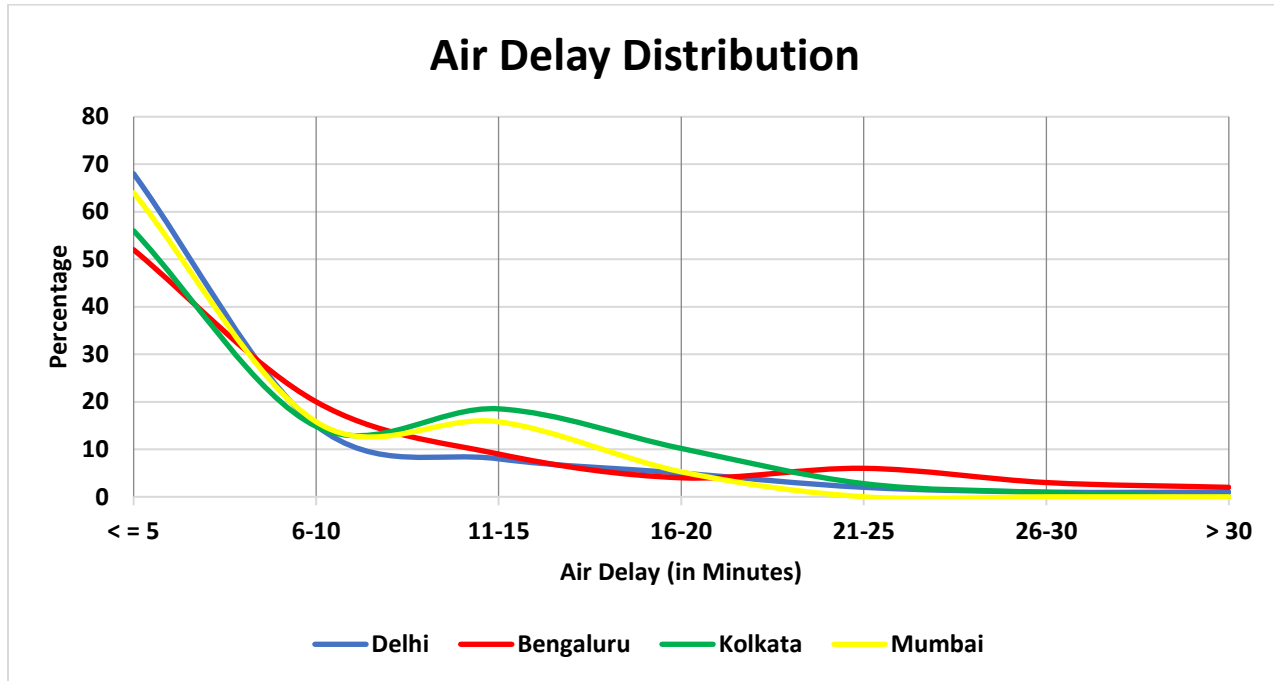
Figure 11: Air Delay during CDM Period

Inference

1. 91% of arriving flights to Delhi had an Air delay equal to or less than 15 minutes during the CDM period.
2. 96% of arriving flights to Mumbai had an Air delay equal to or less than 15 minutes during the CDM period.
3. 85% of arriving flights to Bengaluru had an Air delay equal to or less than 15 minutes during the CDM period.
4. 86% of arriving flights to Kolkata had an Air delay equal to or less than 15 minutes during the CDM period.

E. 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	$$\frac{\textit{Total monthly ATFM delay } (\textit{in minutes})}{\textit{Total Domestic Arrivals}}$$
Maximum ATFM delay	Maximum ATFM delay (in minutes) assigned in the month
Overall compliance rate	Defined as monthly ATFM departure slot adherence rate of regulatedflights. 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: $$\textit{Average Air Delay}$$ $$= \frac{\textit{Total Air Delay to domestic arrivals } (\textit{with values greater than zero})}{\textit{Total Domestic Arrivals}}$$ *CLDT: Calculated Landing Time* *CTOT: Calculated Take off Time* *ALDT: Actual Landing Time* *ATOT: Actual Take off Time*

ANNEXURE-I

<u>CASE STUDY</u>
<u>Aero India show (2021)- Bengaluru</u>

A. Introduction:

Aero India is a biennial air show organised by the Defence Exhibition Organisation, Ministry of Defence. The 13th edition of AERO INDIA 2021 which included an Aerospace, Defence and Civil Aviation Exhibition was held from 03 - 05 February 2021, at Air Force Station, Yelahanka, Bengaluru.

Bengaluru Kempegowda Airport was closed from 30th Jan'21 to 5th Feb'21 during the following hours of the day as a consequence of Airspace closure in connection with Aero India show 2021 vide Notam no. A0171/21 and A0172/21

(A0171/21 NOTAMN

Q) VOMF/QFALC/IV/NBO/A/000/999/
A) VOBL B) 2101300800 C) 2102051130
D) JAN 30-31 0800-1100
FEB 01 0430-0630, 0830-1130
FEB 02-03 0330-0630, 0830-1130
FEB 04-05 0430-0630, 0830-1130
E) AS A CONSEQUENCE OF AIRSPACE CLOSURE IN CONNECTION WITH AERO INDIA SHOW 2021 KEMPEGOWDA INTERNATIONAL AIRPORT, BENGALURU WILL REMAIN CLSD FOR ACFT OPS)

(A0172/21 NOTAMN
Q) VOMF/QRALW/IV/NBO/W/000/150/
A) VOMF B) 2101300800 C) 2102051130
D) JAN 30-31 0800-1100
FEB 01 0430-0630, 0830-1130
FEB 02-03 0330-0630, 0830-1130
FEB 04-05 0430-0630, 0830-1130
E) AIRSPLACE BOUNDED BY 125930N0773616E TO 131155N 0771401E ALONG
WITH CLOCK WISE ARC CENTERED AT HAL AP VOR BBG TILL131143N 0780737E 125930N 0774520E ALONG WITH ANTICLOCKWISE ARC CENTERED AT HAL AP VOR BBG TILL 125930N 0773616E CLSD DUE AERO INDIA SHOW 2021
F) GND G) FL150)

B. Executive Summary

The flight schedule was prompltly shared by Bengaluru AOCC but as it consists of scheduled off block and in block time, all domestic airlines were requested to share their flight intent well in advance in the light of the Aero India show.

The flight data was received in parts from the Airlines and the same was updated twice in the SKYFLOW sytem. Inspite of the best efforts, many flights were observed to be operating during the closure period and the airlines were requested to amend their flight intent based on the discrepancy observed.CCC officers also cross-checked the flight intent on the "D" day against the schedule received from AOCC.

Bengaluru ATC was requested to appoint a nodal officer for effective coordination. The coordinator was responsible for communicating the Airport acceptance rate, the availabilty of Airport/Airspace and any operational matter impacting efficiency and capacity.

Operations were observed to be smooth on most days of the exercise with slight airborne holdings on some days.

ATFM measures for the afternoon closure (0830-1130 UTC)were withdrawn after application of CDM measures on 3rd and 4th Feb'21 due to early availability of Airspace. The closure for 0830 to 1130 UTC was extended upto 1145 UTC on 5th Feb'21 and the same was communicated before the CDM measures were applied.

C. Salient Points:

As informed by the Bengaluru coordinator following points were to be kept in mind by CCC officers while preparing ATFM measures for the closure

- First landing post reopening of Airspace could happen only 9 minutes after the availability of Airspace
- Last Landing before closure had to be 5 minutes prior to the closure time(to accommodate any missed approaches)

D. Challenges:

1. Non-compliance of CTOT was observed from Pune,Ahmedabad,Patna,Lucknow,Gwalior,Bagdogra, Chandigarh, Hubli etc. It was followed up by CCC officers.
2. Few flights which were scheduled to operate pre -closure were observed to be operating after the Airspace closure and had to be manually allotted a CTOT.
3. CTOT was not applied through the SKYFLOW system on few days. The CTOTs were manually downloaded and passed to all concerned through emails, WhatsApp and telephone. It was also uploaded on the portal.
4. CTOT dissemination to satellite remote stations still remains a challenge. Airlines are also faltering in their responsibility of apprising Air Crew about CTOT through their respective Operation Control Center.
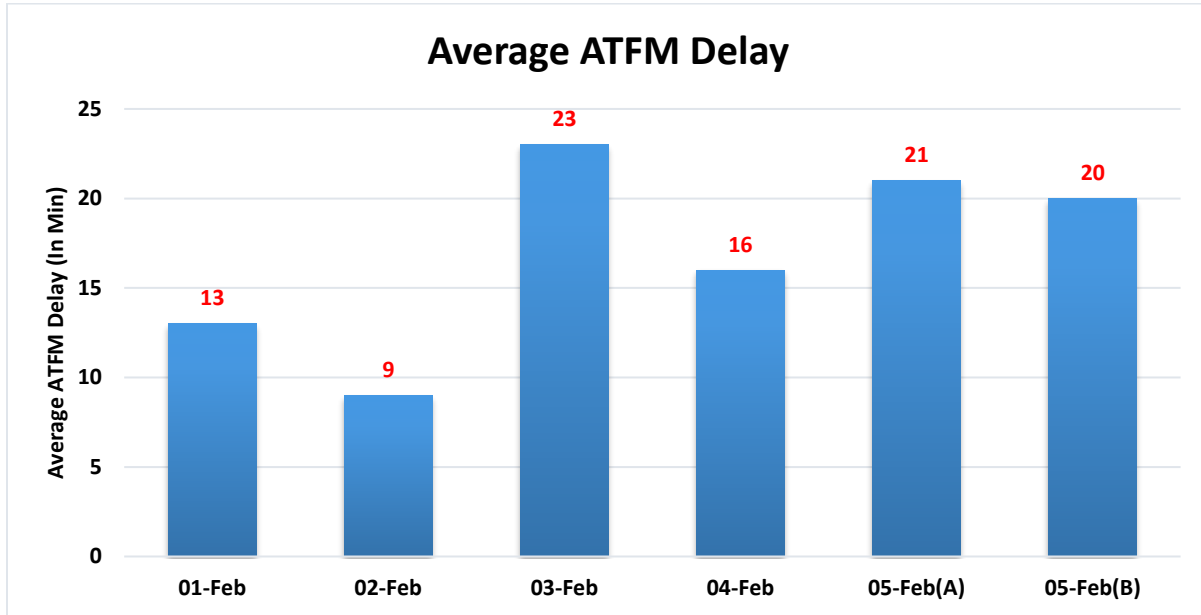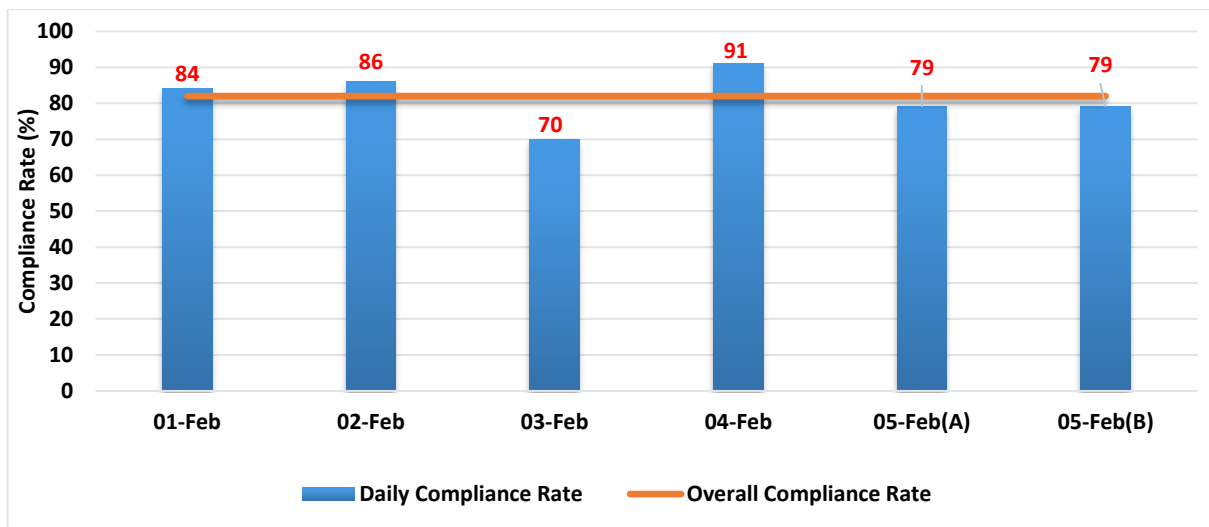
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ATFM Measures Overview:

Only Flights with complete data i.e. ATOT, ALDT etc. are taken into consideration for calculation of ATFM parameters.

I.   Average ATFM Delay – Day wise:

II.   CTOT Compliance – Day wise:

III.   CTOT Compliance – FIR wise:

MUMBAI FIR (79%)*	Compliant	Non Compliant	%Compliant
Mumbai	11	2	85
Pune	1	1	50
Shirdi	1	1	50
Surat	3	0	100
Udaipur	1	0	100
Indore	1	0	100
Ahmedabad	5	2	71
KOLKATA FIR (71%)*			
Kolkata	7	1	87
Guwahati	7	2	78
Allahabad	0	2	0
Gorakhpur	0	2	0
Agartala	1	0	100
Varanasi	2	0	100
Ranchi	4	0	100
Raipur	4	0	100
Darbhanga	0	1	0
Patna	4	3	57
Bagdogra	3	2	60
Bhubhaneshwar	5	2	71
DELHI FIR (86%)*			
Delhi	15	3	83
Jaipur	5	0	100
Jodhpur	1	0	100
Gwalior	1	1	50
Lucknow	4	1	80
Chandigarh	2	0	100
Dehradun	3	0	100
CHENNAI FIR (91%)*			
Chennai	10	0	100
Belgaum	3	0	100
Hyderabad	6	1	86
Mangalore	4	0	100
Kannur	1	0	100
Vijayawada	0	1	0
Coimbatore	1	0	100
Kalaburagi	4	1	80
Tuticorin	5	0	100
Port Blair	1	0	100
Hubli	0	1	0
Vishakhapatnam	1	0	100
Cochin	4	0	100
Mysore	3	0	100

Inference

- Chennai FIR had the highest compliance rate of 91% whereas Kolkata FIR had the minimum compliance rate of 71%.
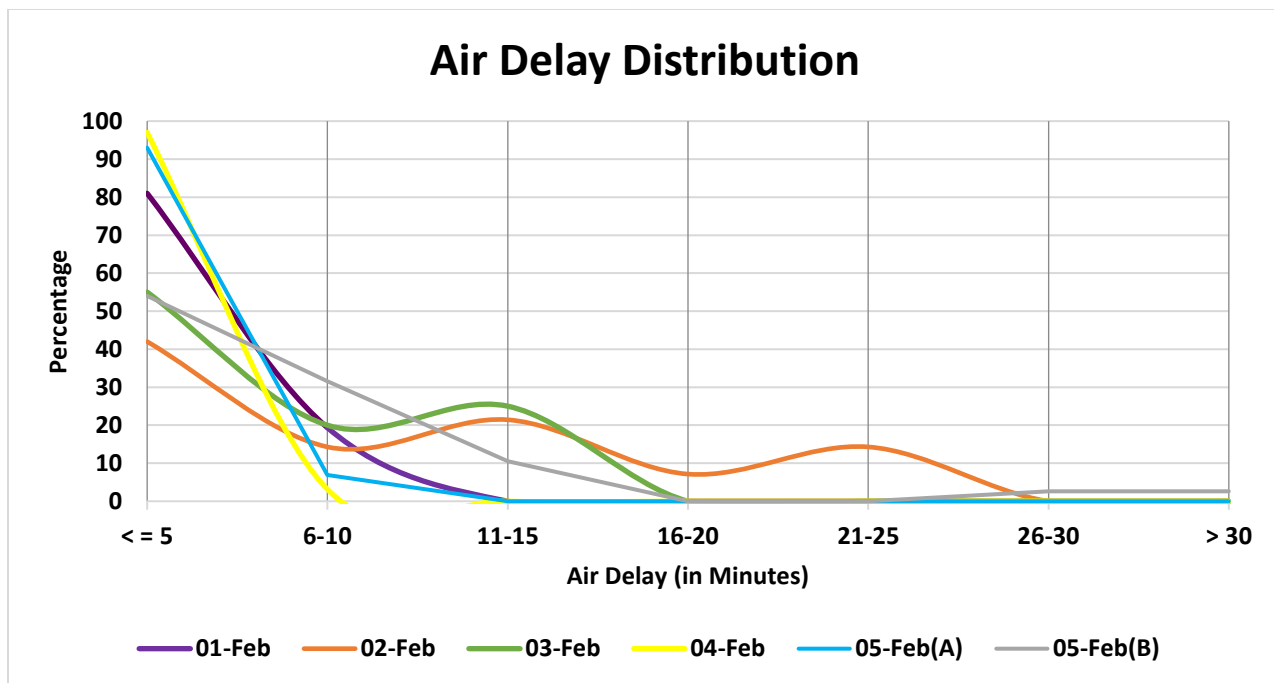
IV. CTOT Compliance – Airline wise:

Airline wise Compliance Rate
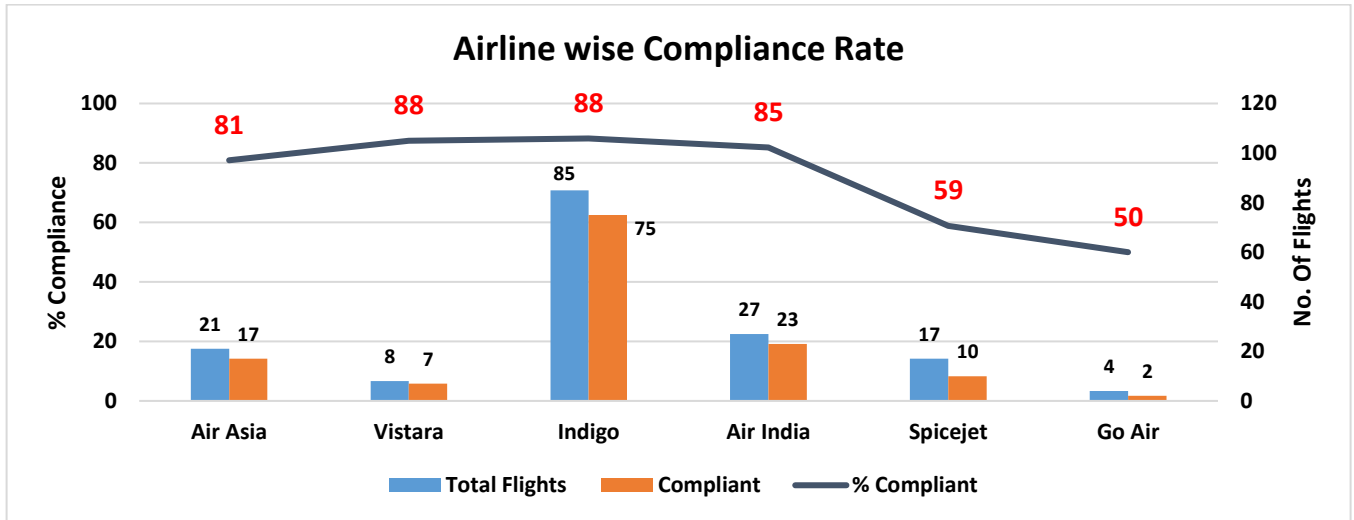
Inference

- Vistara and Indigo had the highest compliance rate of 88% whereas Go Air had the lowest compliance of 50%.

V. Air Delay Distribution during CDM Period:

Air Delay Distribution

Y-axis: Percentage
X-axis: Air Delay (in Minutes)
Legend: 01-Feb, 02-Feb, 03-Feb, 04-Feb, 05-Feb(A), 05-Feb(B)

Inference

1. 100% of arriving flights to Bengaluru had an Air delay equal to or less than 10 minutes during the CDM period on 01st Feb'21.
2. 56% of arriving flights to Bengaluru had an Air delay to or less than 10 minutes during the CDM period on 02nd Feb'21.
3. 75% of arriving flights to Bengluru had an Air delay equal to or less than 10 minutes during the CDM period on 03rd Feb'21.
4. 100% of arriving flights to Bengaluru had an Air delay equal to or less than 10 minutes during the CDM period on 04th Feb'21.
5. 100% of arriving flights to Bengluru had an Air delay equal to or less than 10 minutes during the CDM period on 05th Feb'21(A).
6. 86% of arriving flights to Bengluru had an Air delay equal to or less than 10 minutes during the CDM period on 05th Feb'21(B).

VI. Tangible benefits due to ATFM Measures:

Introduction:

A modest attempt is made to find out the tangible benefit of ATFM measures applied. A Sample study was conducted to calculate Fuel Saving ATFM measures on 3rd Feb'21 during the Aero India show at Bengaluru from 0600 UTC to 0800 UTC.

Two hour window was available at Bengaluru on 3rd Feb '21 during the Airport/Airspace closures.As coordinated with Bengaluru ATC, the Airport was likely to be available for civil traffic from 0630 UTC and ATFM measures were planned to address any congestion arising soon after the availability of Airspace.

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.

•Landings at Bengaluru Airport take place every 150 seconds, considering an Airport acceptance rate of 17

•Average Aircraft fuel burn rate = 40 litre/min

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 Bengaluru 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 Bengaluru with alternate spacing interval of 2.5 minutes.

*Ideal ELDT = ETOT + SKYFLOW calculated Flying time

Where ideal ELDT= ETOT+ SKYFLOW calculated estimated elapsed time

CCC-CATFM/2022/01/31

Actual Calculation during the CDM Period 03.02.2021 (0600 UTC to 0800 UTC)

Total Air delay (with ATFM measures) =72 min

Total Air delay (with no ATFM measures) = 263 min

Total amount of Air delay reduced due to ATFM measures= 263-72= 191 min

Fuel Saving Calculation:

Average Aircraft fuel burn rate = 40 litre/min

Fuel saved by reducing Air delay = 191 x 40= 7.64 kl

Cost of Air Turbine Fuel(Feb'21) = ₹ 43,036.30 per kl

Cost Saving = 43,063.30 x 7.64 = ₹ 3,29,003

Date	ATFM Ground Delay (in mins)	Air Delay- With ATFM measures (in mins)	Air Delay- No ATFM measures (in mins)	Time Saving (in mins)	Fuel Saving (in kilolitres)	Cost Saving (₹)
01-Feb-21	380	5	251	246	9.84	4,23,443
02-Feb-21	120	90	169	79	3.16	1,36,080
03-Feb-21	426	72	263	191	7.64	3,29,003
04-Feb-21	505	-37	217	254	10.16	4,37,523
05-Feb-21(A)	632	-54	195	249	9.96	4,28,910
05-Feb-21(B)	783	233	510	277	11.08	4,77,141
Total	**2846**	**309**	**1605**	**1296**	**51.84**	**22,32,100**

Fuel Saving during ATFM Measures during Aero India Show- Bengaluru(Feb- 21)

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