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Following supplement is issued for information, guidance and necessary action.



**V.P. AGRAWAL**  
**CHAIRMAN**  
**AIRPORTS AUTHORITY OF INDIA**

[EFFECTIVE DATE: 07 APRIL 2011]

## Implementation of Tactical Air Traffic Flow Procedures (T-ATFP) In Delhi FIR

### 1 Introduction

- 1.1 In order to reduce airspace congestion, arrival delays and holding in Delhi TMA, Tactical Air Traffic Flow Control Procedure (T-ATFP) is being introduced. For this purpose sequenced entry into airspaces will be established and maintained.
- 1.2 T-ATFP is being applied to aircraft landing at Delhi airport, classified as follows:
  - 1.2.1 Arrivals from airports within Delhi FIR;
  - 1.2.2 Arrivals from airports outside Delhi FIR but within 10 min flying time from Delhi FIR boundary;
  - 1.2.3 Arrivals from airports other than those in 1.2.1 & 1.2.2

### 2 Acronyms used in the document and associated expansion

AAO	Airline and aircraft operators
CTO	Calculated Time Over
ETO	Estimated Time Over
RTO	Required Time Over
T-ATFP	Tactical Air Traffic Flow Procedures
TM	Traffic Manager (for the purpose of T-ATFP)

### 3 Terminology and their meaning

- 3.1 AAO (Airline and aircraft operators) – includes all aircraft operators including defence, State Govt., paramilitary etc.

- 3.2 Block Time – Time required for arriving over runway THR following a STAR flight path and adhering to STAR speed restrictions.
- 3.3 Calculated Time Over (CTO) – Time at which departure from airports at 1.2.1 & 1.2.2 should arrive over the arrival holding fix to fit into established arrival sequence. By back calculation, the time of takeoff can be computed.
- 3.4 Required Time Over (RTO) – Time at which arrivals in 1.2.3 should arrive over the arrival holding fix to avoid joining the holding.

#### **4 Traffic Manager (TM)**

- 4.1 The Traffic Manager (TM) position is established within Delhi ATC for the implementation of T-ATFP. TM will have access to flight plans and estimates and revisions to estimates of all arrivals landing at Delhi airport.
- 4.2 Functions of TM
  - 4.2.1 Establishing a sequence of arrivals landing at Delhi airport based on touchdown time.
  - 4.2.2 Assign landing runways to arrivals; whenever more than one runway is available for landing.
  - 4.2.3 Advise CTO/RTO to ACC Sector controller.
  - 4.2.4 Advise CTO/RTO, arrival sequence and assigned landing runway to Approach (Arrival) Controller.
- 4.3 For effective and efficient management of arrival sequence, TM shall:
  - 4.3.1 Make available a CTO arrival holding fix for the departures from airports as in 1.2.1 & 1.2.2.
  - 4.3.2 Provide information to arrivals as in 1.2.3, regarding RTO arrival holding fix.
- 4.4 Based on the ETO at arrival holding fix, sequence of arrivals will be determined by TM.

#### **5 Essential requirements**

- 5.1 Arrivals landing at Delhi airport shall flight plan via arrival route (STAR) appropriate to the ATS route. To maintain arrival sequence, non-RNAV arrivals to expect routing/vectors along RNAV STAR.
- 5.2 All flight-plans for landing at Delhi airport shall provide ETO arrival holding fix - AKBAN, SAM, SSB & SAPLO as appropriate, for determination of arrival sequence based on time required to reach runway touchdown point from the arrival holding fix.
- 5.3 Departures from airports within Delhi FIR and within 10 min flying time from Delhi FIR shall coordinate with TM for CTO. Uncoordinated departure from such airports shall be refused entry into Delhi TMA or will be subject to extended delays.

#### **6 Tactical Flow Management Process**

- 6.1 For ensuring efficient flow during T-ATFP, speed management of sequenced aircraft is a critical factor. Approach (Arrival) Controller shall enforce adherence to speed restrictions.
- 6.2 Delhi ACC Sector controllers will clear all arrivals via STAR. Delhi Radar shall vector Non-RNAV arrivals along appropriate STAR route segment with speed control instructions consistent with STAR segment, so as to ensure that the arrival sequence computed by TM is maintained.

- 6.3 The arrival sequence is calculated based on the Block Time plus separation at touchdown point between successive arrivals. During the initial phases of T-ATFP implementation; the separation over touchdown point will be 2 min.
- 6.3.1 The separation over touchdown point is dependent on dynamic factors such as:
- Weather
  - Equipment outage
  - Runway closure
  - Airspace closure
  - Contingency such as RCF, Unlawful interference etc
- 6.4 TM shall advise Delhi ACC sector controller and Approach (Arrival) controller information on RTO. Accordingly arrivals will be advised of RTO thereby facilitating in gaining/losing time so as to arrive over arrival holding fix at RTO.
- 6.5 For ensuring efficient flow based on the arrival sequence, speed management is critical. Approach (Arrival) controller may enforce speed control based on the STAR restrictions and on final approach.
- 6.6 Safety being primary, minimal radar vectoring may be resorted thereby permitting aircraft to adhere to FMS managed flight profile/path of RNAV STAR.
- 6.7 The arrival runway allocation and sequence established by TM, may not be altered by Delhi Approach; as far as practicable, except during emergency, RCF, unlawful interference or during events requiring priority handling.
- 6.8 When adverse conditions such as weather, equipment outage, runway closure and/or airspace closure etc affect Delhi airport/Delhi TMA, the capacity of the airport and TMA could be severely degraded, resulting in unoptimised traffic flows. Therefore in order to avoid excessive holding, airborne delay and congestion during such events; following T-ATFP measures will be implemented:
- 6.8.1 Departure airport ATS units shall be advised of the restricted arrival capacity at Delhi and CTO to be provided for all departures before start-up based on flight-plan ETD. Any delay beyond flight-plan ETD will require revised CTO arrival holding fix to be obtained.
- 6.8.2 During events enumerated in Para 6.8, departures from airports within Delhi FIR and within 10 min flying time from Delhi FIR do not have the option to take-off and absorb delay enroute or by holding within Delhi TMA.

## **7 AAO responsibility**

- 7.1 AAOs are to ensure they are fully informed on the following procedures:
- 7.1.1 AAOs shall adhere to the speed control restrictions of the STAR or speed control instructions issued by Delhi ATC.
- 7.1.2 AAOs shall arrange the departure of their flights to comply with the CTO issued.
- 7.1.3 Non-adherence to CTO may result re-sequencing. TM will issue RTO which may result in disproportionate arrival delay.

**8      ATS Unit responsibility**

- 8.1    ATS Units shall make every effort to enable departing flights to comply with CTO.
- 8.2    ATC shall provide all possible assistance to AAOs to meet CTO/RTO.

**9      Arrivals exempted from T-ATFP**

- 9.1    The following flights are exempted from T-ATFP
  - 9.1.1   Arrival in a state of emergency, including flights subject to unlawful interference
  - 9.1.2   Arrival conducting search and rescue operations
  - 9.1.3   Arrival carrying notified VIP
  - 9.1.4   Arrival with medical emergencies

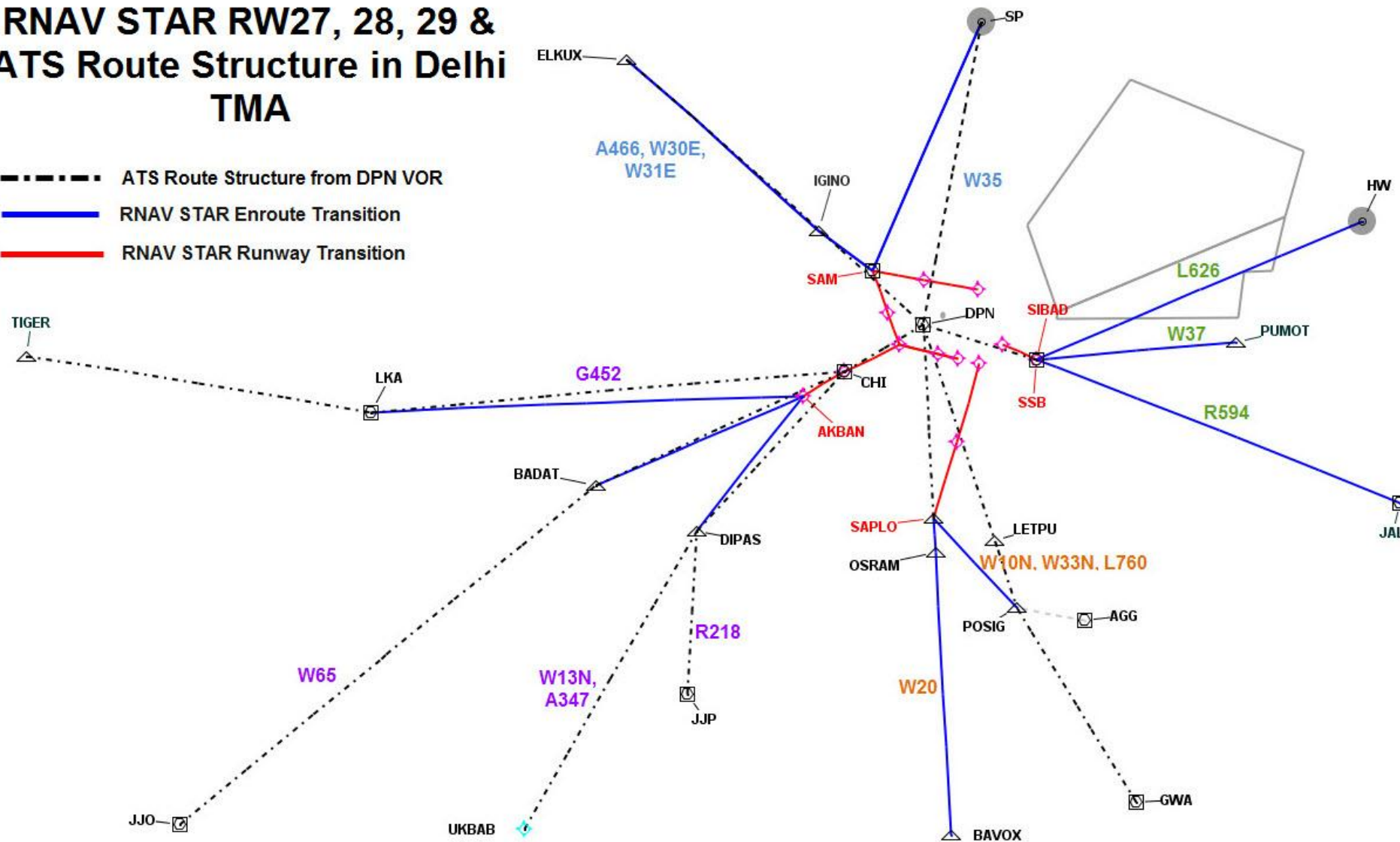
**10     Attachments**

- a)    Attachment 1 – ATS Route structure in Delhi TMA and STARs RWY 27, 28, 29.
- b)    Attachment 2 - ATS Route structure in Delhi TMA and STARs RWY 09, 10, 11.
- c)    Attachment 3 – Illustration of RTO, CTO and Arrival sequence calculation.

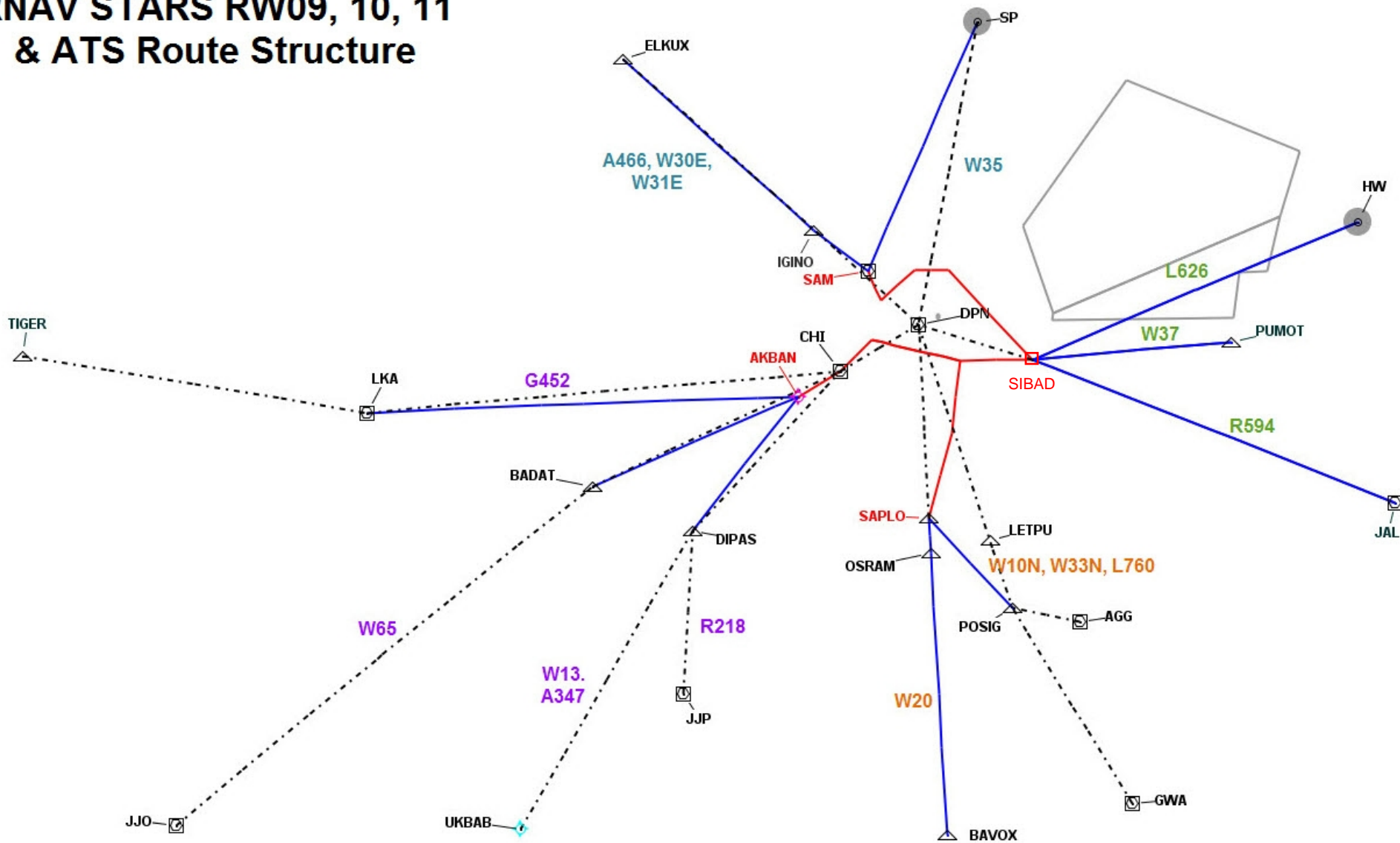
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# RNAV STAR RW27, 28, 29 & ATS Route Structure in Delhi TMA

- ATS Route Structure from DPN VOR
- RNAV STAR Enroute Transition
- RNAV STAR Runway Transition



# RNAV STARS RW09, 10, 11 & ATS Route Structure



## Establishing Arrival Sequence, CTO and RTO computation for RWY 27, 28 & 29

Arrival Holding Fix	Block Time (Medium/ Heavy Jet) (Min)									
AKBAN	00:18									
SAPLO	00:17									
SAM	00:17									
SSB	00:08									
Sepn. over TD	00:02									
AIRCRAFT ESTIMATE OVER ARRIVAL HOLDING FIX						ESTABLISHING ARRIVAL SEQUENCE			TACTICAL ADJUSTMENT	
Callsign	Type	AKBAN	SAPLO	SAM	SSB	Estimate at Touchdown	Add Sepn. at TD between successive arrivals	Arrival sequence	RTO arrival holding fix	Gain/ (-) Lose time to arrive at holding fix (in min)
xx	B747	00:01				00:19		1	00:01	No Delay
xx	A320		00:03			00:20	00:21	2	00:04	1
xx	B777			00:04		00:21	00:23	3	00:06	2
xx	B737			00:04		00:21	00:25	4	00:08	4
xx	A320	00:05				00:23	00:27	5	00:09	4
xx	B737	00:06				00:24	00:29	6	00:11	5
xx	B737	00:07				00:25	00:31	7	00:13	6
xx	B777	00:07				00:25	00:33	8	00:15	8
xx	A330			00:07		00:24	00:35	9	00:18	11
xx	B737	00:07				00:25	00:37	10	00:19	12
xx	A320	00:09				00:27	00:39	11	00:21	12
xx	B737		00:12			00:29	00:41	12	00:24	12
xx	B737		00:18			00:35	00:43	13	00:26	8
xx	A330			00:24		00:41	00:45	14	00:28	4
xx	B767	00:30				00:48	00:47	15	00:29	-1
xx	B777				00:35	00:43	00:49	16	00:41	6
xx	A320	00:35				00:53	00:51	17	00:33	-2
xx	B737		00:36			00:53	00:53	18	00:36	No Delay