International Civil Aviation Organization

The Fourth Meeting of the South Asia/Indian Ocean ATM Coordination Group (SAIOACG/4) and the Twenty first Meeting of the South East Asian ATM Coordination Group (SEACG/21)

Hong Kong, China, 24 – 28 February 2014

Agenda Item 3: Review of Current Operations and Problem Areas

ESTABLISHING A HARMONIZED TRANSITION ALTITUDE IN INDIA

(Presented by Airports Authority of India)

SUMMARY

This paper presents the proposal of harmonizing transition altitude on a national level in accordance with the recommendation of ICAO Air Navigation Commission and further exploring the feasibility of establishing a harmonized regional transition altitude in a collaborative manner with the neighbouring states.

1. INTRODUCTION

1.1 The ICAO 12th Air Navigation Conference held at Montreal from 19 to 30 November 2012 recommended the states to "fully assess the operational, safety, performance and cost implications of harmonization of transition altitude and, if the benefits are proven to be appropriate, undertake further action on a national and (sub) regional basis". [Recommendation 5/1 (b)]. A country with very high aviation growth potential, India shall seriously consider this recommendation of ICAO Air Navigation Commission. We shall explore the feasibility of establishing a harmonized regional transition altitude and lead the neighbouring countries in this activity.

2. DISCUSSION

2.1 Transition altitudes of 106 operational airports in India are published. In line with the geographical pattern of the country, the transition altitude varies from 4000 ft to the height of 20,000 ft at Srinagar airport and 23000 ft at Kullu airport. India has established independent transition altitude in 106 airport, all of them above 3000 ft and follow the general principles except in Lingpuie airport where the Transition altitude is 8500 ft which is not rounded to next 1000 ft, as required by ICAO regulations. The statistical distribution is as follows:

TRANSITION ALTITUE	No OF AIRPORTS	TRANSITION ALTITUE	No OF AIRPORTS
4000 ft	51 airports	**10,000 ft**	6 airports
5000 ft	19 airports	**11,000 ft**	2 airports
6000 ft	6 airports	**12,000 ft**	1 airports
7000 ft	5 airports	**13,000 ft**	2 airports
8000 ft	8 airports	**20,000 ft**	1 airports
8500 ft	1 airports	**23,000 ft**	1 airports
9000 ft	3 airports		

2.2 Considering higher cockpit work load at lower altitudes in large commercial aircraft, there is a strong case presented by the flying community to have higher and harmonized transition altitude. It is ideal and safe to have the transition from flight levels to altitude carried out at relatively low work load periods which will enable pilots to capture better mental picture on the vertical position of the aircraft from the ground. Further, harmonized and higher transition altitudes reduce probability of gross errors in altimeter setting. Transition altitude above 10,000 ft has clear operational advantages.

2.3 Geography / altitude of obstacle around an aerodrome decide the transition altitude. For having a common transition altitude, the highest transition altitude within the region has to be considered. Harmonized regional Transition altitude needs to be the highest TA value within the region. Thus 13,000 ft is the highest common transition altitude with in Indian airports except for airports: 1) Srinagar and 2) Kullu.

2.4 This document discusses two major steps involved in the introduction of Harmonized Indian Transition Altitude [HITA].

1) Developing a Harmonized Indian Transition Altitude.
2) Implementation strategy.

Establishing a Harmonized Indian Transition Altitude

2.5 Steps to establish Harmonized Indian Transition Altitude [HITA].

1) Determination of HITA.
2) Long term pressure variations in India.
3) Obstacles beyond established TA areas.
4) Policy on establishment of new airports / TA.
5) Harmonized Transition Level.
6) Regional QNH.
7) Determination of regional QNH.
8) New Altimeter setting procedure.
9) Areas exempted from HITA.
10) ICAO Regional / Sub- regional status of Harmonized Transition Altitude.

Determination of HITA

2.6 As per the existing altimeter setting procedure in India, vertical positioning of aircraft at or below the transition altitude is expressed in terms of altitude and at or above the transition level is in terms of flight levels. While passing through the transition layer, vertical positioning is expressed in terms of altitude when descending, and in terms of flight level when ascending.

2.7 Transition Altitude is “an altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes” [DOC 4444]. It is selected safely above the obstacles around an airport to ensure that flights reads its altitude with reference to mean sea level pressure well before reaching vertically close to the obstacles. TA enables the pilots to appreciate the relative vertical position of the aircraft above the obstacle from charts indicating altitude of obstacle.

2.8 The basic factor applicable for common TA is to have a value above all obstacles. The common TA applicable in India shall be above all obstacles applicable around the airports in India. That is above the highest TA in India. 23000FT is the highest TA in India.

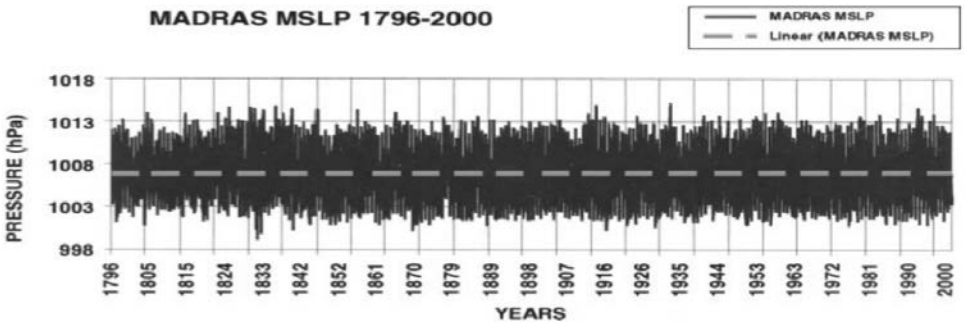
2.9 The values of 20,000 and 23,000FT of TA is much above the Common TA being considered globally. In a common Transition Altitude airspace, exceptionally high TA's are treated separately and kept as special cases and outside the common TA airspace. For example refer AIP Singapore ENR 1. 7

2.10 In India, on excluding the TA of Srinagar and Kullu [20,000 ft and 23,000 ft] next highest value of TA is 13,000 FT which can be adopted as Common Transition Altitude value.

LONG TERM PRESSURE VARIATIONS IN INDIA:

2.11 A research study published in International Journal of Climatology by R J Alen ET AL provides historical mean sea level pressure [MSLP] data and its graphical presentation for a period of 204 years [from 1796 to 2000]. The pressure data of Chennai varies from 1000 to 1015. Data is presented below as Graph 1. Graph 2 below shows a comparative analysis of pressure data of different places for better comparison.

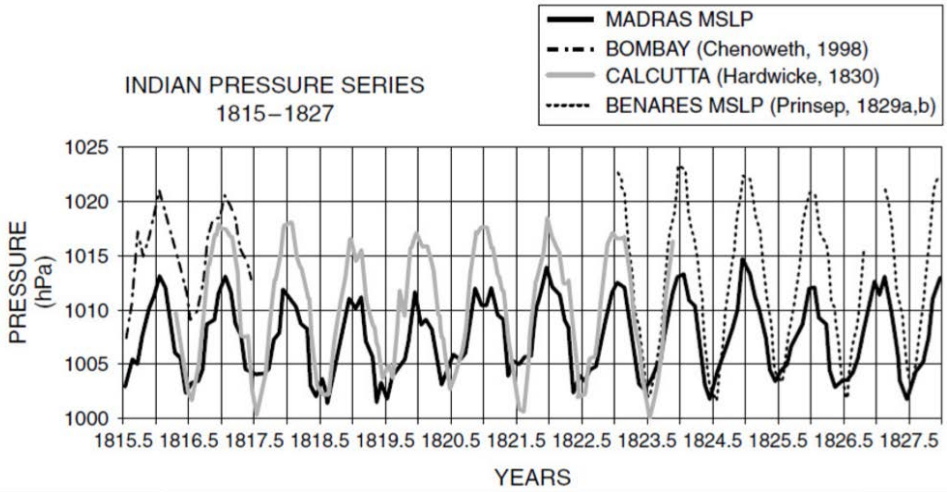
Graph 1



Recovered and quality-controlled monthly Madras MSLP time series reduced to 24-h means from 1796 to 2000. A linear trend line is shown fitted to the data

Graph 1

Graph 2



2.12 The obstacles within a radius of 25NM are considered while establishing TA around an aerodrome. The obstacle clearance of the flights operating beyond this area is controlled by the route lower level / altitudes or Minimum Off Route Altitudes (MORAs) specified.

Policy on establishment of new airports / TA

2.13 Opening of new airports at high altitude locations may affect the HITA. Suitable policy on TA of new airports, higher than HITA should be established.

Harmonized Transition Level

2.14 The lowest flight level available for use above the transition altitude is called Transition Level. To simplify ATC procedures, a uniform transition level of FL 150 is proposed, thus providing a transition layer of 2000 ft. FL 145, FL 140 and FL 135 are not available for flight planning.

Regional QNH

2.15 QNH values are derived for airports and reported to pilots for setting the subscale of the pressure altimeters on board for reading the vertical position of aircraft below transition level. However this value is derived using other meteorological data of an airport and cannot be applied for a region. A regional QNH is defined as the lowest QNH value derived in the region to ensure that the vertical separation with obstacle will be always more than the minimum required

Determination of Regional QNH

2.16 Introduction of harmonized TA across the country require establishing QNH regions with in which a common pressure value [QNH] is applicable for flights to transitioning from reading its vertical position – descending flights from Flight Level to Altitude and climbing flights from Altitude to Flight Level. An area bounded by QNH reading stations with minimum variation in QNH values may be considered as a QNH region. Different QNH reading stations with in a QNH region may read different QNH values at times. The lowest of the values shall be taken as the regional QNH for the region for that period. A standard operating procedure on exchange of QNH data among the QNH reading stations and determination of regional QNH has to be established

New Altimeter Setting Procedure

2.17 All aircraft operating within Indian HITA airspace shall,

a) at or above the transition level of F 150 must maintain vertical position by reference to the standard pressure value of 1013.2hPa; and

b) at or below the transition altitude of 13,000ft must maintain vertical position by reference to the QNH altimeter setting; and

c) While passing through the transition layer, vertical positioning is expressed in terms of altitude when descending, and in terms of flight level when ascending.

d) F 135, F140 and F145 are not available for flight planning. However ATC may authorize flights to maintain F 135, F140 and F145 with in HITA airspace using altimeter setting advised by ATC.

Areas Exempted From HITA

2.18 TA of Srinagar airport is 20,000 FT and Kullu airport is 23,000 FT. Flights operating to these airports shall continue with the existing procedure in altimeter setting.

Icao Regional / Sub- Regional Status of Harmonized Transition Altitude

2.19 Transition altitudes of some of the neighbouring countries of India are given below.

STATE	COMMON TRANSITION ALTITUDE
Sri Lanka:	-- 11,000 ft TA [having common TA & QNH for the FIR]
Maldives:	--11,000 ft TA [having common TA & QNH for the FIR]
Malaysia, Singapore & Brunei :	-- 11,000 ft TA [having common TA & QNH for the FIR]
Nepal :	-- 13,500 ft TA [having common TA & QNH for the FIR]

2.20 A common and harmonized TA required to be evolved with participation of all ICAO member states with in this region. Consultation with neighbouring states to be completed before finalizing HITA.

Implementation Strategy

2.21 The ICAO mandate is to "fully assess the operational, safety, performance and cost implications of harmonization of transition altitude and, if the benefits are proven to be appropriate, undertake further action on a national and (sub) regional basis". [Recommendation 5/1 (b)]. An outline, not exhaustive, is laid out for consideration. The initial process of getting the act together by the stake holders is developed. It is expected that the committee will lay down further procedures on decision making on implementation.

1) The stake holders.
2) Consultation process initiation.
3) Workshop on ICAO Regional Harmonized Transition Altitude [IRHTA].
4) Data analysis further progress of the activity.

Stakeholders

2.22 The Stake holders involved are:

1) The scheduled operators;
2) Non-scheduled aircraft operators;
3) Military and Para military aviation organizations;
4) Airports Authority of India;
5) Meteorological department;
6) Directorate general of civil aviation;
7) Representatives of IATA;
8) Representatives of neighbouring states;
9) Representatives of ICAO; and
10) Representatives of CANSO.

Consultation Process Initiation

2.23 The consultation process required to be initiated and lead by the major stake holder in the process. AAI shall initiate and coordinate the process for the benefit of the community.

Workshop on ICAO Regional Harmonized Transition Altitude [IRHTA]

2.24 The initial workshop on IRHTA will lay down the foundation for the activities. The suggested activities are:

1) Develop templates for evolving harmonized transition altitude for states;
2) Develop sample questioners for stakeholders to evaluate cost and benefits of the activity; and
3) Establish Small Working Group [SWG] to evaluate cost benefit analysis for the ICAO region.

2.25 Sample questionnaire for airline operators, air navigation services providers, meteorological services organizations, Military aviation organizations and Regulators are to be completed during the workshop. The process of data collection and evaluation shall be standardized for uniformity.

Data Analysis

2.26 The data collected by individual states will enable them to arrive at the common transition altitude for the state. The regional committee on analysing the states data will be able to decide on the ICAO Regional Harmonized TA [IRHTA]. Further the implementation strategy may be developed by the Small Working Group [SWG].

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the proposal by India for establishing harmonized Transition Altitude in India
b) consider ICAO a workshop on IRHTA that will lay down the foundation for the activities and the constitution of SWG
c) urge the member states in the sub-region to actively participate in exploring the feasibility for establishing a harmonized regional transition altitude in a collaborative manner.
d) discuss any relevant matters as appropriate.

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