



ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other issues to be considered by the Technical Commission

REVIEW OF PANS-OPS CRITERIA REGARDING ESTABLISHMENT OF TRANSITION ALTITUDE

(Presented by Pakistan)

EXECUTIVE SUMMARY

Procedures for Air Navigation Services (PANS) are *approved* by the Council and are recommended to Contracting States for worldwide application. While uniform application is very desirable, latitude is permitted for the development of detailed procedures which may be needed to satisfy local conditions. However, general deviation from a number of states indicates the need for review of the procedure.

Procedures contained in *Procedure for Air Navigation Services — Aircraft Operations* (PANS-OPS), Volume III, Section 2, Chapter 2, 2.1.2.4 requires that States **shall** establish transition altitude over aerodromes as low as possible but normally not less than 3 000 ft. Based on the safety and efficiency consideration, no rationale found to formulate a global procedure keeping transition altitude as low as possible whereas the benefits have been acquired by a number of States by establishing medium or high level harmonized transition altitudes.

<i>Strategic Objectives:</i>	This paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objective.
<i>Financial implications:</i>	Nil
<i>References:</i>	Doc 8168, <i>Procedure for Air Navigation Services — Aircraft Operations</i> (PANS-OPS)

1. INTRODUCTION

1.1 Procedures for Air Navigation Services (PANS) are *approved* by the Council and are recommended to Contracting States for worldwide application. While uniform application is very desirable, latitude is permitted for the development of detailed procedures which may be needed to satisfy local conditions. However, general deviation from a number of states indicates need for review of the procedure.

1.2 The provisions contained in PANS-OPS, Volume III, Section 2, Chapter 2 require that as far as possible, States **should** establish a common transition altitude for all of its aerodromes or at least for group of aerodromes. On the basis of an agreement, this harmonization of transition altitude may be extended for aerodromes of adjacent States, States within one ICAO region or even for aerodromes for two or more ICAO regions. ICAO PANS-OPS provision also requires that the height above the

aerodrome of the transition altitude **shall be as low as possible** but normally not less than 900 m (3 000 ft).

1.3 In States where terrain height is low and uniform, a common low transition altitude may be practicable. However, where significant differences exist in the aerodrome elevation for a number of aerodromes, it becomes impracticable to harmonize the transition altitude if it has to be kept as low as 3 000 ft above the aerodrome which is the PANS-OPS procedure. Moreover, a number of other associated constraints have been identified linked with the establishment of low transition altitudes around 3 000 ft above aerodromes. Based on the operational benefits associated, a number of States have implemented a medium or high transition altitude for their entire territory which has been proven a positive initiative.

2. DISCUSSION

2.1 A number of factors are required to be considered while establishing transition altitude for an aerodrome. Some guidelines have been provided in ICAO Doc 9426, *Air Traffic Services Planning Manual*. Few practical aspects which are considered for the purpose have been discussed below.

Harmonization

2.2 There are chances for confusion and errors on the flight deck side if wide variety of transition altitudes is used. PANS-OPS therefore recommends harmonization of transition altitude at national or regional level to the extent possible and within regions as well with agreements. A number of countries have therefore adopted the approach of a harmonized transition altitude not only at aerodromes inside its territory rather over its entire airspace. Several studies have also been conducted which have emphasized the need for harmonized transition altitude. A number of States are also using transition altitude which falls in the medium level (above 10 000), significantly higher than 3 000 ft above aerodromes thus giving preference to harmonization rather than the PANS-OPS provision to keep transition altitudes lower close to 3 000 ft. The procedure requiring transition altitude as low as possible by using “shall” is thus not considered appropriate.

Terrain clearance

2.3 The altimeter corrections required to determine the true altitude from which the pilot can determine actual height above terrain can be complex enough and time consuming to be error prone or misapplied. This could lead to either a loss of pilot situation awareness resulting in a collision with terrain. In airspace where transition altitudes have been established at relatively low altitudes and terrain clearance is a factor, there can be a significant safety risk. However, if the aircraft operated on the local QNH to a higher transitional altitude, the risk of a terrain accident due to an uncorrected pressure differential error is considered to be reduced significantly.

Airspace management

2.4 Different philosophies are being used for setting the transition level by different States. Few States have established the provision where transition level is determined by air traffic control (ATC) based on the current QNH while majority of states uses fixed transition level above the transition altitude so as to ensure minimum vertical separation between transition level and transition altitude for all QNH values. A low transition altitude (3000 ft) in this scenario results in blocking of airspace within transition layer which is vital for airspace management and ATC especially in busy terminal control areas. Favourable arguments have also been made by various ATS forums on raising the transition altitude to a medium level (8 000 to 10 000 ft) or high level (16 000 to 18 000 ft).

Cockpit workload

2.5 Besides the harmonization, pilot forums are of general opinion that any transition altitude below 5 000 ft above aerodrome requires changing altimeter settings during critical departure and approach phases of flight. It results on extra burden on the cockpit workload without any advantage or benefit.

Efficiency of terminal procedures

2.6 Performance-based navigation (PBN) is the highest priority element in Doc 9750, *Global Air Navigation Plan* (GANP) and being implemented worldwide to take advantage of associated benefits. Terminal procedures using PBN concept, if appropriately designed, can lead to significant benefits in terms of safety and efficiency of aircraft operations including the benefits from continuous climb operations/continuous descent operations (CCO/CDO) implementation. However, lower transition altitude established around aerodromes did not allow real optimization of vertical profile because of significant variation of transition layer width. This becomes more complex where a conflict between arrival and departure has to be managed in PBN airspace designing close to aerodrome.

3. CONCLUSION

3.1 According to the terminologies used in the PANS-OPS criteria, transition altitudes are required to be as low as possible generally 3 000 ft above aerodrome elevation. However, from the practical perspectives, numbers of constraints have been observed in application of the criteria in safe and efficient airspace management. Harmonization of transition altitudes by raising transitional altitude to medium or higher level has been proven beneficial and this strategy is being used by many states over the globe. Different studies in aviation industry have also resulted in positive arguments in favour of medium and high level transition altitude in comparison to low transition altitudes. The contents of the PANS-OPS for establishment of transition altitude therefore need to be reconsidered for the safety and efficiency in real perspective.

4. RECOMMENDATION

4.1 The ICAO Assembly may like to consider the arguments presented in the paper and may advise the Council for review of the relevant procedures for establishment of transition altitude at aerodromes.

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