International Civil Aviation Organization

WORKING PAPER

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ASSEMBLY — 38TH SESSION

TECHNICAL COMMISSION

Agenda Item 38: Other issues to be considered by the Technical Commission

NEED FOR REVIEW OFANNEX 14 OBSTACLE LIMITATION SURFACE CRITERIA

(Presented by India)

EXECUTIVE SUMMARY

Obstacle Limitation Surfaces (OLS) defined in Annex 14 — *Aerodromes* have been established with the objective of ensuring a safe airport environment free from obstacles. The current Annex 14 OLS criteria are in existence for a long time. It is considered appropriate that the significant advancements in aircraft performance, navigation capability, Ground Equipment and Improvements in procedures are taken into account and OLS criteria suitably reviewed in order to maintain balance between the current and future air navigation requirements and need for community infrastructure in the vicinity of the airport. Considered review of OLS will provide for growth of city around airports without affecting safety of aircraft operations and ultimately pave for economic development.

Action: The Assembly is invited to request the Council to consider reviewing Annex 14 OLS criteria taking into consideration current aircraft navigational and performance capability.

Strategic Objectives:	This working paper relates to the Safety and Environmental protection and sustainable development of civil aviation Strategic Objectives.
Financial implications:	Not applicable
References:	Annex 14 — *Aerodromes* Doc 9137, *Airport Services Manual*, Part 6 Doc 8168, *Procedures for Air Navigation Services, Volume II*

1. INTRODUCTION

1.1 OLS as given in Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*, defines the airspace around airports that should be maintained free from obstacles in order to permit the intended aircraft operations to be conducted safely and to prevent the airport from becoming unusable by the uncontrolled growth of obstacles.

1.2 OLS, even after many amendments of Annex 14, have basically remained unchanged and cater to an aviation environment and aircraft that exist since 1960s. The OLS were developed at a time when airports were located on the outskirts of the city. However, as the city and the communities developed around an airport conflict arose between the need for city's growth in vertical dimension and preserving safety and operational efficiency of an airport. The coastal cities, in particular, require vertical Growth as lateral expansion of such cities is obviously constrained.

1.3 The present day modern aircraft are technologically advanced with superior performance capability and equipped with modern on-board avionics and navigation systems. Though Instrument Landing System (ILS) continues to be the primary precision landing aid, implementation of approach procedures such as LPV, LNAV, LNAV & VNAV, LPV, GLS & RNP AR that are being developed in line with ASBU requirements, has enhanced accuracy of navigation on final approach considerably.

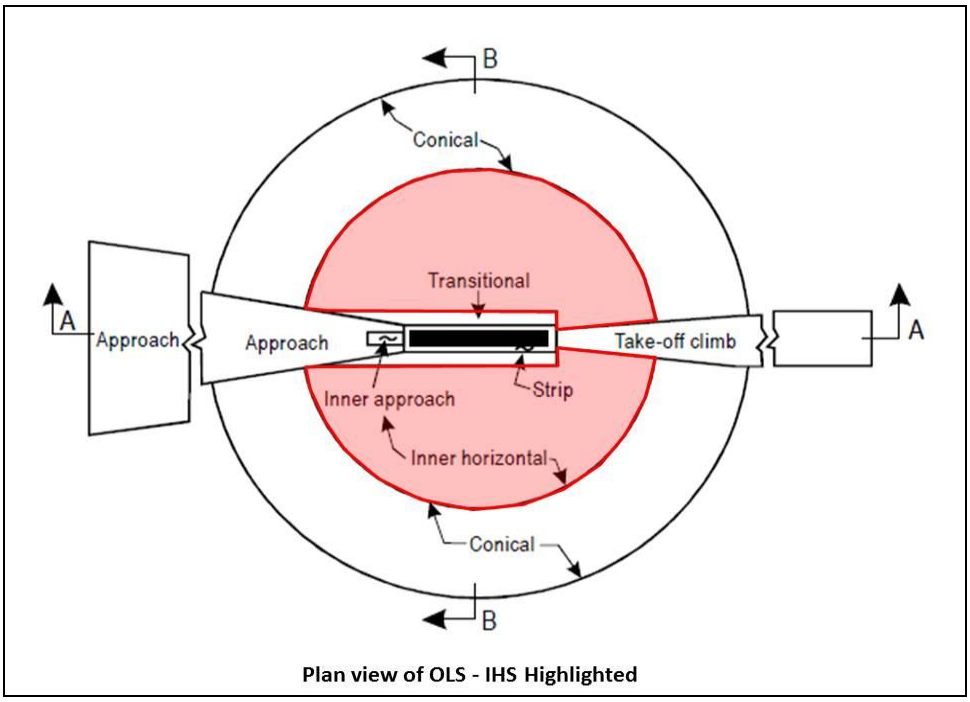
2. DISCUSSION

2.1 The width and the extent of approach surface is dependent on the accuracy of navigation on final approach along the extended runway centreline. The improved track keeping ability and improved positional accuracy of the modern day aircraft provide enough scope for considering the revision of OLS criteria without violating safety norms.

2.2 With reference to Annex 14-Vol I, Table 4-1, the dimensions of approach surface in case of both precision approach and non-precision approach for Code 3 & 4 runways is same. Thus there is no consideration for the ability of the aircraft to navigate precisely along the extended runway centreline (LLZ) in case of precision approach. Furthermore, in order to protect aircraft during visual segment of the final approach Visual Segment Surface (VSS) has been established in Doc 8168-Vol II (PANS-OPS) which needs to be protected in accordance with the criteria defined therein. Since Visual segment is being protected through VSS, the dimension and slope of Annex 14 approach surface may be reviewed, modified and aligned with that of VSS. Further, the minimum and optimum descent gradient on final approach up to threshold in accordance with Doc 8168-Volume II is 5.2%, whereas, OLS approach surface gradient criteria for Code 3 & 4 runways have remained at initially 2% and 2.5%. Review and increase of r nominal gradient of OLS Approach surface may be considered.

2.3 Similarly, superior climb performance capability of modern aircraft does permit review of climb gradient criteria associated with take-off climb surface.

2.4 In accordance with Doc 9137-Part 6-Control of Obstacle, the Inner Horizontal Surface (IHS) is established to protect the aircraft while conducting circling procedure in the vicinity of an aerodrome. As prescribed in Annex 14-Vol I, in case of Precision Approach Code 3 & 4 runway; the IHS extends up to 4KM (2.2NM) from a reference datum at the airport. When the lateral limit of IHS is correlated with protection area required by various category of aircraft defined in Doc 8168 (PANS-OPS) significant differences are observed. The Visual circling protection area required for Cat A to E is 3.1KM (1.7NM), 4.9KM (2.7NM), 7.9KM (4.2NM), 9.8KM (5.3NM) & 12.8KM (6.9NM) respectively. It is evident that, due to varying speeds of different categories of aircraft, the protection area required increases and the obstacle protection offered by IHS is inadequate. Limits of IHS are depicted in Figure 1.



Plan view of OLS - IHS Highlighted

Figure1

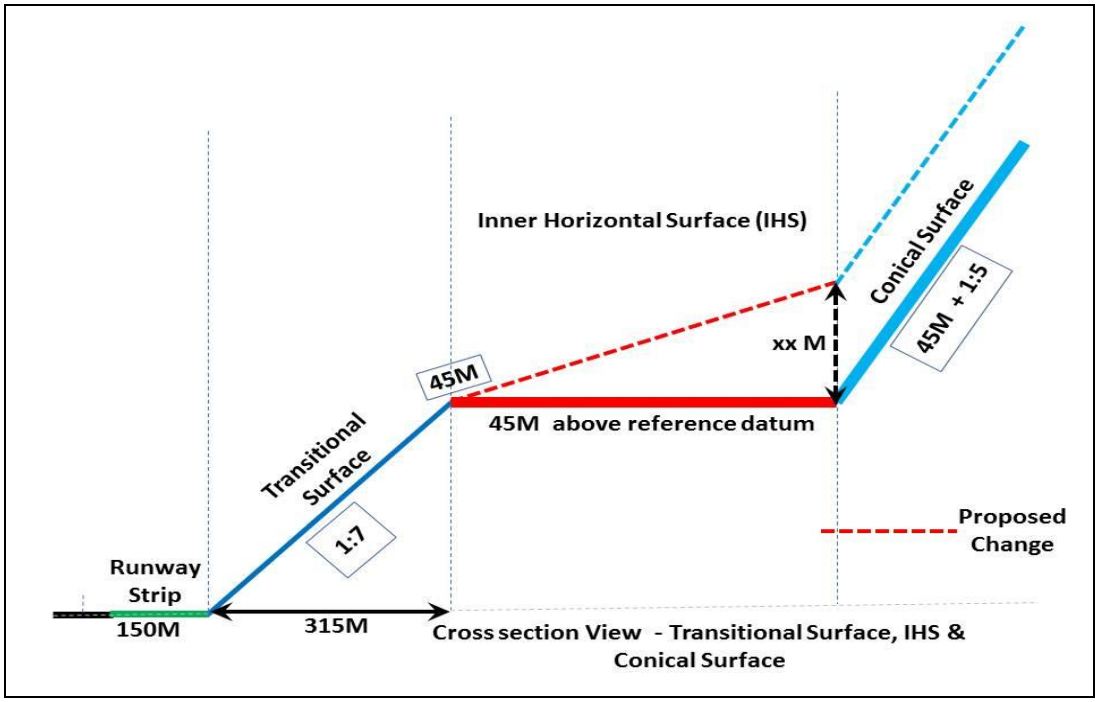


Figure 2

2.5 As shown in Figure 2, IHS originates at the point where transitional surface reaches a height of 45M, thereafter IHS becomes the controlling OLS surface. IHS thus imposes limitation on

development of aerodrome infrastructure within the airport boundary and in the vicinity of the airport as well. Penetration of IHS requires an aeronautical study to be carried out to assess safety and operational impact on the aircraft operations. Additionally, as elaborated above IHS is not extensive enough to protect all categories of aircraft during visual circling but l is severely restrictive in respect of permissible height for infrastructure development as well.

2.6 In view of the forgoing discussion, review of IHS is necessary to make the OLS relevant to the current scenario. Instead of being a horizontal surface, IHS could be an outward and upward sloping surface reaching a suitable height from where conical surface will continue to climb outward and upward. Figure 3 below depicts the proposal.

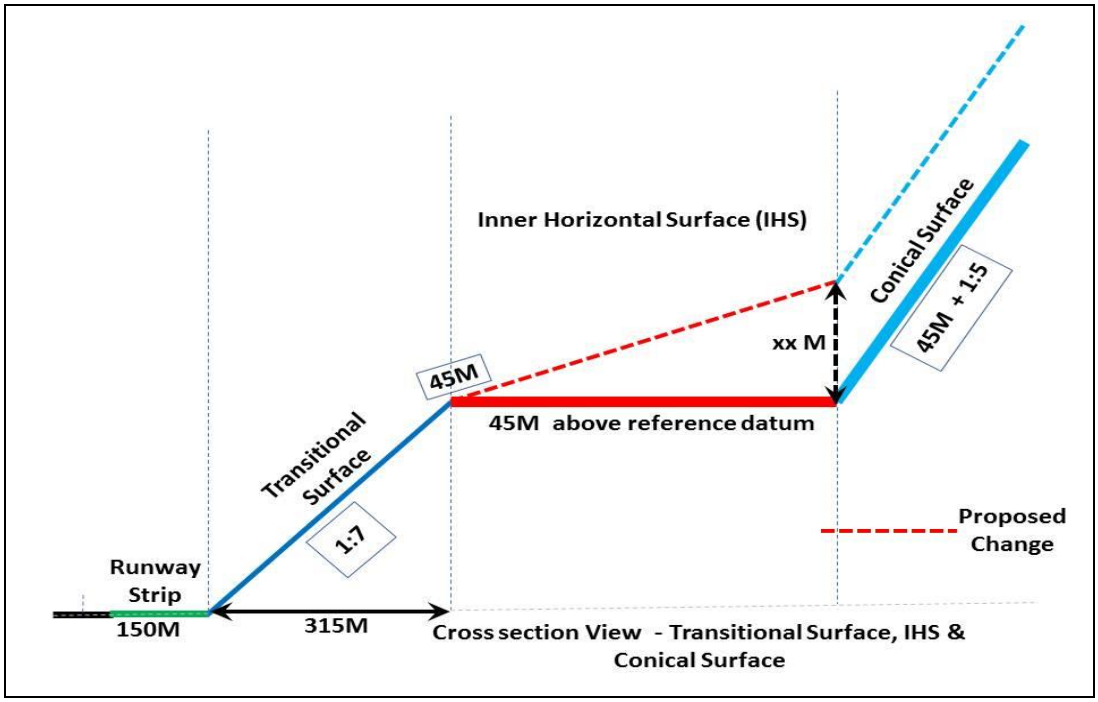


Figure 3

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