



International Civil Aviation Organization

**SIXTEENTH MEETING OF THE  
COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND  
METEOROLOGY SUB-GROUP (CNS/MET SG/16) OF APANPIRG**

Bangkok, Thailand, 23 – 27 July 2012

**Agenda Item 5: Navigation**

**OBSTRUCTION CRITERIA BEYOND ILS CRITICAL AND SENSITIVE AREAS –  
AMENDMENT TO GUIDANCE MATERIAL IN ANNEX 10**

(Presented by India – Airports Authority of India)

**SUMMARY**

This paper presents the case analysis for the obstruction criteria beyond critical and sensitive area for the ILS. The critical and sensitive areas of ILS are generally maintained in accordance to the guidance provided in Annex 10. Vol. I. In India, beyond the critical and sensitive area, obstructions are being controlled as per the coverage required in course and clearance area. But it has been experienced that certain structures, despite of being below the coverage volume, are affecting the performance of ILS. And hence, there is a need to redefine the guideline and control the obstruction in the area of influence.

This paper relates to –

**Strategic Objectives:**

**A: Safety** - *Enhance global civil aviation safety*

**C: Environmental Protection and Sustainable Development of Air Transport** - *Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

**Global Plan Initiatives:**

GPI-12 Functional integration of ground systems with airborne systems

GPI-16 Decision support systems and alerting systems

GPI-21 Navigation systems

**1. INTRODUCTION**

1.1 The critical and sensitive areas of ILS are maintained in accordance to the guidance provided in Annex 10. Vol. I to ensure adequate protection of the ILS signals. The ILS critical area is an area of defined dimensions about the localizer and glide path antennas where vehicles, including aircraft, are excluded during all ILS operations.

1.2 The ILS critical area is required to be protected because any presence of vehicles and/or aircraft inside its boundaries will cause unacceptable disturbance to the ILS signal-in-space. The ILS sensitive area is an area extending beyond the critical area where the parking and/or movement of vehicles, including aircraft, are required to be controlled to prevent the possibility of unacceptable interference to the ILS signal during ILS operations. The sensitive area is protected

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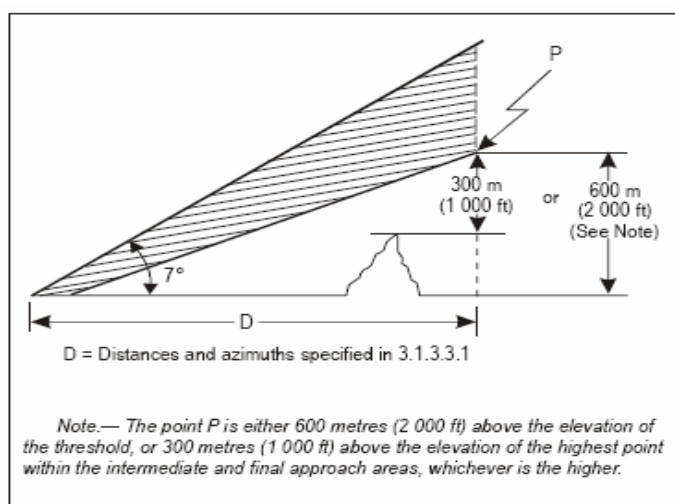
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against interference caused by large moving objects outside the critical area but still normally within /outside airfield boundary.

**2. Discussion**

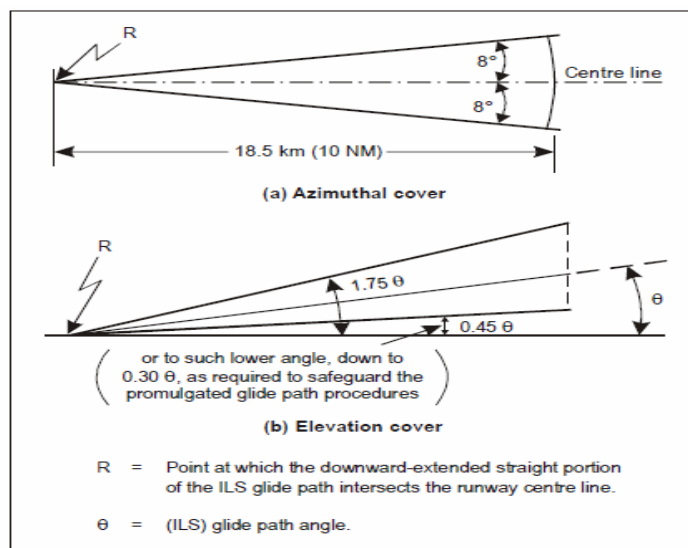
2.1 In India, in case of Localizer beyond the critical area the structures are restricted as - within  $\pm 10$  degrees azimuth in front of antenna, an object should not subtend an angle of elevation more than 0.75 degrees at the centre of antenna array. and beyond  $\pm 10$  degrees to  $\pm 35$  degrees azimuth in front of antenna an object should not sustain an angle of elevation more than 1.1 degree.

2.2 The above Para 2.1 is based on the coverage requirement specified in Annex 10. Vol. I. as reproduced below



**Fig . Localizer coverage requirements**

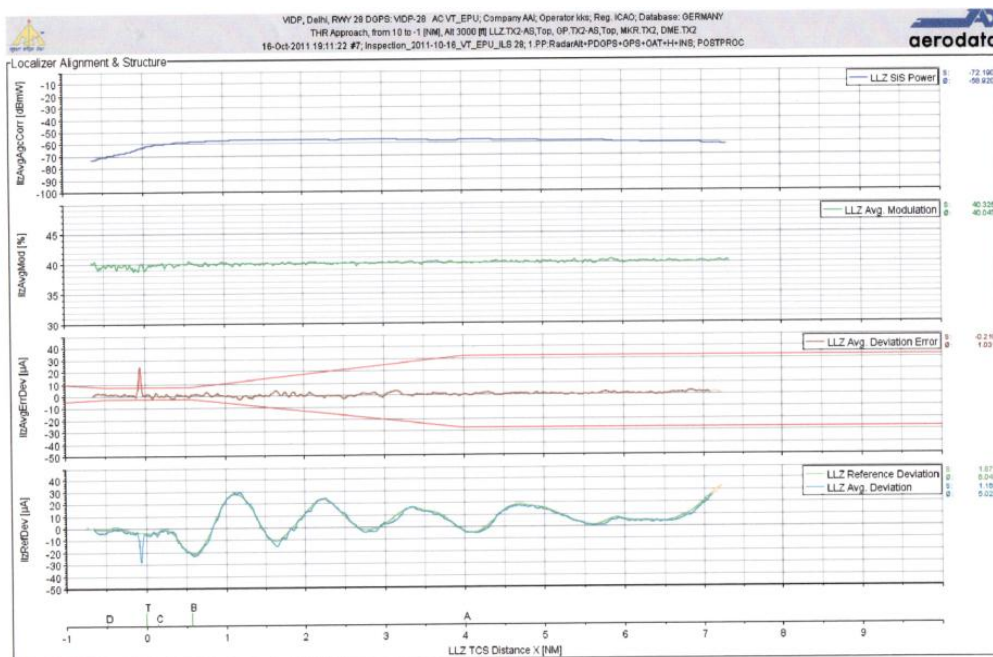
2.3 Similarly, in case of glide path the obstructions beyond critical area and within  $\pm 8$  degrees azimuth in front of the glide path antenna, a building/structure should not subtend an angle of elevation more than 1.1 degree at antenna base. . this is based on the coverage requirement of Glide path in Annex 10 Vol. I. given as below:



**Fig. Glide path coverage requirement**

2.4 Though based on the above criteria, the No Objection Certificate (NOC) for height clearance for structures requested to be built by intending agencies is issued while taking in to account the distances and elevations from various CNS facilities in and around the airport, there are no guidelines available on type of permissible material (e.g. RCC, steel, fiber sheet etc.) that can be used for building the intended structures. Once NOC is granted, the structures are built by the users as per their wish. The material to be used for construction, orientation and design/composition of the structure(s) are not controlled by ANS provider.

2.5 We would like to share our experience of the recent case of Delhi airport where ILS 28 is functioning as CAT III B. This ILS was commissioned in Oct 2010 and was meeting CAT III criteria as specified in Annex 10 Vol. I. In the scheduled flight inspection it was observed that there is a prominent sharp bends between point T and D which remained steady. As a result, the ILS had to be de-categorized to CAT II.



2.6 In order to investigate the cause of above referred deviation in ILS signal, the area around the airport which is under continuous development in the recent years, was surveyed and examined. After a long study & mathematical modeling/simulation, it was concluded that the Terminal 1-D was the source of this problem. Perhaps certain modifications were carried out in existing building incorporating certain metallic structures.

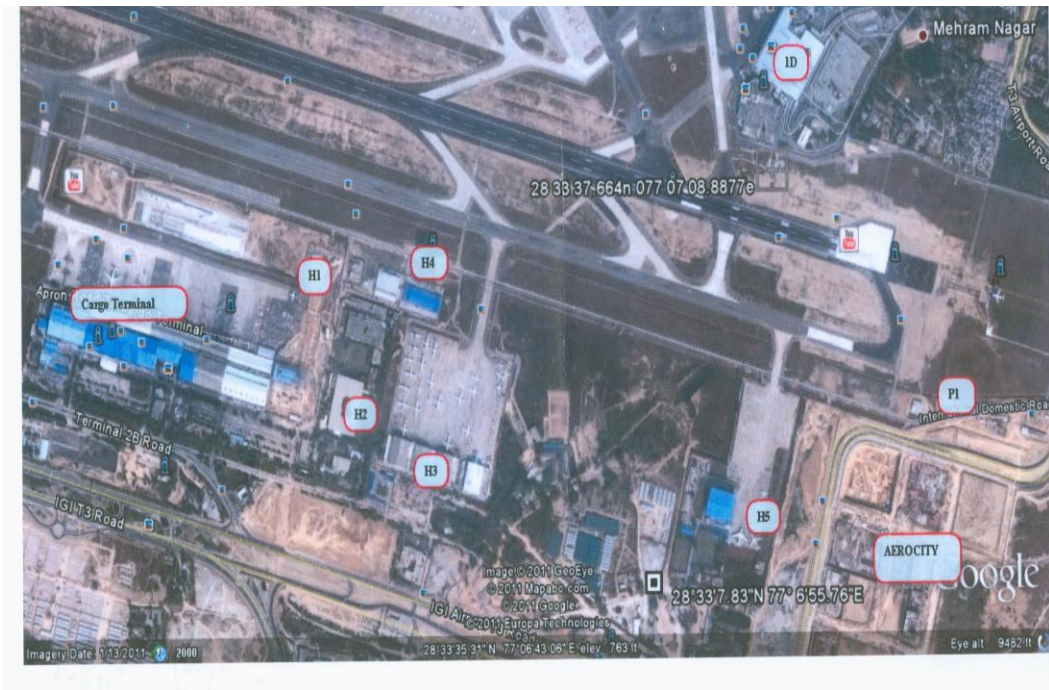
2.7 The Terminal 1-D is domestic terminal which was existing even before the commissioning of this ILS in 2010. Another make of ILS was functioning well as Cat III before 2010 alongside the Terminal 1-D, therefore, at the first instance no one could have doubted for Terminal 1-D being the source of problem. This is the example where small modification to existing structures led to such a big problem.

2.8 To mitigate the effects of modifications in the said structure, deflective fence was provisioned to divert the reflected beam from the modified structure. Thereafter, ILS facility was restored to CAT III. Therefore, it is imperative that surface characteristics of the structure are also required to be defined so as to ensure that reflected signals do not interfere with ILS signals.

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2.9 From our experience the control of critical areas, designation of sensitive areas on the airport and restricting the structure merely below the minimum elevation requirement of ILS may still not be sufficient to protect an ILS from multipath effects caused by large, fixed ground structures. Structures inside and outside the boundaries of the airport may also cause difficulty to the ILS course quality, even though they meet restrictions of obstruction criteria.

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) Recommend issuance of guidelines for type of material and surface characteristics to be used for construction of structure(s) apart from the permissible height of structure(s) intended to be constructed in and around airports that could adversely affect coverage of Localizer/Glide path.

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