

# AERODROME METEOROLOGICAL OBSERVATION AND FORECAST STUDY GROUP (AMOFSG)

# TENTH MEETING

# Montréal, 17 to 19 June 2013

Agenda Item 5: Aerodrome observations

### SITING OF CEILOMETERS

(Presented by Michel Leroy)

### SUMMARY

Amendment 76 of Annex 3 changes the recommendation concerning the representativeness of cloud observations for local reports. The "approach area" is replaced by "the runway threshold(s) in use".

It is proposed to adapt the recommendation concerning the siting of the sensors for cloud amount and height of cloud base, accordingly.

Action by the AMOFSG is in paragraph 4.

# 1. **INTRODUCTION**

1.1 Until Amendment 76, §4.6.5.2 of ICAO Annex 3 — Meteorological Service for International Air Navigation was: **Recommendation.** - Cloud observations for local routine and special reports should be representative of the approach area.

1.2 Annex 3, Amendment 76 changes this Chapter 4.6.5.2 in: **Recommendation.** - *Cloud observations for local routine and special reports should be representative of the runway threshold(s) in use.* 

1.3 Annex 3, Appendix 3, §4.5.1 recommends the siting of ceilometers for precision approach runways to be at the middle marker site or an equivalent position (distance of 900 to 1200 m from the landing threshold.

1.4 Annex 3, Amendment 76 does not change the siting recommendation of the ceilometers.

# 2. **DISCUSSION**

2.1 The rationale behind the siting recommendation of ceilometers is twofold:

2.1.1 With a  $3^{\circ}$  angle of descent, an airplane is approximately 50-60 m (~200 ft) above the middle marker before landing. 200 ft is a typical decision height (DH) for Cat II operations. The localization of the ceilometer upstream to the landing threshold may correspond to the point where a pilot could interrupt the descent if the required visual reference is not attained.

2.1.2 Until Amendment 76 to Annex 3, it was recommended that cloud observations for local reports be representative of the approach area. Though not being defined, the approach area is also upstream to the landing threshold.

2.2 Now that it is recommended that cloud observations be representative of the runway threshold in use, does the siting recommendation of ceilometers have to be changed?

2.2.1 To recommend a siting of the ceilometer close to the runway threshold would be more appropriate.

2.2.1.1 With new GNSS procedures, more and more (small) aerodromes have no middle marker. The piece of land located 900 to 1200 m from the landing threshold may be outside the aerodrome airfield and a ceilometer installation may be impracticable, or very costly.

2.2.1.2 The theoretical advantage of locating the ceilometer close to a DH point is greatly limited by the fact that cloud layers at this point are to be reported, not the "instantaneous" Height of Cloud Base (HCB), measured by the ceilometer. The successive measurements of HCB are used, either by a human observer or by an automatic system, to get the best evaluation of the cloud layers. In this process, the exact location of the ceilometer loses its interest, because the cloud layer calculation uses temporal variations of HCB to evaluate the cloud amount. And by definition, the cloud amount refers to a large area, not to a single point above the ceilometer.

2.2.2 The exact location of the ceilometer is therefore not so important. It has to be installed close to the landing threshold, but a location at the middle marker or at an equivalent distance is not so critical and may be an unjustified constraint if an installation at this point is not practical.

# 3. CONCLUSION

3.1 It is therefore proposed to change the recommendation for siting. A proposal is given below.

3.2 A new wording of §4.5.1 of Appendix 3 of Annex 3 could be:

# 4.5.1 Siting

**Recommendation.**— When instrumented systems are used for the measurement of the cloud amount and the height of cloud base, representative observations should be obtained by the use of sensors appropriately sited. For local routine and special reports, in the case of aerodromes with precision approach runways, sensors for cloud amount and height of cloud base should be sited to give the best practicable indications of the height of cloud base and cloud amount at the runway threshold in use. For that purpose, a sensor should be installed at a distance less than 500 m from the threshold. This distance can be extended up to 900-1200 m from the landing threshold in the axis of the approach end of the runway.

3.2.1 A proposal of a distance less than 500 m from the runway threshold is given to introduce an objective definition and tolerance for the ceilometer's location.

3.2.2 A sensor's location at the middle marker or an equivalent distance should remain acceptable.

### 4. **ACTION BY THE AMOFSG**

### 1.1 The AMOFSG is invited to:

- a) note the information contained in this paper; and
- b) consider appropriate follow-up actions.

-END-