



## **AERODROME METEOROLOGICAL OBSERVATION AND FORECAST STUDY GROUP (AMOFSG)**

### **NINTH MEETING**

**Montréal, 26 to 30 September 2011**

**Agenda Item 5: Observing and forecasting at the aerodrome and in the terminal area  
5.1: Observations**

### **PROPOSED NEW SPECI PROVISIONS**

(Presented by Bill Maynard)

#### **SUMMARY**

This study note suggests that new SPECI criteria for rapidly changing atmospheric pressure should be enabled. Furthermore, SPECI standards should be expanded to support existing standards for TAF amendments.

## **1. INTRODUCTION**

1.1 Instrument procedures, in some cases, are based upon the use of a Remote Altimeter Setting Source (RASS). In cases of rapidly changing pressure the only practical means of warning pilots that these RASS may no longer be current would be by the issuance of SPECI.

1.2 Also, when it comes to aligning aerodrome forecast (in meteorological code form) (TAF) amendment criteria standards with related aerodrome special meteorological report (in meteorological code form) (SPECI) criteria; in the case of duststorms and sandstorms, there are no corresponding SPECI standards related to existing TAF amendment criteria standards.

## 2. DISCUSSION

### 2.1 Rapid Pressure Changes

2.1.1 Instrument approaches may be based upon the use of a RASS, as defined in the *Procedures for Air Navigation Services — Aircraft Operations*, Volume II — *Construction of Visual and Instrument Flight Procedures* (Doc 8168), section 5.4.4.3 (see appendix), and in corresponding procedures implemented by some States. This is typically used for aerodromes with limited services and when and where there is no local altimeter setting. The use of RASS provides a usable altimeter setting for the conduct of an instrument approach in these cases. However, the RASS factors in PANS-OPS are meant to be used during “reasonably homogenous” weather conditions. During periods of rapidly changing pressure, these factors may not be sufficient.

2.1.2 In extreme conditions, such as during the approach of a tropical storm, the accumulated error in the RASS can be more than the equivalent of 100 feet (30 m) per hour. In such cases, it can be argued that the use of RASS is clearly imprudent and obvious to the pilot. However, there is also a range of error that error remains significant but may not be readily apparent.

2.1.3 In the case of rapidly falling pressure, the aircraft may be closer to the ground than indicated leading to a potential safety compromise of the aircraft making contact with the ground or an object on the ground while in controlled flight. In the case of rapidly rising pressure the aircraft is further above the ground than indicated leading to a potential unnecessary missed approach or diversion.

2.1.4 The following excerpt validates the potential hazard:

The lack of situational awareness, particularly the lack of vertical situational awareness, is a causal factor in 50 % of approach-and-landing accidents (this includes most accidents involving a CFIT) (Source: FSF Flight Safety Digest Volume 17 & 18 – November 1998 / February 1999).

2.1.5 It is proposed, as one means of mitigation, that SPECI criteria be specifically **enabled** for situations when rapid pressure changes are occurring at those aerodromes used as a RASS. The current enabling provision in Appendix 3, paragraph 2.3.3 d) relate to local criteria, not to the remote use of the information. Moreover, a direct reference to rapid pressure changes in the Annex may be useful in improving awareness of this phenomena and the mitigation of the associated potential risks.

2.1.6 Based upon the current definitions of rapidly changing pressure used in Canada and the United States, the following recommendation is proposed to be added under 2.3.3 in Appendix 3:

...when pressure has increased or decreased by 0.6hPa (0.02”Hg) or more within the previous 15 minutes...

2.1.7 Alternatively, the proposed criteria could be limited to only falling pressure which represents the greater hazard.

### 2.2 Alignment with TAF amendment criteria

2.2.1 The standards for TAF amendment include the following (Appendix 5 refers):

1.3.1 The criteria used for the inclusion of change groups in TAF or for the amendment of TAF shall be based on any of the following weather phenomena or combinations thereof being forecast to begin or end or change in intensity:

- freezing precipitation
- moderate or heavy precipitation (including showers thereof)
- thunderstorm (with precipitation)
- duststorm
- sandstorm.

2.2.2 It is notable from the comparable standards for SPECI issuance, in section 2.3.2 of Appendix 3, that there are no SPECI criteria standards for duststorm or sandstorm although there is a recommendation for it in 2.3.3 d).

2.2.3 It is proposed that duststorms and sandstorms be added to the standard for SPECI issuance.

2.2.4 Consideration could also be given to upgrading the entire text of Appendix 3, 2.3.3 d) to a standard which would also include the onset or cessation of funnel clouds or tornadoes. Given the hazard presented by tornadoes, this seems reasonable. It may be a challenge for automated systems to provide reports related to these phenomena but the combined factors of associated hazard and a pre-established need for this information in the TAF support the development of new SPECI standards in this regard.

### 3. ACTION BY AMOFSG

3.1 The AMOFSG is invited to comment on this paper and, in particular, the proposed actions described in paragraphs 2.1.6, 2.2.3 and 2.2.4.

-----

## APPENDIX

### EXCERPTS FROM PANS-OPS VOLUME II – AIRCRAFT OPERATIONS

5.4.5.3.1 *Remote altimeter setting.* When the altimeter setting is derived from a source other than the aerodrome, and more than 9 km (5 NM) remote from the threshold, the OCA/H shall be increased at a rate of 0.8 m for each kilometre in excess of 9 km (5 ft for each nautical mile in excess of 5 NM) or a higher value if determined by local authority. In mountainous areas or other areas where reasonably homogenous weather cannot always be expected, a procedure based on a remote altimeter setting source should *not* be provided. In all cases where the source of the altimeter setting is more than 9 km (5 NM) from the threshold, a cautionary note should be inserted on the instrument approach chart identifying the altimeter setting source.

5.4.5.3.2 *Remote altimeter setting source (RASS) in mountainous areas*

a) The use of RASS in mountainous areas requires additional calculations to determine the correct OCA/H.

The calculation uses the formula

$$\text{OCA/H} = 2.3x + 0.14z \text{ (non SI)}$$

$$\text{OCA/H} = 0.4x + 0.14z \text{ (SI)}$$

where: OCA/H is the RASS increased altitude/height value (m/ft);  
x is the distance from the RASS to the landing area (km/NM); and  
z is the difference in elevation between the RASS and the landing area (m/ft).

These formulas are used where no intervening terrain adversely influences atmospheric pressure patterns. The use of this criteria is limited to a maximum distance of 138 km (75 NM) laterally or an elevation differential of 1 770 m (6 000 ft) between the RASS and the landing area. An example calculation in nautical miles and feet is illustrated in Figure I-4-5-4.

b) Where intervening terrain adversely influences atmospheric pressure patterns, the OCA/H shall be evaluated in an Elevation Differential Area (EDA). The EDA is defined as the area within 9 km (5 NM) each side of a line connecting the RASS and the landing area, including a circular area enclosed by a 9 km (5 NM) radius at each end of the line. In this case, z becomes the terrain elevation difference (m/ft) between the highest and lowest terrain elevation points contained in the EDA. An example of a calculation in nautical miles and feet is illustrated in Figure I-4-5-5.

— END —