AERODROME METEOROLOGICAL OBSERVATION AND FORECAST STUDY GROUP (AMOFSG)

EIGHTH MEETING

Melbourne, Australia, 15 to 18 February 2010

Agenda Item 5: Observing and forecasting at the aerodrome and in the terminal area
5.2: Aerodrome forecasts

TREND FORECAST

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SUMMARY

This paper describes a proposed trial in TREND forecasting in the Netherlands, following the ongoing use of automated observations for aviation. Changing the existing practice according to the suggestion in this paper will reduce workload and costs, and at the same time present the same or more useful information to users. This paper also raises the question whether TREND appended to METAR or SPECI should be identical to the TREND in local routine or local special reports.

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1.   INTRODUCTION

1.1   In many States use is made of the TREND type landing forecast according to Annex 3 — *Meteorological Service for International Air Navigation* , para 6.3.3: *"trend forecast shall consist of a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a local routine or local special report, or a METAR or SPECI. The period of validity of a trend forecast shall be 2 hours from the time of the report which forms part of the landing forecast"*.

1.2   Following discussion during AMOFSG/7, it was agreed:

Action agreed 7/18   TREND forecasts in SPECI from automatic systems

That, information on problems encountered in issuing TREND forecasts in SPECI where automatic systems provide more frequent SPECI and potential solutions be provided to Kees by30 June 2009 and Kees to provide a collated study note for consideration at the next meeting of the group.

2.   **DISCUSSION**

2.1   Automated weather reporting in itself proves to generate more local special reports (and SPECI, when issued, which has become much less since SPECI is no longer a requirement where (AUTO) METAR is provided every 30 mins), since an automated system will strictly adhere to regulations, where human observers tend to anticipate changes and are able to combine changes which occur shortly after each other into one report.

2.2   Preparing TREND forecasts with every new report has always taken a lot of effort from aviation forecasters, even more where they are providing TREND forecasts for several aerodromes from a centralized forecast office.

2.3   TREND forecasts according to the present recommendation have to provide ……… *the expected significant changes* in the meteorological conditions….. . Especially in weather situations with rapidly changing conditions this results in many different TREND forecasts, while the prevailing weather conditions do hardly change.

2.4   Although only a few comments from other members of the group where received, there seems to be a shared opinion:

Automated Observations have the generic characteristic of missing the "natural human laziness" which prevents human observers from issuing SPECI at too short intervals. The problem arises from the strict application of threshold values (e.g. visibility, traces of rain or snow, ceiling height) which may fluctuate around such a pre-defined threshold value and thus require a frequent "inversion" of the TREND-type forecast.

Imagine a situation with the visibility fluctuating between 750 and 850 m , where every time the threshold of 800 m is passed, you would be formally obliged to send a SPECI, which no human observer would do if the frequency of fluctuation is less than say 10 min.

The question of "inverting" the TREND from "TEMPO 800" to TEMPO 700" every time simply illustrates the fallacy of a single accurate value of visibility being representative for the aerodrome.

The problem is not the TREND in itself, but the misconception that visibility /ceiling/WX conditions, measured by some localized instrument with some calibration should be considered the "whole truth". For automated systems, some elasticity or hysteresis needs to be built in, i.e. a transition through an important threshold value should only be indicated by the system if:

         a)   a strong and un-ambiguous trend in the observed (calculated..) value has been confirmed for some time (between 5 and 10 min minimum!); and

         b)   no relapse in the other direction has occurred for 2-5 minutes through the nearest threshold value.

2.5   Next to this the question arises whether the current provisions in Annex 3 concerning both METAR/SPECI and local (special) reports do really reflect the actual requirements of the different types of users at and beyond aerodromes. In The Netherlands it is assumed that METAR has to provide a more or less generic weather "picture", representative for the whole aerodrome (which might be: the area within the perimeter, the circle with radius of 8 NM around the Aerodrome Reference Point, the Approach area, or… (which definition applies??)). For Local (special) reports the reported weather should be representative for the runway in use…but also the question arises for which part or area is the representativity really required. It could be (as done at present in The Netherlands) the TDZ of the main landing runway, but consultations with ATC and local users, like flying schools, indicate that such local reports lack information on e.g cloud base height and cloud distribution in the Terminal area.

2.6   Given the situation as mentioned in para 2.5 above: for which area or location should the TREND forecast be representative, since in practice TREND for METAR and local (special) report are identical in almost all cases?

2.7   To reduce the number of different TREND forecasts (and thus workload and costs) the Netherlands will implement, on trial basis, a different TREND-type landing forecast, in which both the prevailing conditions, for the next two hours, and the expected significant changes during this period are mentioned.

An example:

(the examples are in METAR/SPECI code to make them easily readable, but same applies to examples for local (special) reports.) The codeword **PREV** is suggested with a meaning: Forecast prevailing conditions during the next 2 hours.

Present ideal situation:
         METAR EHAM 041425Z 14011KT 4000 SHRA FEW034CB BKN040 05/01 Q1007
         BECMG 9999 NSW NSC TEMPO 14017G28KT 4000 SHRA SCT030CB=

Present situation (not correct but common practice…):
         METAR EHAM 041425Z 14011KT 4000 SHRA FEW034CB BKN040 05/01 Q1007
         BECMG 9999 NSW=

Trial situation:

        METAR EHAM 041425Z 14011KT 4000 SHRA FEW034CB BKN040 05/01 Q1007
        PREV 14010KT 9999 NSC TEMPO 14017G28KT 4000 SHRA SCT030CB=

The ideal and trial TREND forecasts are about the same length and require more or less the same amount of work. The second example, which unfortunately is common practice, has lost part of the information. When after about 10 minutes the shower has moved away and then the reports would become:

Present ideal situation:

        SPECI EHAM 041435Z 14011KT 9999 FEW034CB BKN040 05/01 Q1007
        BECMG NSC TEMPO 14017G28KT 4000 SHRA SCT030CB=

Present situation (not correct but common practice…):

        SPECI EHAM 041435Z 14011KT 9999 FEW034CB BKN040 05/01 Q1007
        TEMPO 14017G28KT 4000 SHRA=

Trial situation:

        SPECI EHAM 041435Z 14011KT 9999 FEW034CB BKN040 05/01 Q1007
        PREV 14010KT 9999 NSC TEMPO 14017G28KT 4000 SHRA SCT030CB=

In which the trial TREND is somewhat longer, but has not changed, while in the present situation the forecaster has to change at least part of the TREND, and in practice again some information is lost.

Shortly after this another SPECI would be required because the wind has become gusty:

Present situation:

        SPECI EHAM 041440Z 15016G27KT 9999 FEW034CB BKN040 05/01 Q1007
        BECMG NSC TEMPO 4000 SHRA SCT030CB=

Trial situation:

        SPECI EHAM 041440Z 15016G27KT 9999 FEW034CB BKN040 05/01 Q1007
        PREV 14010KT 9999 NSC TEMPO 14017G28KT 4000 SHRA SCT030CB=

Where in the present situation the forecaster has again to adapt the TREND to the actual report and in the trial situation the original TREND is still valid.

Another example:

Present situation:

        METAR EHAM 051425Z VRB03KT 1600 R1200/18R BCFG FEW004 05/05 Q1007
        TEMPO 0400 FG BKN002=

Trial situation:

        METAR EHAM 051425Z VRB03KT 1600 R1200/18R BCFG FEW004 05/05 Q1007
        PREV 1200 BCFG BKN004 TEMPO 0400 FG BKN002=

5 minutes later, deterioration, to be reported immediately:

Present situation:

SPECI EHAM 051430Z VRB03KT 0400 R0600/18R FG OVC002 05/05 Q1007
BECMG 1200 BCFG BKN004=

Trial situation:

SPECI EHAM 051430Z VRB03KT 0400 R0600/18R FG OVC002 05/05 Q1007
PREV 1200 BCFG BKN004 TEMPO 0400 FG BKN002=

12 minutes thereafter (the improvement has already been 10 minutes ago…):

Present situation:

SPECI EHAM 051442Z VRB03KT 2000 RP2000/18R MIFG FEW025 05/05 Q1007
TEMPO 0400 FG BKN002=

Trial situation:

SPECI EHAM 051442Z VRB03KT 2000 RP2000/18R MIFG FEW025 05/05 Q1007
PREV 1200 BCFG BKN004 TEMPO 0400 FG BKN002=

Here also the forecaster has to change TREND 3 times in less than 20 minutes (for this station only!!) where the trial TREND remains unchanged.

There is also another advantage: For the users in the trial situation there might be less confusion, because they don't have to ask themselves…is the forecast changed or are only the actual conditions varying????

2.8   In order to facilitate the "new" TREND forecast the current ICAO Annex 3 template needs to be revised.

3.   **CONCLUSION**

3.1   Producing TREND forecasts in a centralised forecasting environment is time consuming and leads to high workload, especially in rapidly changing conditions. This is even more true for automated observations which tend to generate more SPECI or local special reports than in the situation with a human observer.

3.2   Changing the existing practices according to the suggested examples on TREND forecasts will reduce workload and costs, while for users at least the same and possibly more valuable information will be available.

3.3   Representativity of observations as required in Annex 3 is lacking guidance. Since METAR and SPECI, and local routine and local special reports are meant for different use and require different representativity (which is not clearly defined) it may be questioned whether TREND appended to METAR can/should be identical to the TREND in local reports.

4.   **ACTION BY THE AMOFSG**

4.1   The AMOFSG is invited to:

a) note and discuss the information in this paper;

b) ask ICAO to provide guidance on the issue of TREND appended to both METAR and SPECI, and local routine and local special reports; and

c) decide how to proceed, it is suggested that AMOFSG keeps the TREND forecast on the agenda while asking The Netherlands to report on trial results in AMOFSG/9.

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