

**Vereniging van Nederlandse Verkeersvliegers**

**Dutch Air Line Pilots Association**



**Position Paper 07 / 3**

**AUTOMETAR**

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This position paper represents the opinion of the Dutch Air Line Pilots Association based on IFALPA / ECA policy, legislation, scientific research and manufacturer guidelines and recommendations.

## *Issue*

Since 2004 the Royal Netherlands Meteorological Institute (KNMI) has been planning to replace the reporting of actual weather conditions (METAR) during operational hours by a local meteorologist at the regional airports Rotterdam (EHRD), Maastricht (EHBK) and Groningen (EHGG) with an automated reporting system called AUTOMETAR. AUTOMETAR is already active outside operational hours at EHBK and EHGG since May 2004. Due to the fact that EHRD is officially part of “Mainport Schiphol” (EHAM), the AUTOMETAR concept has to be reviewed in order to comply with ATC procedures at EHAM. Therefore it has been decided not to implement AUTOMETAR at EHRD as of yet.

The SPECI reports will be replaced by a similar format called AUTOSPECI. All information described below regarding AUTOMETAR also applies to AUTOSPECI.

## *Introduction*

AUTOMETAR contains the same coded elements as a regular METAR. All data in AUTOMETAR is acquired and processed automatically. Its contents are monitored by a meteorologist (CWRL) who will be located in the KNMI “central weather room” at KNMI’s main location in De Bilt. All coded elements comply with the standards established by the World Meteorological Organization (WMO) and ICAO. The following parameters are available in AUTOMETAR:

- wind
- visibility
- present / significant weather
- clouds, height and coverage
- temperature / dew point
- QNH
- TREND type landing forecast

Additionally there are a number of parameters in AUTOMETAR regarding the technical state of the system. An extensive description of the formats used in AUTOMETAR / SPECI is available with KNMI or VNV.

During the last three years there has been a discussion between KNMI, Dutch ALPA (VNV), and ATC Netherlands (LVNL) about the implementation of AUTOMETAR out of which a number of concerns emerged.

For VNV the main issues concerned the quality of certain parameters of AUTOMETAR, namely the reporting of visibility, clouds and present or significant weather especially the reporting of precipitation at temperatures around freezing level. Inadequate reporting of these parameters can have significant operational consequences for aircrews when assessing icing conditions and runway state, dispatch requirements and fuel planning.

Also the reliability of the system and some legal aspects were points of concern, such as the legal position of air traffic controllers who may be confronted with weather information generated by AUTOMETAR which does not correspond with their own observations.

As a result of this discussion KNMI has worked on a number of improvements of the AUTOMETAR system.

### *Legislation*

Legal basis for KNMI is mainly laid down in regulations concerning aviation meteorological observations (Regeling Luchtvaartmeteorologische Waarnemingen, RLMI). The RLMI is based on ICAO Annex 3 with some additional regulations specific for the Netherlands.

As of November 2007 ICAO Annex 3 contains a recommendation that allows states to use AUTOMETAR during non operational hours and during operational hours as decided by the local meteorological authority in concert with the 'using' parties (Amendment 74 Annex 3, Ch. 4.7.1). Guidance on the use of automatic meteorological observing systems is given in the manual on automatic meteorological observing systems at aerodromes (ICAO Doc 9837).

Accuracy requirements concerning meteorological observations and reports can be found in ICAO Annex 3 Chapter 4 and Attachment A. There are currently no references to AUTOMETAR in IFALPA Annex 3.

### *Technical Issues*

#### *Wind, temperature, dewpoint and QNH*

These parameters are generated by automated systems in standard METAR and there are no differences in reporting these parameters in AUTOMETAR.

#### *TREND type landing forecast*

The TREND group is still made by a meteorologist (CWRL).

#### *Visibility*

Visibility is measured by a Forward Scatter meter (FS). The FS meter measures the permeability of light through a small volume of light. Visibility is then calculated by means of an algorithm.

By using this method, visibility is only measured at one specific position, namely the position of the FS meter. As a result the reported value may not be representative for the airport during inhomogeneous conditions that could be present during fog or shallow mist.

By using multiple FS meter locations in combination with Transmissometers and by determining the average of a large number of measurements, the reporting of visibility has become sufficiently reliable, i.e. in accordance with ICAO annex 3 (Ch.4.6.2 and Attachment A). In addition camera systems are installed as a secondary means of observation to aid the CWRL in monitoring AUTOMETAR visibility reporting.

### *Present / significant weather (SWX) (in casu precipitation)*

Present / significant weather (SWX) is measured by a Present Weather Sensor (PWS), in fact a FS meter which measures precipitation. When Present/SWX is measured at one specific location it may not be representative for the entire airport. Previously the system could not always distinguish different types and intensity of precipitation accurately. Especially reporting of precipitation during freezing conditions (app.  $-4 < T < +3$  C) was inaccurate.

By using multiple FS meters in combination with temperature and moisture measurements and improved algorithms the reporting of Present/SWX has improved. Intensity and type of precipitation is determined by taking the average of a large number of measurements, for example:

Time	PWS Type	PWS Intensity
12:15	RA	2 mm/h
12:16	RADZ	2 mm/h
12:17	DZ	0.2 mm/h
12:18	RADZ	0.8 mm/h
12:19	RA	1.5 mm/h

This would result in RADZ (medium intensity) in AUTOMETAR format. According to KNMI this method of AUTOMETAR reporting corresponds with standard METAR reporting in 84 % of all cases. Although Annex 3 does not specifically address the accuracy of precipitation (Ch. 4.6.4) these results are considered satisfactory.

During freezing conditions the system is conservative in reporting Present/SWX, by always adding FZ to the WX group when precipitation is measured with the wet bulb temperature below 0 C. In this case, FZ is added even when impending freezing conditions exist, thereby creating an acceptable safety margin.

The following conditions are not available in AUTOMETAR: FC, SS, DS, PO, SA, DU, FU, VA, MI, BC, PR, DR and BL. For the Netherlands, MI, BC and PR are still relevant conditions. Pilots should therefore exercise caution when other AUTOMETAR parameters suggest the existence of Low visibility conditions, such as visibility and temperature – dew point spacing.

### *Clouds*

A laser - ceilometer is used to determine cloud height and coverage.

The use of a laser ceilometer also results in a measurement at one specific point, which may not be representative for the whole airport. Cloud height measurement is satisfactory, i.e. comparable with standard METAR in more than 90% of all cases and complies with ICAO Annex 3 (Ch.4.6.5 and Attachment A). Coverage of clouds is determined by averaging the number of measurements during a certain period of time using algorithms. This may result in inaccurate measurements especially during stationary coverage conditions although coverage reporting complies with ICAO annex 3 Ch.4.6.5 and Attachment A.

The system was not capable of determining type of clouds which is especially important in case of CB and TCU activity in the vicinity of an airport.

Determining type of clouds is still limited however detection of CB and TCU has improved sufficiently by correlating convective activity with a combination of weather radar reflections and electrical discharges in a radius of 8 km around the airport. By using this method, the system is also capable of detecting embedded CB activity. This capability is not present in current METAR reporting.

#### *Reliability / redundancy*

According to KNMI, equipment failure is always a possibility, however by applying sufficient redundancy and the availability of contingency procedures, the chances of system failure are considered at least equal to the current system. As such the introduction of AUTOMETAR itself should not have a negative effect on operational procedures.

#### *AUTOMETAR formats*

An extensive overview of all possible formats in METAR and AUTOMETAR reports is available. As mentioned before most parameters in AUTOMETAR are reported in exactly the same way as in regular METAR. For day to day operations there are however a few new formats crews can encounter, of which the following are the most common:

AUTO	This indicates that the report contains parameters generated by automatic observation systems. It should be positioned before the wind group.
////	Whenever the automatic observation system is unable to detect a particular parameter, its group should be replaced by slashes, according to Appendix A page 17.
NDV	No Directional Value. Whenever the visibility group is followed by NDV, it indicates that the automatic observation system is only able to determine visibility at one specific position. Thus the reported visibility may not be representative for the entire airport.
NCD	No Clouds Detected. This group indicates that the automatic observation system has not detected any clouds and there are no limitations in vertical visibility.

#### *Conclusions*

KNMI has aimed at implementing AUTOMETAR August 15<sup>th</sup> 2006, however due to the ongoing discussion with VNV and LVNL this date was postponed to June 5<sup>th</sup> 2007.

At the moment of writing AUTOMETAR is active during operational hours at EHBK and EHGG. KNMI has decided not to implement AUTOMETAR on EHRD yet, for organizational reasons mentioned above.

At the moment of writing ATC Netherlands (LVNL) is in the process of evaluating the performance of the AUTOMETAR system. Until now it seems that there are still some irregularities in the reporting of visibility, i.e. the system reports visibility at specific locations, which may not be representative for the entire airport.

Furthermore the AUTOMETAR system seems to be slow in reporting rapid changes in weather, e.g. passage of showers. In order to improve these particular issues, KNMI is currently installing new ceilometers as well as a higher number of visibility meters.

For VNV, it seems that most of the technical issues mentioned above have been resolved. Also there have not been any reports by pilots which indicate serious problems when operating on AUTOMETAR equipped airports. Therefore, for now AUTOMETAR can be considered to work satisfactory and in compliance with ICAO Annex 3.

A further evaluation of the performance of the system is however highly desirable, therefore VNV will remain involved in any further developments regarding AUTOMETAR and the need for additional requirements or improvements will be addressed directly with KNMI and on ICAO level through IFALPA.