
**WMO AMDAR PANEL
(Fifteenth Session)**

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PROJECTS, PLANNING AND WORK PROGRAMME

Research and Development of New Aircraft Observations Technologies

Report on Activities by the Science and Technical Sub-Group

(Submitted by Axel Hoff)

SUMMARY AND PURPOSE OF DOCUMENT

Overviews are given about the implementation of routine measurements of air constituents on commercial aircraft (IAGOS).

The status of AMDAR's monitoring of icing measurement concepts is reported.

ACTION PROPOSED

1. The Panel is invited to note the information contained in the document.

References:

1. Measurement of Air Constituents by Commercial Aircraft

The IAGOS-ERI project has just been extended up to mid-2013. There is some delay to finalize the status of the infrastructure. The goal is to finalize the status of an AISBL (International Non-Profit Association) which will be legally settled in Belgium. Meteo France (and the CNRM) are supposed to join this AISBL and handle the real time data transmission.

For the technical issues: The RTTU has been built, tested and approved DO160. Tests was done succesfully with E-ADAS (E-AMDAR switch) to relay all messages on th GTS (in BUFR format).

The next project IGAS (IAGOS for GMES Atmospheric Services) will start on the 1st of January 2013. Meteo-France deliverables are the installation and the certification of the RTTU on the D-AIGT Airbus-340.

2. Icing

1.1 Summary of issue and progress made

In the WMO Aircraft Observing System core and long-term activities of the AMDAR Panel and ET-AIR work plan, activities related to icing are:

Activity 4 of 2.1-implement water vapour sensing measurement, that is to promote the standardization of aircraft equipment by merging the interests of meteorology pilots, airlines, ATM, NMHSs, Environmental control for - better deicing warning, - deicing efficiency, - NWP, - contrail warning.

Activity 1 of 2.3-implement icing indication, that is to undertake planning and project coordination in the implementation by Members of icing measurement within the AMDAR Observing System.

Activity 2 of 2.3-implement icing indication, that is to coordinate negotiations for standardisation with aircraft and avionics manufacturers and aviation standards authorities.

These are long term activities and to the knowledge of the STSG coordinator for icing there appears to have been little development on these activities over the year. However an avenue is airborne humidity measurements that could significantly improve the detection and forecast of icing hazard, and this should be used in our communications with various aviation partners about the benefits of AMDAR and humidity measurements.

In the window of high relative humidity and temperatures between 0 and -30 °C the risk of icing is high. Outside of this window the air is safe and the expensive energy consumption for de-icing could be avoided without risk. An automatic support for switching the de-icing could be developed. The humidity information together with temperature and pressure is as well important for identifying the risk of engine icing. In combination with particle measurements, the ice supersaturated regions (ISSR) could be directly identified by each single aircraft. The air traffic control would get a tool to keep the upper atmosphere free of contrails.

On the topic of icing forecasting over and at an airport, the Science and Technology Branch of Environment Canada has been leading the development of the Canadian Airport Nowcasting System (CAN-Now) that includes a capacity to detect and forecast icing (see article by Isaac, G et al, Meteorol. Appl. (2012), published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/met.1342). Short term forecasts of icing over the airport are produced and the team has been trying to verify those forecasts with

microwave radiometers and a vertically pointing radar. The team did get close to producing numbers on the verification and then decided not to include them in the paper because of some problems with the radiometer, but the study is on-going. Airborne measurements of humidity would be beneficial to the project.

1.2 Suggested action for 2013

Advance/promote the activities related to icing in the WMO Aircraft Observing System core and long-term activity list of the AMDAR Panel and ET-AIR work plan. Refine the concept of using airborne humidity measurements for icing detection and forecasting.
