



# Aircraft-based Humidity Measurement

Aircraft-based observations with humidity data are a critical data input to improve weather services for aviation operations

## AVAILABLE AIRCRAFT-BASED HUMIDITY MEASUREMENT SYSTEMS

- FLYHT WVSS-II: Operational on commercial aircraft since 2005
- TAMDAR: Operational on commercial aircraft since 2004
- IAGOS: Operational on commercial aircraft since 1994, under the name IAGOS since 2011

### BENEFITS TO WEATHER COMMUNITY:

Supplements the existing radiosonde network to increase spatial and temporal resolution of upper-air observations.

Since introducing humidity observations to national weather services, the data have improved warnings and forecasts for the following conditions:

- Precipitation type and intensity
- Thunderstorms/Heavy rain/Flooding events
- Low-level wind shear/crosswinds
- Clouds (base/tops amount)
- Low visibility Conditions (IFR and MVFR)
- Icing/Frost/Fog
- Droughts/Wildfire Weather

### BENEFITS TO AIRLINES:

70% of all delays at high-capacity airports are weather related. Better planning for weather events significantly supports flight operations.

Safer and more accurate route planning to avoid severe weather.

Improved forecasts will improve optimization of fuel planning and consumption and reduction of fuel costs and CO<sub>2</sub> emissions.

Improved prediction of conditions favouring contrail production and avoidance.

Customer perception improved due to taking a leading role in reducing emissions footprint and contributing to environmental concerns.

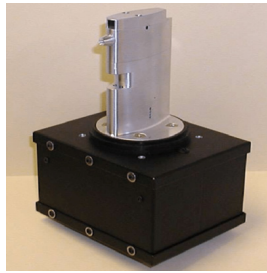
*As extreme weather events continue to increase, we can reduce human impacts and save money by increasing the accuracy of weather forecasts.*



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## FLYHT WVSS-II

- Stand-alone water vapour sensor that uses Tunable Diode Laser Absorption Spectroscopy
- Combine with aircraft AMDAR to measure and report static air temperature, winds, pressure altitude, indicated airspeed, GPS position and time.
- No adjustments or settings necessary by airline partner
- Data are continuously transmitted
- No routine maintenance is necessary and minimal long-term maintenance
- No consumable components to be exchanged
- 15-20+ year lifespan

## TAMDAR

- All-inclusive sensor that measures and reports air temperature, ice presence, static and pressure altitude, relative humidity (two capacitive humidity sensors), turbulence (EDR), winds, GPS lat/long/alt/time
- Data are continuously transmitted over Iridium satellite communication
- 3-5 years lifespan (7 000–8 000 flight hours)

## IAGOS

- Capacitive relative humidity sensor and a platinum resistance sensor for the measurement of the temperature at the humidity sensing surface.
- Measures relative humidity and temperature
- Autonomous deployment over periods of up to 2 months
- Data transmission post flight

## OPPORTUNITY

A complete “end-to-end” solution:

- Proprietary high impact data from aircraft-based sensors
- Real-time data, from anywhere on the planet communicated over various platforms (SATCOM, VHF, HF or Iridium)
- Increased vertical, horizontal and temporal data resolution supplementary to radiosondes
- Provides a measurement of humidity with at least equivalent accuracy to radiosondes and little environmental impact.
- With deployment over 5 or more years, offers a cost-efficient solution to an equivalent radiosonde program

*Superior weather data, forecasting and analytics leading to faster decision-making, more proactive risk mitigation, and lower costs*