



# AIRCRAFT-BASED MOISTURE MEASUREMENT

AIRCRAFT-BASED OBSERVATIONS WITH MOISTURE DATA ARE A CRITICAL DATA INPUT TO IMPROVE WEATHER SERVICES FOR AVIATION OPERATIONS



## AVAILABLE AIRCRAFT BASED MOISTURE MEASUREMENT SYSTEMS

- FLYHT-WVSS-II: Operational on commercial aircraft since 2005
- TAMDAR: Operational on commercial aircraft since 2004

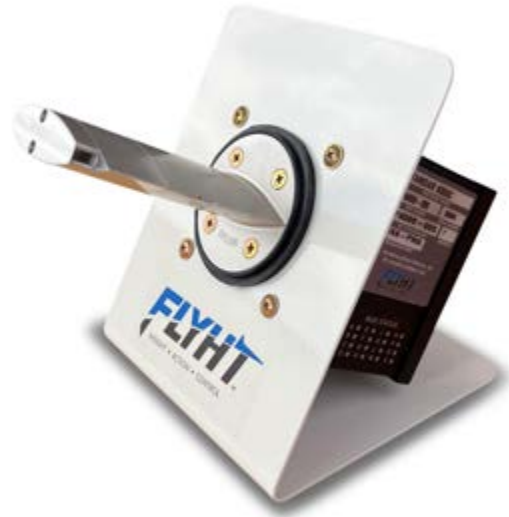
### BENEFITS TO WEATHER COMMUNITY:

- Supplements the existing radiosonde network to increase spatial and temporal resolution of upper air observations
- Since introducing moisture 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 supports significantly 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 CO2 emissions
- Improved prediction of conditions favoring contrail production and avoidance
- Customer perception improved due to taking a leading role in reducing emissions footprint and addressing 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.**



## FLYHT-WVSS-II

- Stand-alone water vapor 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 is required
- No consumable components to be exchanged

## 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 network
- Ideal system for regional aircraft
- 3-5 years lifespan (7000-8000 flight hours)

## 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
- Less expensive than the total cost of radiosondes over 5 years

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

### Additional Resources:

<https://public.wmo.int/en/our-mandate/what-we-do/observations/Aircraft-based-observations>  
[https://library.wmo.int/doc\\_num.php?explnum\\_id=9882](https://library.wmo.int/doc_num.php?explnum_id=9882)  
<https://community.wmo.int/activity-areas/wmo-iata-collaborative-amdar-programme/benefits/amdar-benefits>  
<https://community.wmo.int/activity-areas/aircraft-based-observations/resources/papers-and-references>

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