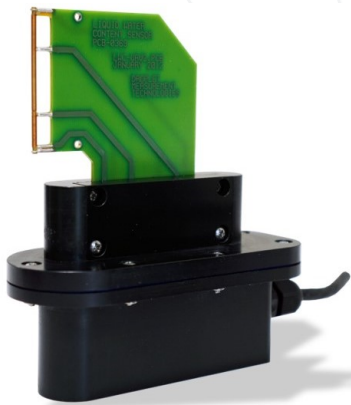


UAV-LWC

Unmanned Aerial Vehicle Liquid Water Content Sensor



Outcome

The Unmanned Aerial Vehicle Liquid Water Content Sensor (UAV-LWC), oftentimes referred to as the "King Probe", is used primarily for the study of cloud micro-physical processes, aircraft icing studies, aircraft icing certifications and cloud seedings while mounted on UAV platforms. Understanding the mass of water in a cloud is important because it helps determine cloud formations and the types of clouds most likely to produce rain; this is beneficial in drought-laden areas and for weather forecasting models.

Overview

The UAV-LWC operates under the principle that liquid water content can be calculated from measuring the heat released when water droplets are vaporized. A heated cylinder is exposed to the airstream and intercepts oncoming droplets. The electronics maintain this sensor at a constant temperature (approximately 150°C) and monitors the power required to regulate the temperature as droplets vaporize. This power is directly related to the amount of heat taken away by convection plus the heat of vaporization. The convective heat losses are known empirically and vary with airspeed, ambient temperature and ambient pressure. The liquid water content is calculated from total power requirements minus convective power losses.

Applications

- Precipitation characterization
- Weather modification
- Cloud physics research

Advantages

The UAV-LWC is a tiny sensor which measures liquid water content (LWC) from 0.05 to 3 g/m³. It can be easily mounted on manned or unmanned aircraft, cooling towers, and spray rigs. It is ideally suited for applications where the precise measurement of LWC is needed.



Product Specifications

UAV-LWC Specifications:

- Measured parameters: Liquid water content
- Measured LWC range: 0 – 3 g/m³
(Measured range depends on airspeed, temperature, and pressure. 0 – 3 g/m³ is typical)
- Air speed range: 0.24 mm²
- Air speed range: 0 – 200 m/sec
- Special features:
 - Interchangeable circuit card sensor
 - DSP control

Environmental Operating Conditions:

- Temperature: 0°C to 40°C
- Altitude: 0 to 12,200 meters
- Relative humidity: 0-100%

Data System and Power Requirements:

- Serial output rate: 1hz or 10hz
- Control frequency response:>25 Hz
- Output type: Serial, RS-422, 115, 200 baud rate
- Software: Particle Analysis Data Software (PADS), included
- Power requirements:
 - Operating power: 28 VDC, 7.5 A maximum

Weight:

- Probe: 466g
- Probe dimensions:
 - Sensor strut: 4.5cm W x 10.5cm L x 13.3cm H
 - Electronics with mounting plate: 5.3cm W x 12.7cm L x 3.8cm H

Available Accessories

- Non-heated sensors
- Science Care Program
- 1 and 2 Year Extended Warranty
- Lifecycle Care Program

The Droplet Guarantee

Droplet understands how the versatility and performance of an instrument can impact your research, career, and the world we live in. As you strive to provide a better understanding of our planet, we guarantee to be here to support you through your journey.

Whether you are establishing your first laboratory or are a tenured researcher; we have a team of scientists, engineers, and technical staff available to assist with application questions, technical support, data analysis, and training.



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