# CopterSonde 3

## WxUAS Boundary Layer Vertical Profiler
## Technical Data Sheet

**Purpose-built, Rotary-wing UAS for Boundary Layer Profiles**

The CopterSonde 3* reimagines boundary layer observations by combining the efficiency of UAS-based operations with proven radiosonde-quality sensors. This breakthrough technology offers exciting new opportunities for atmospheric research *and* operational meteorology.

Three Air Temperature and Humidity sensors are mounted in a custom-built enclosure with a front-facing intake duct to protect the sensors and supply undisturbed air for sampling. A programmable, integrated fan ensures proper aspiration at 10 m/s for consistent data quality. All system elements are designed to isolate the PTU sensors from electronic and physical interference.

**A Comprehensive Observation Platform**

The CopterSonde 3 is a complete, turn-key design that measures all atmospheric variables observed by traditional radiosondes (Air Temperature, Humidity, Barometric Pressure and Wind Speed/Direction). The intake scoop is a modular design that allows for future development of pollution and gas sensing options.

Autonomous and semi-autonomous flight modes allow the aircraft to be used as a radiosonde analog - producing conventional met data products ready for input to forecast models. Raw data and standardized meteorological messages allow for many data plot options including Skew-T Log-P, hodograph and contour data visualizations.

**Wind Vane Flight Mode**

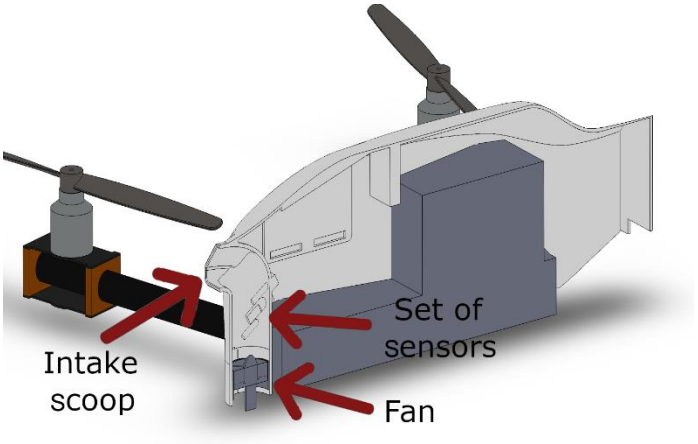
CopterSonde 3 uses proprietary algorithms working in tandem with the aircraft's autopilot and inertial measurement units (IMUs) to adaptively turns the drone into the wind. Wind speed is calculated from the energy required to keep the aircraft horizontally stationary while profiling vertically, eliminating the need for an auxiliary anemometer.

**Wireless Data Streaming in Real-Time**

Weather data and messages are sent to the ground station in real-time using the Micro Air Vehicle Link (MAVLink) protocol. Sensors and messages can be monitored without the need for cloud-based post processing. Users have immediate access to data in real time, with more extensive information stored on removable media.

**A World-Class Team**

The Coptersonde project brings together the University of Oklahoma - one of the world's leading centers of atmospheric research and engineering, with InterMet System's 25 years' experience building operational radiosondes. The result is a high-quality, sensor-oriented design *at an affordable price.*

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** Patent Pending*
*Specifications Subject to Change without Notice*
*Document 244001-12*

# Platform Technical Specifications

| Drone Dimensions | |
|---|---|
| Weight (ex. battery) | 1.5 kg (3.3 lbs) |
| Average All-up Weight | 2 kg (4.4 lbs) |
| Diagonal | 51 cm |
| Height | 15 cm |

| Communications | |
|---|---|
| Telemetry Frequency (Data) | 915 MHz |
| Flight Controller Frequency | 2.4 GHz |
| Transmission Distance | up to 5 km |
| ADSB Equipped | Yes |
| Remote ID Compliance | Yes |
| System Computer | Toughbook Model 55 |

| Field Cases | |
|---|---|
| Primary (Drone) | Pelican 1650: 81x52x32 cm |
| Batteries and Charger | Pelican 1520: 51x41x19 cm |

| Propulsion Systems | |
|---|---|
| Motors | Brushless DC |
| T-Style Propeller Material | Polymer |
| Attachment Style | Screws |

| Power | |
|---|---|
| Battery Type | 4S LiIon |
| Capacity | 8000 mAh |
| Typical Flight Endurance | 15 min |
| High Wind Failsafe Return | Included |

*Standard system includes up to eight batteries with charger*

## Meteorological Specifications

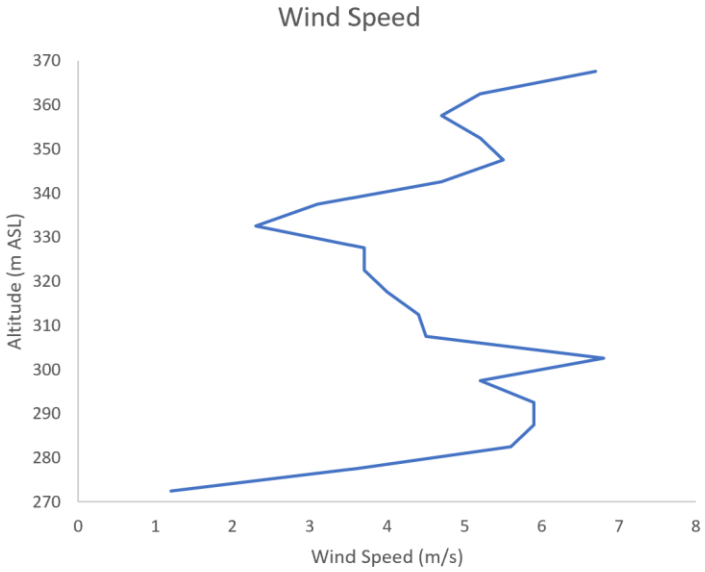
| Thermodynamic | |
|---|---|
| Primary Variables | Pressure, Temperature, Humidity |
| Derived Variables | $T_d$, $T_v$, $\theta$, $\theta_e$, $\theta_\omega$, r, $r_s$, q, $q_s$, e, $e_s$, LCL, $\Gamma$ |
| Accuracy | T: ± 0.3 °C<br>RH: ± 5 %<br>p: ± 1.5 mbar |
| Raw Data Rate | 4 Hz |

| Kinematic | |
|---|---|
| Primary Variables | Tilt Angles |
| Derived Variables | Horizontal wind speed and direction |
| Accuracy | Wind Speed: ± 0.6 m/s<br>Wind Direction: ± 4° |
| Raw Data Rate | 4 Hz |

| Available Meteorological Messages | |
|---|---|
| Altitude Message | 5 m height levels |
| NetCDF | WMO Specified |


## Operating Conditions

| | |
|---|---|
| Mean Wind Speed | 19 m / s (37 knots) |
| Max Wind Gust | 22 m / s (43 knots) |
| Maximum Flight Ceiling MSL | 3 km (~10,000 ft) |
| Maximum Flight Altitude | 1.5 km AGL |
| Recommended Operating Temp. | -20 to 40 °C |
| Typical Ascent Rates | 1 – 5 m / s |
| Typical Descent Rates | 1 – 6 m / s |

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