Artium

*High-precision measurement systems for energy, environmental, and industrial applications*


**Aircraft Icing and Meteorology Research**

**Droplet Size, Velocity and Time-of-Arrival**

**Number Density**

**Liquid Water Content**

**Liquid Volume Flux**

*Built-in DPSS laser for long life and stable operation*

*Fully heated for cold weather operation (to -40$^0$C)*

*Dual size range; data automatically merged for extended size range*

*Single electronics cable with watertight connectors*

# PDI Dual Range Flight Probe

**The PDI Flight Probe** has been developed specifically for aircraft-based cloud studies that require the measurement of liquid droplet size distribution, velocity distribution, number density, and liquid water content (LWC). The probe incorporates the well established phase Doppler technique for directly measuring the size and velocity of individual droplets in the cloud. The measurement method is sensitive only to spherical particles and therefore non-spherical ice crystals are rejected. Furthermore, the probe has the ability to differentiate between liquid droplets and droplets that are frozen. The PDI Flight Probe overcomes the inherent problems, such as depth-of-focus, measurement uncertainty, and coincidence errors in high number density environments, faced by older and obsolete measurement technologies which are based on forward light scattering.

The PDI Flight Probe offers turnkey operation with a fully automated setup feature. The flight probe system can be used for the real-time, non-intrusive measurement of individual droplet size and single velocity component in a variety of flight and windtunnel applications. The complete instrument includes the flight probe (including the optical transmitter and receiver), ASA signal processor, and the AIMS system software. The diode-pumped solid state (DPSS) laser used in the probe provides stability, compactness, ruggedness, and high reliability; it eliminates the need for inefficient and unreliable fiber optics. The **PDI-FPDR** system has optional built-in heaters to prevent ice accretion. This allows the flight probe to be used under extreme icing environments without any signal loss.

This probe was developed with funding support from the U.S. Navy, U.S. Army, and NASA Glenn Research Center.

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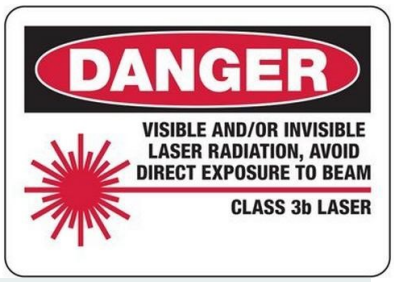
## Technical Specifications:




| | |
|---|---|
| Size Range | 0.5 to 2500 µm |
| Velocity Range | 1 to 500 m/s |
| Size Resolution and Accuracy | + /- 0.5 µm |
| Liquid Water Content (LWC) | 0 to 50 g/m^3 |
| LWC Resolution | 0.1 g/m^3 |
| LWC Uncertainty | <10% |
| Instrument Weight | ~15 kg |
| Approximate Dimensions | L = 100 cm, W = 180 cm, H = 180cm |
| Power/Voltage | 12 – 52 VDC or 120 – 240 VDC |


US Patents: 7, 126, 694 B1, 7, 564, 564 B2, 7, 788, 067 B2, 8, 525, 093 B2 EPO Patent: EP 1 855 081 B1

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