

## Instruments Details

The details of instruments are as follows:

VARIABLE	INSTRUMENT	RANGE	ACCURACY	RESOLUTION	FREQUENCY
Air temperature	Rosemount 102DB1CB	-50°C to +50°C	0.1°C	0.01°C	1 Hz
Air temperature (reverse flow)	0.038" DIA. Bead Thermistor	-30°C to +50°C	0.05°C/0.3°C incl DHC	0.01°C	< 1 s TC
Relative humidity (reverse flow)	Thermoset Polymer RH Sensor	0 to 100% RH	2% RH	0.1% RH	5 s TC @ 20°C
Barometric pressure	MEMS Pressure Sensor	0 to 110000 Pa	100 Pa	10 Pa	20 Hz
u wind component	Extended Kalman Filter (EKF)		0.50 m/s @ 75 m/s TAS	0.01 m/s	5 Hz
v wind component	Extended Kalman Filter (EKF)		0.50 m/s @ 75 m/s TAS	0.01 m/s	5 Hz
w wind component	Extended Kalman Filter (EKF)		0.50 m/s @ 75 m/s TAS	0.01 m/s	5 Hz
Position (Lat./Long.)	WAAS DGPS		2 m (2 □)	< 1 m	5 Hz
Altitude	WAAS DGPS	-300 to 18000 m	5 m (2 □)	< 1 m	5 Hz
Geometric Altitude	King KRA 405 Radar Altimeter	0 to 2000 ft	3% < 500 ft 5% > 500 ft	0.48 ft (0.15 m)	
Roll Attitude (°)	MEMS IMU/GPS/EKF	-60 to +60°	0.1°	0.01°	5 Hz
Pitch Attitude (°)	MEMS IMU/GPS/EKF	-60 to +60°	0.2°	0.01°	5 Hz
Yaw Attitude (°)/ Heading	MEMS IMU/GPS/EKF	0 to 360°	0.1°	0.01°	5 Hz
Angle of attack (°)	MEMS Pressure Sensor	-15 to +15°	0.03° @ 150 m/s	0.001° @ 150 m/s	20 Hz
Side-slip (°)	MEMS Pressure Sensor	-15 to +15°	0.03° @ 150 m/s	0.001° @ 150 m/s	20 Hz
True Air Speed	MEMS Pressure Sensor	0 to 150 m/s	0.1 m/s	0.01 m/s	20 Hz

Logging, telemetry & event markers	ESD DTS (GPS)				1 Hz
Cloud droplet spectra	DMT CDP	2 to 50 $\mu\text{m}$		1 to 2 $\mu\text{m}$ , 30 bins	1 Hz
Cloud particle spectra	DMT CIP	25 to 1550 $\mu\text{m}$		25 $\mu\text{m}$ , 62 bins	1 Hz
Cloud particle image	DMT CIP	25 to 1550 $\mu\text{m}$		25 $\mu\text{m}$	
Liquid water content	DMT LWC-100	0 to 3 $\text{g}/\text{m}^3$	0.05 $\text{g}/\text{m}^3$	0.01 $\text{g}/\text{m}^3$	1 Hz
Liquid water content	CDP calculated	> 3 $\text{g}/\text{m}^3$			1 Hz
Isokinetic aerosol inlet	Brechtel double diffuser inlet	28 lpm			100 m/s
Aerosol spectrometer	PMS PCASP SPP-200	0.1 to 3 $\mu\text{m}$		0.02 $\mu\text{m}$ , 30 bins	1 Hz
CCN	DMT CCN counter	0.5 to 10 $\mu\text{m}$ 0.1 to 1.2 % SS	see text	0.5 $\mu\text{m}$ , 20 bins	1 Hz

### Trace Gases

Measurement	Range	Measurement	Range
O <sub>3</sub>	1 ppb – 100 ppm	NO/NO <sub>y</sub>	0.2-200 ppb
SO <sub>2</sub>	0.3-200 ppb	H <sub>2</sub> S	
CO	<5 ppb	Syringe* samples for laboratory analysis	
CO <sub>2</sub>	Canister* samples for laboratory analysis		
NO/NO <sub>2</sub> /NO <sub>y</sub>	NO ~10 ppt @ 10 s, NO <sub>2</sub> ~50 ppt @10 s, NO <sub>y</sub> ~100 ppt @10 s		

# Air craft - N361 JC



**CDP –Cloud Droplet Probe –Measures cloud droplet size (3 $\mu$ m-50 $\mu$ m)**



**CIP – Cloud Imaging Probe – measures droplet ( 25 $\mu$ m -1.55mm)**



# PCASP – Passive Cavity Aerosol Spectrometer Probe

Measures aerosol particle ( 0.1  $\mu\text{m}$  – 3  $\mu\text{m}$ )



# AIMMS-20 Aircraft Integrated For Meteorological Measurement Software -20 Hz



# LWC 100 – Hot Wire Liquid Water Sensor





# Portable Aethalometer (Black carbon)

