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 (^{o})	MEMS IMU/GPS/EKF	-60 to +60°	0.1°	0.01°	5 Hz
Pitch Attitude (^{o})	MEMS IMU/GPS/EKF	-60 to +60°	0.2°	0.01°	5 Hz
Yaw Attitude (^{o})/ Heading	MEMS IMU/GPS/EKF	0 to 360°	0.1°	0.01°	5 Hz
Angle of attack (^{o})	MEMS Pressure Sensor	-15 to +15°	0.03° @ 150 m/s	0.001° @ 150 m/s	20 Hz
Side-slip (^{o})	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 µm		1 to 2 µm, 30 bins	1 Hz
Cloud particle spectra	DMT CIP	25 to 1550 µm		25 µm, 62 bins	1 Hz
Cloud particle image	DMT CIP	25 to 1550 µm		25 µm	
Liquid water content	DMT LWC-100	0 to 3 g/m^3	0.05 g/m^3	0.01 g/m^3	1 Hz
Liquid water content	CDP calculated	> 3 g/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 µm		0.02 µm, 30 bins	1 Hz
CCN	DMT CCN counter	0.5 to 10 µm 0.1 to 1.2 % SS	see text	0.5 µm, 20 bins	1 Hz

Trace Gases

Measurement	Range	Measurement	Range
O_3	1 ppb – 100 ppm	NO/NOy	*0.2-200 ppb*
SO_2	0.3-200 ppb	H_2S	
CO	<5 ppb	Syringe* samples for laboratory analysis	
CO_2	Canister* samples for laboratory analysis		
$NO/NO_2/NO_y$	NO ~10 ppt @ 10 s, NO_2 ~50 ppt @10 s, NO_y ~100 ppt @10 s		

(Ground Base Instruments)

Micro Rain Radar

Dropsize Distribution Measurement (Disdrometer)
Vertical profiles of rain rate, LWC , Fall velocity and drop size distribution
Monitoring of the melting layer
Calibration of weather radar signals

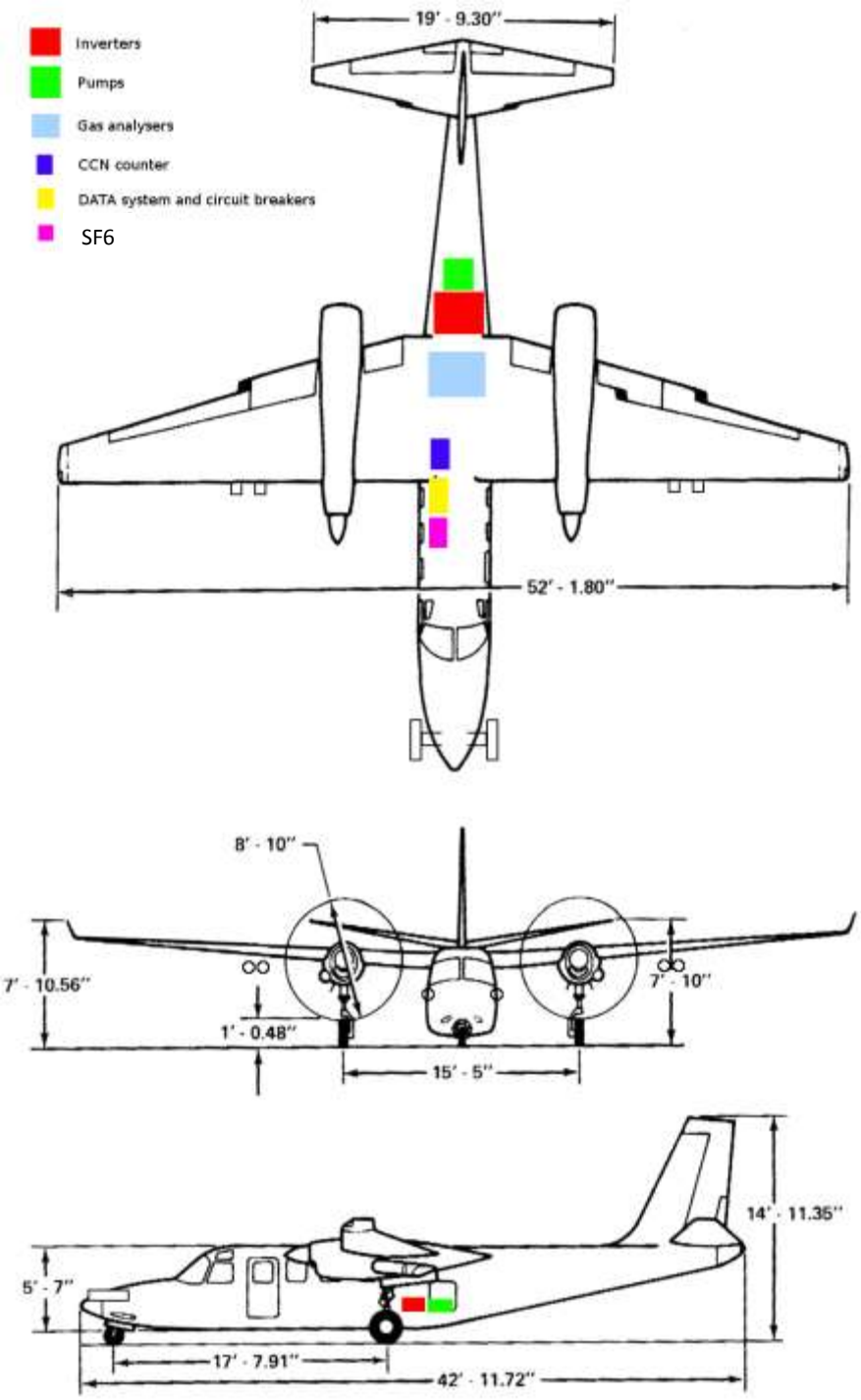
Optical Disdrometer

Measures size and fall velocity of hydrometeors
Sampling area: ~50 cm2, varies with drop diameter
Number of size and velocity bins: 32 x 32 matrix
Drop size range: 0.06-24.5 mm
Velocity range: 0.05-20.8 m/sec

MICRO TOPS

Measures Aerosol Optical Depth (AOD) at 380, 440, 500, 675, 870 & 1020 nm
Estimates Total Column Precipitable Water Vapor (in cm) using 940 nm absorption band
Estimates Total Column Ozone (in DU) using UV absorption band

Air Craft Details

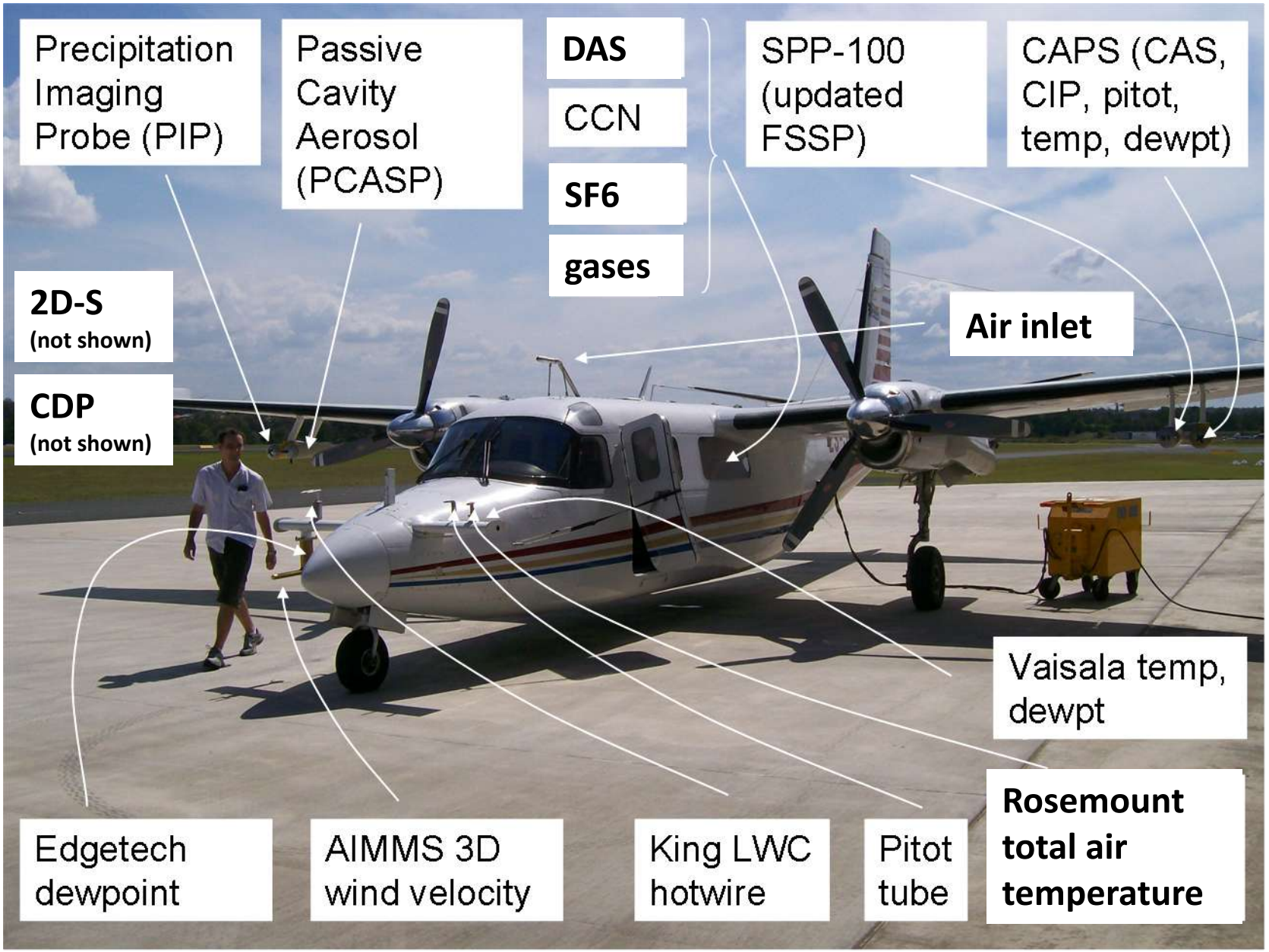


Aero Commander 690A
ZS-JRA

Aero Commander Technical Information

- Aircraft length: 44'4.25''
- Aircraft wingspan: 46'6.64''
- Aircraft height: 14'11.35''
- Maximum gross weight: 10 250 lbs
- Nominal operating altitude: 25 000' to 28 000' AMSL
- Maximum operating altitude: 31 000' AMSL
- Minimum speed: 82 KTS Nominal cruise speed: 245 KTS
- Maximum speed: 260 KTS @ 25000' (as equipped)
- Nominal sampling speed: 100 to 180 KTS
- Nominal rate of climb: 1200'/min@ 18000' & 120KTS & 10000lbs
- Maximum rate of climb: 3400'/min@ 2000'MSL & 140KTS & 9000lbs
- Endurance with maximum fuel: 5.5 HRS @ 5000'MSL & 150KTS (no reserve)
- Crew Capacity: 1 to 4 (with instrument racks)

Air Craft Instruments



DAS = PADS (Labview based) data acquisition system
2D-S, CDP = not shown here - will be added for CAIPEEX

Gases = all required trace gas analyzers for CAIPEEX

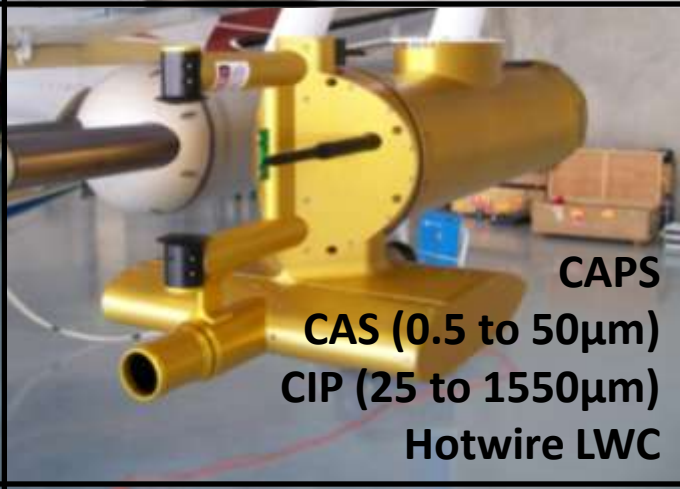

Rosemount
temp


AIMMS winds
temp, RH

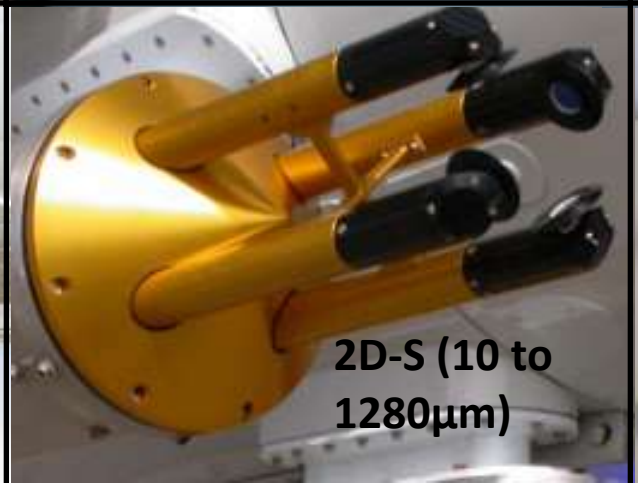

King hotwire LWC


PCASP SPP-200 (0.1 to 3µm)


FSSP SPP-100 (3 to 47µm)


CAPS
CAS (0.5 to 50µm)
CIP (25 to 1550µm)
Hotwire LWC


CDP (2 to 50µm)


2D-S (10 to
1280µm)


PIP (100 to 6200µm)

Rosemount temp

AIMMS winds temp, RH

King hotwire LWC

PCASP SPP-200 (0.1 to 3µm)

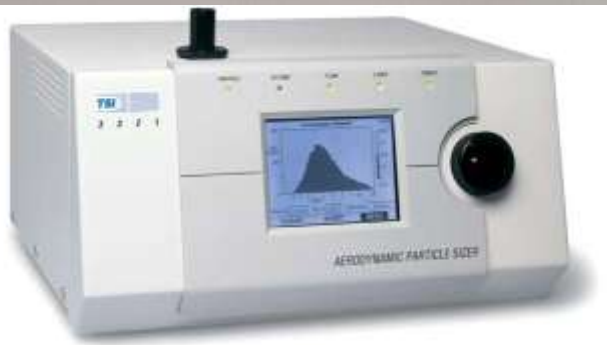
CDP (2 to 50µm)

CIP (25 to 1550µm)

Portable Aethalometer

(Black carbon)

Scanning Mobility Particle Sizer (SMPS)



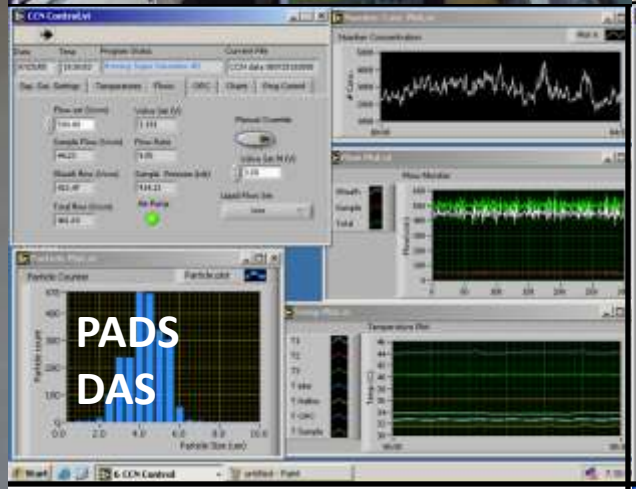
Aerodynamic Particle Sizer (APS) Spectrometer

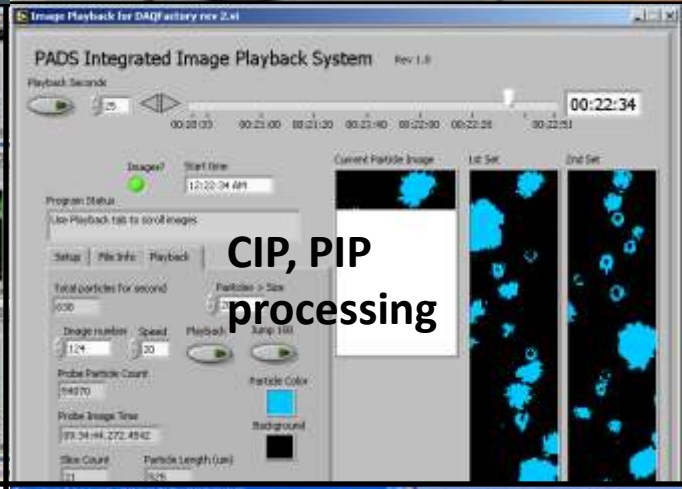

Isokinetic inlet


Trace gas analyzers

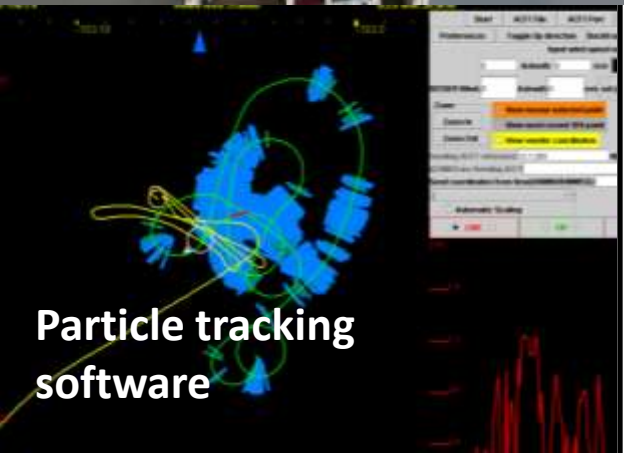

SF6 detector


CCN counter

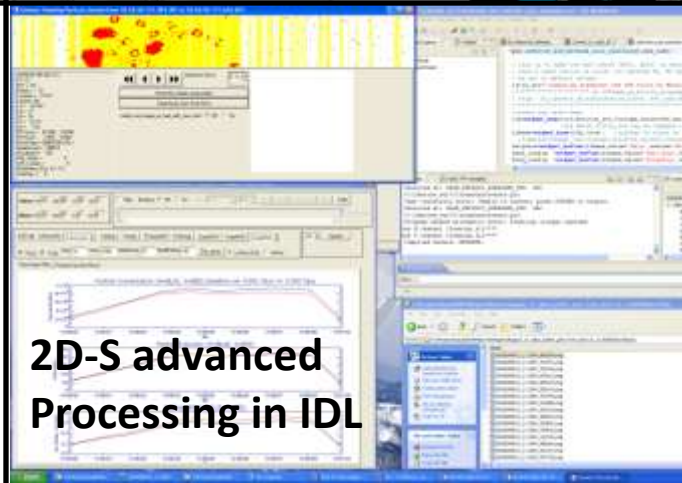

PADS DAS



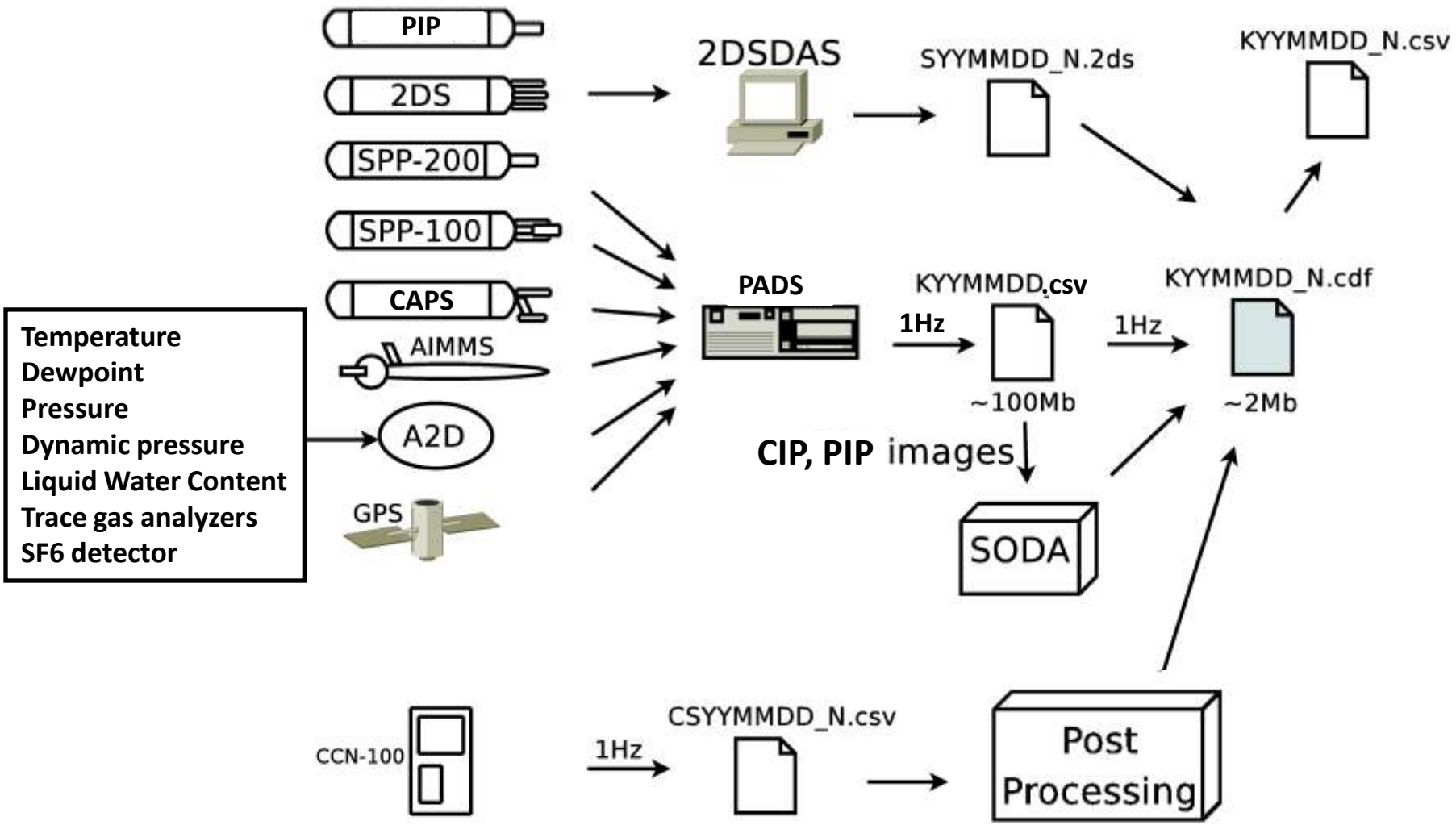
CIP, PIP processing


Particle tracking software

Advanced data processing in Python and Labview


2D-S advanced Processing in IDL

Advanced data processing methods



Seeder Aircraft - Ayres Turbo Thrush

A Two-seater, single engine aircraft equipped with salt seeding capability with SF_6 dispenser, along with wing-mounted hygroscopic flares for warm cloud seeding.

Turbo Thrush Technical Information

Total Length :	32.808 ft	10.000 m
Greatest height :	9.186 ft	2.800 m
Wingspan :	44.291 ft	13.500 m
Wing area :	326.149 sqft	30.300 qm
Max. speed :	138 kts	256 km/h
Cruising speed :	130 kts	241 km/h
Initial climb rate :	1732.28 ft/min	8.80 m/s
Wing load :	18.45 lbs/ft2	90.00 kg/qm
Range :	664 nm	1230 km
Maximum Weight carried	2399.0 lbs	1088.0 Kg