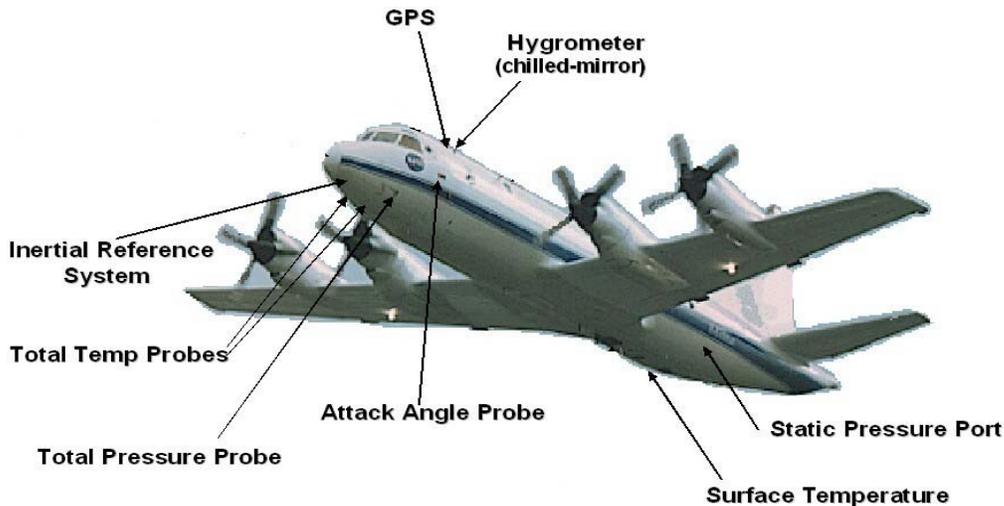


P-3B Supporting Measurements Data System (PDS)

Basic aircraft housekeeping data will be recorded (10 Hz) and distributed to investigator stations onboard the Wallops P-3B aircraft via a centralized Project Data System (PDS). The PDS is a data acquisition, display, and distribution system for base meteorological and navigational measurements onboard the P-3B aircraft. This system is comprised of PC-based high speed CPU computers, network server, video cameras, visual displays, and instrumentation required for supporting meteorological measurements. The PDS will also have the capability to interface with aircraft flight systems using ARINC-429 data format and a data/video distribution system via Ethernet, serial, and RGB video interface networks.

The data acquisition computers and server are interconnected and host the internal ethernet and serial network interface. This local network can be extended to include onboard video, printer, FTP, and WWW servers for data displays and exchange. The data acquisition computer collects data from various sources on the aircraft via an ARINC-429 bus interface. These sources will be augmented to include the Flight Management System (FMS), Inertial Navigation Unit (INU), Air Data Computer (ADC), Global Positioning System (GPS), and Micro Air Data Transducer (MADT). Data from additional meteorology sensors (temperature, dew/frost point, pressure, etc) are sampled and collected using high-speed analog/digital (A/D) and digital I/O interfaces. These signals are converted to engineering units and utilized to make necessary flight parameter calculations. Respective aircraft instruments and sensors previously included in the P-3B flight payload configuration are shown below.

Supporting Measurement Instrumentation/Sensors



Real Time Data Distribution Systems

Real-time displays of selected housekeeping and ancillary data sets during flight are provided on the P-3B via a RGB and ethernet distribution system. These displays are viewable on any computers with ethernet access to the onboard network or selected flat-panel LCD monitors

which can be independently selected. Ethernet access points and monitors will be distributed throughout the P-3B to provide visual access to all PIs. Accessible displays include (1) alphanumeric displays of selected flight parameters, (2) graphical displays of selected flight parameters, (3) profile and real-time plots, (4) nadir and forward-viewing cameras, (5) flight track with selected flight and surface information.

The data distribution system transmits selected flight data electronically via RS-232 serial data link at 1 Hz throughout the aircraft at a transmission rate of 19.2K baud. All data parameters are in engineering units. The data stream is constructed as one (1) block of parameters as defined by the science team.

The PDS will also provide GPS data and a standard IRIG-B signal synchronized to UTC as generated from an onboard GPS. The IRIG-B signal may be used by investigators when a timing accuracy better than 1 second is required.

Instrumentation/Sensor Specifications

PARAMETER	SENSOR	RANGE	RESOLUTION	ACCURACY	RESPONSE
Dew/frost point	GE 1011B Hygrometer	+30 to -50 °C	0.03°C	±0.6°C	2sec-10min
Static Air Temperature	Rosemount model 102	+50 to -50 °C	0.006°C	±0.2°C	2 Hz
Total Pressure	Rosemount MADT 2014	30 to 1300 mb	0.02 mb	± 0.25 mb	64 Hz
Static Pressure	Rosemount MADT 2014	30 to 1300 mb	0.01 mb	±0.25 mb	64 Hz
Dynamic Pressure:	Rosemount MADT 2014	4 to 1000 mb	0.02 mb	± 0.50 mb	64 Hz
Pressure Altitude	Rosemount 2014MA1A	-2K to 75K ft	0.5 ft	± 8 ft	32 Hz
Time	Truetime XL601 GPS	UTC	1 µsec	2 µsec	1µsec
True Heading	Honeywell INS	0 to 360°	0.1°	±0.2°	25 Hz
Pitch	Honeywell INS	±180°	0.0002°	±0.1°	50 Hz
Roll	Honeywell INS	±180°	0.0002°	±0.1°	50 Hz
Vertical Velocity	Honeywell INS	±32768 ft/min	1 ft/min	NA	25 Hz
N/ S Velocity	Honeywell INS	±4096 m-s ⁻¹	0.0125 kts	NA	25 Hz
E/W Velocity	Honeywell INS	±4096 m-s ⁻¹	0.0125 kts	NA	25 Hz
Wind Speed	Honeywell INS	0 to 255 kts	0.00025 kts	±2 kts	10 Hz
Wind Direction	Honeywell INS	0 to 360 °	0.00017 °	±5 °	10 Hz
Ground Speed	Honeywell INS	0 to 4096 kts	0.125 kts	NA	10 Hz
GPS Latitude	GPS	±180 °	1.716E-4 deg	±15 m	1 Hz
GPS Longitude	GPS	±180 °	1.716E-4 deg	± 15 m	1 Hz
GPS Altitude	GPS	±131072	0.125 ft	± 30 m	1 Hz