

NASA 2023 IMPACTS P-3 Aircraft Configuration

Revision History

2021/11/02 – Written by Kendra Sand

2021/12/03 – Updated for IMPACTS 2022 Configuration by David Delene

2021/12/13 – Updated with IP address by David Delene

2022/06/27 – Updated for IMPACTS 2023 w/ addition of Probe Canister section by Jennifer Moore

2022/09/16 – Updated for IMPACTS 2023 Rack Configurations by Jennifer Moore

2022/11/03 – Updated for IMPACTS 2023 Rack Configurations by David Delene

Instrumentation Summary

List of instruments on the NASA P-3 Orion Research Aircraft (N426NA). Instrument owners include the University of North Dakota (UND), National Aeronautics and Space Administration (NASA), United States Army (Army). Manufacturers include Droplet Measurement Technologies (DMT), and Science Engineering Associates, Inc. (SEA).

Acronym	Full Name	Manufacturer	Model #	Serial #	Owner
2D-S	Two-Dimensional Stereo Optical Array Probe	SPEC		012	UND
CAPS	Cloud, Aerosol, and Precipitation Spectrometer	DMT	AAA-0009	5	Army
CDP	Cloud Droplet Probe	DMT	CDP	0901-048	UND
Hawkeye	Hawkeye	SPEC			NASA
HVPS3-A	High Volume Precipitation Spectrometer (Horizontal)	SPEC	HVPS3	H004	NASA
HVPS3-B	High Volume Precipitation Spectrometer (Vertical)	SPEC	HVPS3	H016	UND
King Probe	King Hotwire Probe	PMS	KLWC-5	33087-1294-58	UND
M300	M300 Data Acquisition Unit	SEA	300	3115	UND
RICE-A	Rosemount Icing Detector	Collins Aerospace	0871ND4		NASA
RICE-B	Rosemount Icing Detector	Collins Aerospace	0871ND4		Citation
Pitot Static	Pitot Static Pressure Transducer	Setra	270		UND
Pitot Dynamic	Pitot Dynamic Pressure Transducer	Setra	239		UND
WCM-3000	Multi-Element Water Content System	SEA	3000		NASA

Analog to Digital Board

Ch	Tag	Description	Range	Cal-Slope	Cal-Offset	Calibration	Status
0	100	Spare	5 Volts	1.0	0.0	N/A	N/A
1	101	Spare	5 Volts	1.0	0.0	N/A	N/A
2	102	Spare	5 Volts	1.0	0.0	N/A	N/A
3	103	Spare	5 Volts	1.0	0.0	N/A	N/A
4	104	Pitot Static Wing	5 Volts	4.0	0.0	N/A	Installed
5	105	Pitot Dynamic Wing	5 Volts	1.0	0.0	N/A	Installed
6	106	Spare	5 Volts	1.0	0.0	N/A	N/A
7	107	Spare	5 Volts	1.0	0.0	N/A	N/A

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8	108	Spare	5 Volts	1.0	0.0	N/A	N/A
9	109	Spare	5 Volts	1.0	0.0	N/A	N/A
10	110	King Slave	10 Volts	1.0	0.0	2008	Installed
11	111	King Signal	10 Volts	10.0	0.0	2008	Installed
12	112	Spare	5 Volts	1.0	0.0	N/A	N/A
13	113	Spare	5 Volts	1.0	0.0	N/A	N/A
14	114	Spare	5 Volts	1.0	0.0	N/A	N/A
15	115	Spare	5 Volts	1.0	0.0	N/A	N/A
16	116	Spare	5 Volts	1.0	0.0	N/A	N/A
17	117	Spare	5 Volts	1.0	0.0	N/A	N/A
18	118	Spare	5 Volts	1.0	0.0	N/A	N/A
19	119	Spare	5 Volts	1.0	0.0	N/A	N/A
20	120	Spare	5 Volts	1.0	0.0	N/A	N/A
21	121	Spare	5 Volts	1.0	0.0	N/A	N/A
22	122	Spare	5 Volts	1.0	0.0	N/A	N/A
23	123	Spare	5 Volts	1.0	0.0	N/A	N/A
24	124	Spare	10 Volts	1.0	0.0	N/A	N/A
25	125	Spare	10 Volts	1.0	0.0	N/A	N/A
26	126	Spare	10 Volts	1.0	0.0	N/A	N/A
27	127	Spare	10 Volts	1.0	0.0	N/A	N/A
28	128	Spare	10 Volts	1.0	0.0	N/A	N/A
29	129	Spare	10 Volts	1.0	0.0	N/A	N/A
30	130	Spare	10 Volts	1.0	0.0	N/A	N/A
31	131	Spare	10 Volts	1.0	0.0	N/A	N/A

Serial Boards External (ext) and #1 (Bluestorm Card Inside M300)

Interface (Ch)	Tag	Instrument Description	Type	Setup	Baud Rate	Status
/dev/ser1 (ext)	N/A	M300 Software Key (Back of M300)	N/A	N/A	N/A	Installed
/dev/ser2 (1)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser3 (2)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser4 (3)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser5 (4)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser6 (5)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser7 (6)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser8 (7)	6200	Cloud Droplet Probe (422)	422	8-N-1	230,400	Installed
/dev/ser9 (8)	10102	Rosemount Ice Detector RICE-A (422)	422	8-N-1	230,400	Installed

Serial Boards #2 (Bluestorm Card Inside M300)

Interface (Ch)	Tag	Instrument Description	Type	Setup	Baud Rate	Status
/dev/ser10 (1)	N/A	Spare RS232	232	N/A	N/A	N/A

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/dev/ser11 (2)	N/A	Spare RS232	232	N/A	N/A	N/A
/dev/ser12 (3)	N/A	Spare RS422	422	N/A	N/A	N/A
/dev/ser13 (4)	N/A	Spare RS422	422	N/A	N/A	N/A
/dev/ser14 (5)	N/A	Spare RS422	422	N/A	N/A	N/A
/dev/ser15 (6)	N/A	Rosemount Ice Detector RICE-A (422)	422	8-N-1	230,400	Installed
/dev/ser16 (7)	N/A	WCM-3000 1-wire	422			Installed
/dev/ser17 (8)	6200	WCM-3000 Data	422			Installed

Data System Cards

Interface	Tag	Instrument Description	Serial #	Owner	Status
0x4B001	100-131 ?	S Bus A/D Board	55	UND	Installed
ser2-ser9	N/A	BTG Serial Board (Channels 2-9)		UND	Installed
0x7B02	32000,33000	CAPS Card for CAPS Probe	1019	UND	Not Installed
ser10-ser17	N/A	WCM Card for WCM-2000 Probe		UND	Installed

Network Configurations (Reserved UND 10.15.1.225-10.15.1.234)

Instrument Description	IP Address	Owner	Status
M300	10.15.1.225	NASA/UND	Installed
2DS	10.15.1.226	NASA/UND	Installed
HVPS 3A	10.15.1.227	NASA/UND	Installed
HVPS 3B	10.15.1.228	NASA/UND	Installed
Hawkeye	10.15.1.229	NASA/SPEC	Installed
Spec (Old HVPS 3A)	10.15.1.230	NASA/SPEC	Installed
PHIPS	10.15.0.205	KIT	Installed
NCERT NTP (Time Sync)	10.15.1.4 & 10.15.1.5	NCERT	Installed
NCERT Web Server	10.15.1.10?	NCERT	Installed

Instrumentation Configuration

Location	Location Detail	Instrument	Data Wiring	Owner	Status
Right Wing	Outboard Pylon (Outer)	CAPS	CAPS Card (M300)	UND	Not Installed
Right Wing	Outboard Pylon (Inner)	2DS	SPEC Computer	UND	Installed
Right Wing	Inboard Pylon	Hawkeye	Hawkeye Computer	NASA	Installed
Fuselage	Starboard	RICE-A	Ser9 (M300)	NASA	Installed
Fuselage	Port	WISPER	WISPER Computer	CU	Installed
Left Wing	Inboard Pylon (Inner)	HVPS-3B (Vert.)	SPEC Computer	SPEC	Installed
Left Wing	Inboard Pylon (Outer)	HVPS-3A (Hor.)	SPEC Computer	NASA	Installed
Left Wing	Hotwire Boom (Outboard)	RICE-A	Ser9 (M300)	Citation	Installed
Left Wing	Hotwire Boom (Bottom)	King	A/D (M300)	UND	Installed
Left Wing	Hotwire Boom (Inboard)	CDP	A/D (M300)	UND	Installed
Left Wing	Hotwire Boom (Top)	WCM-3000	WCM Card (M300)	UND	Installed

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Left Wing	Hotwire Boom (Forward)	Static Pressure	A/D (M300)	UND	Installed
Left Wing	Hotwire Boom (Forward)	Dynamic Pressure	A/D (M300)	UND	Installed

Equipment Summary

Item Type	Description	OS (Format)	General Purpose	Owner	Status
Laptop	IMPACTS Laptop	Linux Mint	Primary Processing for M300 Data	UND	Operable
Digital Key	M300 Playback	Linux	M300 Table Maintenance/Testing	UND	Operable
Flash Drive	M300	64 GB (FAT32)	M300 Data Transfer	UND	Operable
Flash Drive	Hawkeye	64 GB (FAT32)	HAWKEYE Data Transfer	UND	Operable
Flash Drive	HVPS-A	64 GB (FAT32)	HVPS-3A Data Transfer	UND	Operable
Flash Drive	HVPS-B	64 GB (FAT32)	HVPS-3B Data Transfer	UND	Operable
Flash Drive	2-DS	64 GB (FAT32)	2-DS Data Transfer	UND	Operable
Flash Drive	PHIPS	32 GB (FAT32)	PHIPS/Misc. Data Transfer	UND	Operable

Aircraft Power Breaker Setup

Item	Breaker	Label Name	Power Recipient system	Power Types
Switch	J5	STATION 16 HAWKEYE	Hawkeye Heaters	AC
Switch	J7	BAY 7 HWK I HEAT	Hawkeye Heaters	AC
Switch	J8	BAY 7	Power Strip Right Rack	AC
Switch	J9	BAY 7	HVPB Computer	AC
Switch	J13	BAY 5	Power Strip Left Rack; 2DS Monitors	AC
Switch	J16	BAY 5 HWK I DATA	Hawkeye Rack Computer	AC
Switch	J17	BAY 5 2DS Computer		AC
Switch	J18*	BAY 9 KNG PRBS	King Probe Power	28VDC
Switch	J20*	BAY 9 HAWKEYE	Hawkeye Probe Power	28VDC
Breaker		STATION 9 PITOT HEAT	Aft Breaker Box (All Listed Below)	115/200 VAC
Breaker		PITOT HEAT	Port Wing Pitot Tube Heat	28 VDC
Breaker		CDP SYSTEM	CDP Probe Power	28 VDC
Breaker		CDP ANTI ICE	CDP Heater	28 VDC
Breaker		HVPS1	HVPS-3A Probe Power	28 VDC
Breaker		HVPS2	HVPS-3B Probe Power	28 VDC
Breaker		HVPS AC 1	HVPS-3B Heater	115 VAC/60 Hz
Breaker		HVPS AC 2	HVPS-3A Heater	115 VAC/60 Hz
Breaker		2DS	Standalone 2DS Probe Power	28 VDC
Breaker		2DS HEAT	Standalone 2DS Heater	115 VAC/60 Hz

In-Flight Down-link Parameters

Acronym	Long Name	Units	Variable	Character Format
CASTConc	CAS Total Concentration	#/cc	TBD	11.4f
CASMVD	CAS Mean Volume Diameter	æm	TBD	11.4f

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CASLWC	CAS Liquid Water Content	g/m3	TBD	11.4f
CDPTConc	CDP Total Concentration	#/cc	F6911	11.4f
CDPMVD	CDP Mean Volume Diameter	µm	F6914	11.4f
CDPLWC	CDP Liquid Water Content	g/m3	F6913	11.4f
KingLWC	King Liquid Water Content	g/m3	F1409	11.4f
RICEFreq	Rosemount Icing Detector Frequency	Hz	F10116	6d
WCMLWC	WCM Liquid Water Content	g/m3	TBD	11.4f
WCMTWC	WCM Total Water Content	g/m3	TBD	11.4f

Probe Canisters

Instrument	Instrument Serial #	Probe Canister Serial #	Station #
2-DS	012	H-016	18
HVPS-3A	H004	H-015	11
HVPS-3B	H016	H-006	11
CAPS	5		18
PHIPS			18