

# **CapeEx19 Aircraft Configuration**

## **North Dakota Citation Research Aircraft (N555DS)**

### **Summer 2019 – Florida Cirrus Cloud Sampling**

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#### **Instrumentation Summary**

List of instruments on the North Dakota Citation Research Aircraft (N555DS). Instrument owners include the University of North Dakota (UND, red), Weather Modification International (WMI), United States Army (Army), National Research Council Canada (NRC), Schnaitec (SCH – Martin Schnaiter), and Collins Aerospace (COL).

<b>Acronym</b>	<b>Full Name</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>Serial #</b>	<b>Owner</b>
2D-C	2-D Optical Array Probe	PMS, Incorporated	OAP-2D-C	685-0478-07	UND
A/D	32 Ch. Analog-Digital Converter	SEA, Incorporated	N/A		WMI
Applanix	Position and Orientation System	Applanix Corporation	POSAV 310	N/A	WMI
CAPS	Cloud, Aerosol, & Precipitation Spectrometer	Droplet Measurement Tech.			Army
CDP	Cloud Droplet Probe	Droplet Measurement Tech.	CDP2	0901-0048	UND
CIP	Cloud Imaging Probe	Droplet Measurement Tech.	CIP-15um		NRC
CPC	Condensation Particle Counter	TSI Incorporated	377100	70827077	UND
CPC Flow	Alicat Mass Flow Controller	Alicat, Incorporated	MC-2SLPM-D/5M		UND
CO	Carbon Monoxide Analyzer				UND
Data Ratio	465 MHz Down-link Data Ratio				WMI
Dew Point	Dew Point Temperature Probe	Edgetech	N/A	1776	WMI
Gust Static	Static Pressure Transducer	Honeywell, Incorporated	PPT0015AXN2VA	53166	WMI
Gust Attack	Gust Probe Attack Angle	Honeywell, Incorporated	PPT2-0001DKK2VS	81483	WMI
Gust Beta	Gust Probe Beta Angle	Honeywell, Incorporated	PPT2-0001DKK2VS-F	80857	WMI
Gust Pitot	Gust Probe Pitot	Honeywell, Incorporated	PPT2-0002DKKSVS-F	79921	WMI
Icing Probe	Magnetostrictive Ice Output Detector	Goodrich	0871LM5	0325	WMI
King Probe	Liquid Water Content	PMS			WMI
M300	M300 Data Acquisition System	Science Engineering			WMI
Nevzorov	Nevzorov Total Water Content	Sky Tech Research			WMI
OID	Optical Icing Detector	Collins	Gen 4		COL
Ozone	Ozone Analyzer	Thermoscientific	42C		UND
PHIPS	Particle Habit Imaging & Polar Scattering	Martin Schnaiter			SCH
PIP	Precipitation Imaging Probe	Droplet Measurement Tech.	PIP Mono		WMI
Pitot (Wing)	Differential Pressure Transducer	Honeywell	PPT0002DXX2VB-BC	60764	WMI
Pitot (Nose)	Differential Pressure Transducer	Rosemount	1221F2AF7B1B	1441	WMI
Pitot (Boom)	Differential Pressure Transducer	Rosemount	1221F2AF71B	1441	WMI
Serial Board	24 Channel Serial Board (3 Cards)			N/A	WMI
TDL	Tunable Diode Laser Hygrometer	Maycomm Research Com.	AC19-400		UND
TDL Pump	Thomas Compressor Vacuum	Thomas	107CAB18	311A	UND
TDL Meter	Tylan Mass Flow Meter	Tylan, Incorporated	FM-380		UND
Temp (Wing)	Total Temperature Probe	Rosemount	102AU1AF		WMI
NMEA GPS	Miniature Time Code Generator	Instrument. Tech. Systems	6115g-8	N/A	WMI

\*The M300 Data Acquisition System acquires data from all the instrument above, except the PHIPS.

List of instruments at the MCR surface site. Instrument owners include the University of North Dakota (UND, red), Weather Modification International (WMI), United States Army (Army), National Research Council Canada (NRC), and Schnaitec (SCH – Martin Schnaiter).

Acronym	Full Name	Manufacturer	Model #	Serial #	Owner
VHF Radio	Radio for Voice Communications		N/A		UND
VHF Data	465 MHz Data Modem			N/A	UND
CCNC	Cloud Condensation Nuclei Counter	Droplet Measurement Tech.	100		WMI

## Analog to Digital Board

Ch	Tag	Description	Serial #	Range	Cal-Slope	Cal-Offset	Units	Calibration	Status
0	100	Spare 1	N/A	10 volts	1.0	0.0	volts		Not-Installed
1	101	Spare 2	N/A	5 volts	1.0	0.0	volts		Not-Installed
2	102	Spare 3	N/A	5 volts	1.0	0.0	volts		Not-Installed
3	103	Spare 4	N/A	5 volts	1.0	0.0	volts		Not-Installed
4	104	Pitot Press. Wing	105151	5 volts	87.0381	216.2293	volts		Installed
5	105	Nose-ring Static Pressure	N/A	5 volts	207.08	0.71	volts		Installed
6	106	Cabin Pressure	N/A	5 volts	275.44	-1.16	volts	Cal. 01/29/10	Installed
7	107	Temp Left Wing	57095	5 volts	28.20758	-70.08814	volts	Cal.11/9/09	Not Installed
8	108	Temp Fuselage	A30131	5 volts	23.04512	-64.852771	volts	Cal. 11/17/09	Installed
9	109	Chilled Mirror	N/A	10 volts	20.0	-70.0	volts		Installed
10	110	King Slave	N/A	10 volts	1.0	0.0	volts		Not-Installed
11	111	King Signal	N/A	10 volts	10.0	0.0	volts		Not-Installed
12	112	CPC Flow Meter	N/A	5 volts	0.3895	0.0107	volts	Cal. 3/17/10	Not-Installed
13	113	Spare	N/A	10 volts	2.3461	.2353	C	Cal 5/10/08	Not Installed
14	114	TDL High Bit	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
15	115	TDL Low Bit	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
16	116	TDL 2f Mon	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
17	117	TDL flow meter	N/A	5 volts	1.9733	0.7359	volts	Cal 3/17/10	Not-Installed
18	118	Inlet Pressure	N/A	5 volts	207.02	-2.0377	volts	Cal 4/14/10	Installed
19	119	GustBox St. Press.	53166	10 volts	205.199	-0.1358	volts	Cal 4/20/10	Installed
20	120	Spare	N/A	10 volts	1.0	0.0	C	Cal 5/10/08	Installed
21	121	Spare	N/A	10 volts	1.0	0.0	volts	Default	Installed
22	122	Spare	N/A	10 volts	1.0	0.0	volts	Default	Installed
23	123	Spare	N/A	10 volts	1.0	0.0	volts	Default	Installed
24	124	Nev_TWC_col_volt	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
25	125	Nev_TWC_col_curr	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
26	126	Nev_TWC_ref_volt	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
27	127	Nev_TWC_ref_curr	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
28	128	Nev_LWC_col_volt	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
29	129	Nev_LWC_col_curr	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
30	130	Nev_LWC_ref_volt	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed
31	131	Nev_LWC_ref_curr	N/A	10 volts	1.0	0.0	volts	Default	Not-Installed

## Serial Boards (Three Boards each of 8 Channels – 24 Total + 1 on M300: 25 Total)

Interface	Tag	Instrument Description	Type	Baud Rate	Status
/dev/ser1	65001	CPC Alicat Volume Flow Meter	232	19,200	Installed
/dev/ser2	N/A	Spare RS232	232		Not Installed
/dev/ser3	31000	Condensation Particle Counter (CPC)	232	115,200	Installed
/dev/ser4	11100	Aircraft GPS (Trimble 2000)	232	9,600	Installed
/dev/ser5		M300 Software Key	N/A		Installed
/dev/ser6	12000	Laser Hygrometer (TDL)	232	9,600	Installed
/dev/ser7*	52000	Spare RS232	232		Installed
/dev/ser8*	51000	Spare RS232	232		Installed
/dev/ser9	63501	Gust Probe Honeywell Transducer	232	9,600	Installed
/dev/ser10	10000	Time Code Generator	232	19,200	Not Working
/dev/ser11	N/A	TAS Data Output Stream to HVPS3	232	9,600	Installed
/dev/ser12	N/A	Output TAMDAR Heading Data	232	9,600	Installed
/dev/ser13	N/A	Spare RS232	232	9,600	Installed
/dev/ser14	N/A	Data Radio Output	232	9,600	Not Installed
/dev/ser15	6100	Spare RS232	232	57,600	Not Installed
/dev/ser16	N/A	Spare RS232	232		Not Installed
/dev/ser17	10100	Rosemount Ice Detector (422)	422	19,200	Installed
/dev/ser18	N/A	Spare RS232	232	230,400	Not Installed
/dev/ser19	51004	OID Gen 4 Serial 1	232	115,200	Not Installed
/dev/ser20	51014	OID Gen 4 Serial 2	232	230,400	Not Installed
/dev/ser21	N/A	Spare RS232	232	9600	Installed
/dev/ser22	N/A	Spare RS422	232		Not Installed
/dev/ser23	N/A	Spare RS422	232		Not Installed
/dev/ser24	6200	Cloud Droplet Probe (422)	422	460,800	Not Installed
/dev/ser25	N/A	Spare RS422	422		Not Installed

## Network (8 Port Router)

Channel	Instrument Description	IP Address	Status	Owner
1	M300	192.168.1.110	Installed	WMI
2	PLANET		Installed	WMI
3	Flight Scientist Laptop			UND
4	Spare			WMI
5	Spare			WMI
7	Spare			WMI
8	Spare			WMI

## Data System Cards

Interface	Tag	Instrument Description	Serial Number	Status	Owner
0x4F00		Applanix	1021	Installed	WMI
0x1B00		2DC	1042	Installed	WMI
		CAPS for Army CAPS probe			UND
0x7700		CAPS for PIP	1028	Installed	WMI
0x7300		CAPS for CIP	1004	Installed	WMI
0x4B001		SBus A/D Board	1021	Installed	WMI
		BTG Serial Board (Channels 2-9)	1243	Installed	WMI
		BTG Serial Board (Channels 10-17)	5138	Installed	WMI
		BTG Serial Board (Channels 18-25)	5100	Installed	WMI

## Left-Wing Rear Aft-Facing Inlet/Outlet

Number	Instrument Description	Type	Pump	Status
1	Tunable Diode Laser Hygrometer	N/A	External	Installed
2	Exit Tunable Diode Laser Hygrometer	N/A	External	Installed

## Basic Inlet Sampling System (BISS) (Forward Facing, Right-Wing)

Number	Instrument Description	Type	Pump	Status
1	Ice Particle Sampler	1/4 Swagelok	External	Not Installed
2	Spare	1/4 Swagelok	External	Not Installed
3	Spare	1/4 Swagelok	External	Not Installed
4	Spare	1/4 Swagelok	External	Not Installed
5	Spare	1/4 Swagelok	External	Not Installed
6	Condensation Particle Counter	1/4 Swagelok	External	Not Installed
7	37 mm Filter Sampler	1/4 Swagelok	External	Not Installed
8	Spare	1/4 Swagelok	External	Not Installed
9	Spare	1/4 Swagelok	External	Not Installed
10	Spare	1/4 Swagelok	External	Not Installed

## Right-Wing Aft-Facing Outlet

Number	Instrument Description	Type	Pump	Status
1	Exit Tunable Diode Laser Hygrometer	1/4 Swagelok	External	Installed
2	Exit Condensation Particle Counter	1/4 Swagelok	External	Installed

## Left Wing Pylon

Location	Instrument	Owner	Status
Outboard PMS Can	PHIPS	SCH	Not-Installed
Outboard Down Strut	Rosemount Temperature Probe	WMI	Not-Installed
Inboard Down Strut	Pitot Tube	WMI	Installed
Inboard PMS Can	CAPS	Army	Not-Installed

## Right Wing Pylon

Location	Instrument	Owner	Status
Outboard PMS Can	PIP	WMI	Not-Installed
Outboard Down Strut	King Probe	WMI	Not-Installed
Inboard Down Strut	CDP	UND	Not-Installed
Inboard PMS Can	CIP	NRC	Not-Installed

## Nose Fuselage

Location	Instrument	Owner	Status
Nose Left	TAMDAR	Panasonic Weather Solutions	Installed
Nose Right	Icing Probe	Collins	Installed
Nose Right	Pitot Tube	WMI	Installed
Nose Right	Nevzorov Probe	WMI	Not-Installed
Nose Right	Temperature Probe	WMI	Installed

## PMS Cans

Location	Description	Owner	Status
Left Outboard	Gray (UND-001)	UND	Installed
Left Inboard	Amber (UND-002)	UND	Installed
Right Outboard	Amber (UND-003)	UND	Installed
Right Inboard	Amber (UND-004)	UND	Installed
Spare	Gold (38628-0299-56)	Army	Installed

## Fuselage Window Ports

Location	Description	Instrument	Status
Front Left	Metal Plate	None	Installed
Back Left	Metal Plate	None	Installed

Front Right	Collins OID Special Glass	None	Installed
Back Right	Collins OID Special Glass	OID Gen 4	Not Installed

### Seat Assignments

Location	Description	Name
Left Cockpit	Pilot	TBD
Right Cockpit	Co-Pilot	Jody Fisher
Front Cabin	Flight Scientist	David Delene
Mid Cabin	Cloud Probe (PHIPS) Flight Engineer	Martin Schnaiter, Shawn Wagner
Back Cabin	M300 Flight Engineer	Kendra Sand, Nick Gapp, Henno Havenga

### Questions:

1. Does the M300 in the Citation have an ARINC card? **No (Don't need).**
2. How can we get dual-monitor support in the Citation for the M300? **Splitter.**