CapeEx19 Aircraft Configuration
North Dakota Citation Research Aircraft (N555DS)
Summer 2019 – Florida Cirrus Cloud Sampling

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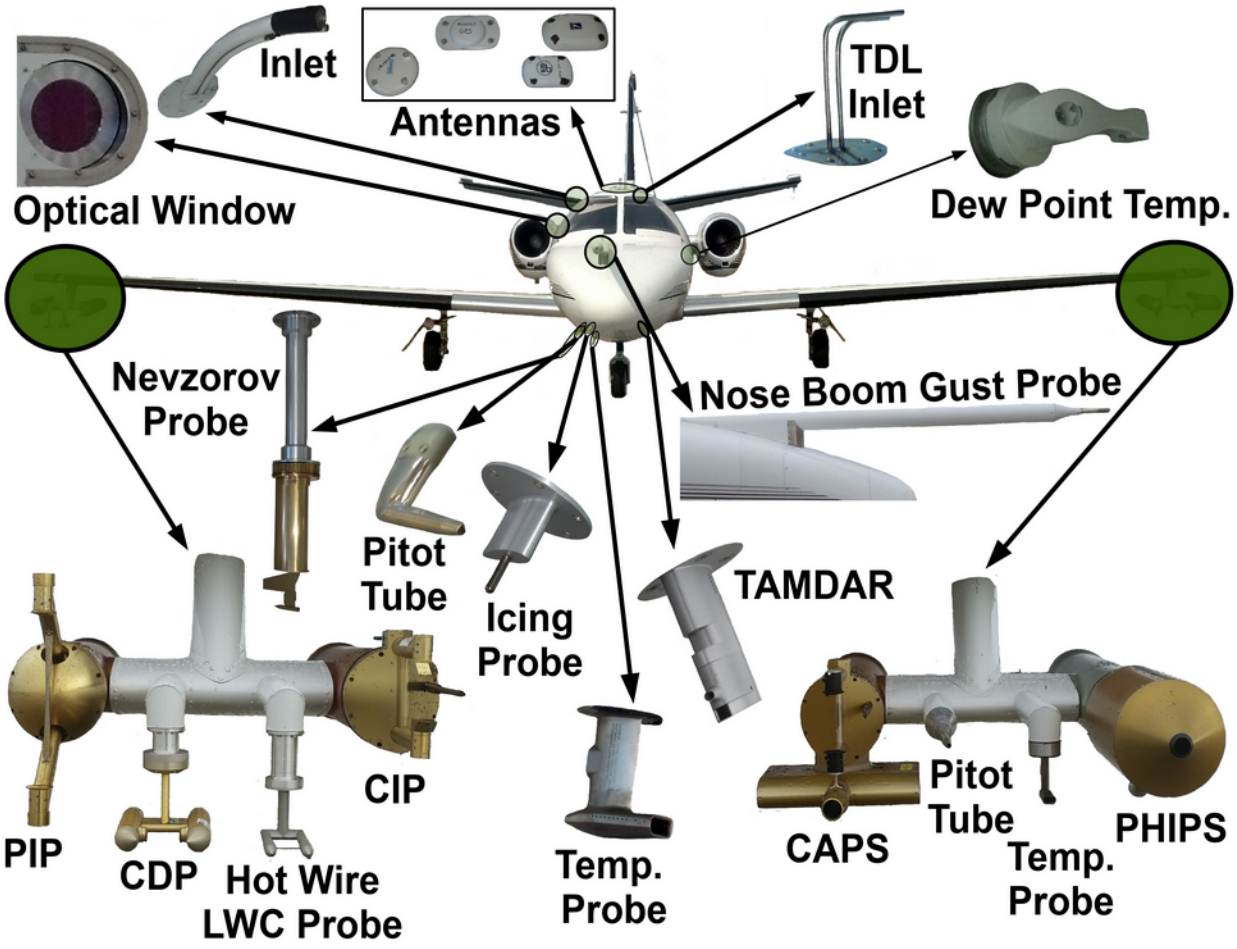

Instrumentation Summary

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), University of Alabama (UA), and Collins Aerospace (COL).

Acronym	Full Name	Manufacturer	Model #	Serial #	Owner
A/D	32 Ch. Analog-Digital Converter	SEA, Incorporated	N/A	1033	WMI
Applanix	Position and Orientation System	Applanix Corporation	POSAV 310	N/A	WMI
CAPS	Cloud, Aerosol, & Precipitation Spec.	Droplet Measurement Tech.	AAA-0009	5	Army
CDP	Cloud Droplet Probe	Droplet Measurement Tech.	CDP2	0901-0048	UND
CIP	Cloud Imaging Probe	Droplet Measurement Tech.	CIP-15um	1403-064	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	Monitor Labs	8830	337	UND
Dew Point	Dew Point Temperature Probe	Edgetech	N/A	1776	WMI
FM	Electric Field Mills	University of Alabama			UA
GoPro	TBD	GoPro			UND
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
iPad	iPad Stratus Display System	Apple			UND
King Probe	Liquid Water Content	PMS	KLWC-5	33087-1294-58	WMI
M300	M300 Data Acquisition System	Science Engineering			WMI
Nevzorov	Nevzorov Total Water Content	Sky Tech Research		369 Head	WMI
NMEA GPS	Miniature Time Code Generator	Instrument Tech. Systems	6115g8	N/A	WMI
OID	Optical Icing Detector	Collins	Gen 4		COL
Ozone	Ozone Analyzer	Thermoscientific	49C	0517812010	UND
PHIPS	Particle Habit Imaging & Polar Scatter.	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
Stratus	Stratus Portable Receiver	Appareo Systems, LLC	2S	153510-000008	UND
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
ViperModem	465 MHz Down-link Data Ratio	CalAmp			WMI

*The M300 Data Acquisition System acquires data from all the instrument above, except the PHIPS. The CAPS was calibrated on 6/2019. The CIP-15um was calibrated on 6/2018.

List of instruments at the 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	Location	Manufacturer	Model #	Serial #	Owner
VHF Radio	Radio for Voice Communications	MCR		N/A		UND
VHF Data	465 MHz Data Modem	MCR			N/A	UND
CCNC	Cloud Condensation Nuclei Counter	Airport	Droplet Measurement Tech.	100		WMI

Analog to Digital Board (Frequency 25 Hz)

Ch	Tag	Description	Serial #	Range	Cal-Slope	Cal-Offset	Units	Calibration	Status
0	100	Pitot Press. Fuselage	N/A	10 volts	1.0	0.0	volts		Installed
1	101	Spare	N/A	5 volts	1.0	0.0	volts		N/A
2	102	Spare	N/A	5 volts	1.0	0.0	volts		N/A
3	103	Spare	N/A	5 volts	1.0	0.0	volts		N/A
4	104	Pitot Press. Wing	105151	5 volts	87.0381	216.2293	volts		Installed
5	105	Spare	N/A	5 volts	1.0	0.0	volts		N/A
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	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		Installed
11	111	King Signal	N/A	10 volts	10.0	0.0	volts		Installed
12	112	CPC Flow Meter	N/A	5 volts	0.3895	0.0107	volts	Cal. 3/17/10	Installed
13	113	Spare	N/A	10 volts	1.0	.1.0	volts	Default	N/A
14	114	TDL High Bit	N/A	10 volts	1.0	0.0	volts	Default	Installed
15	115	TDL Low Bit	N/A	10 volts	1.0	0.0	volts	Default	Installed
16	116	TDL 2f Mon	N/A	10 volts	1.0	0.0	volts	Default	Installed
17	117	TDL flow meter	N/A	5 volts	1.9733	0.7359	volts	Cal 3/17/10	Installed
18	118	Spare	N/A	5 volts	1.0	0.0	volts	Default	N/A
19	119	Spare	N/A	10 volts	1.0	0.0	volts	Default	N/A
20	120	Spare	N/A	10 volts	1.0	0.0	volts	Default	N/A
21	121	Spare	N/A	10 volts	1.0	0.0	volts	Default	N/A
22	122	CO Monitor (Recorder)	N/A	10 volts	1.0	0.0	volts	Default	Installed
23	123	CO Monitor (DAS)	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	Installed
25	125	Nev_TWC_col_curr	N/A	10 volts	1.0	0.0	volts	Default	Installed
26	126	Nev_TWC_ref_volt	N/A	10 volts	1.0	0.0	volts	Default	Installed
27	127	Nev_TWC_ref_curr	N/A	10 volts	1.0	0.0	volts	Default	Installed
28	128	Nev_LWC_col_volt	N/A	10 volts	1.0	0.0	volts	Default	Installed
29	129	Nev_LWC_col_curr	N/A	10 volts	1.0	0.0	volts	Default	Installed
30	130	Nev_LWC_ref_volt	N/A	10 volts	1.0	0.0	volts	Default	Installed
31	131	Nev_LWC_ref_curr	N/A	10 volts	1.0	0.0	volts	Default	Installed

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

Interface (Ch)	Tag	Instrument Description	Type	Configure	Baud Rate	Status
/dev/ser1		M300 Software Key	N/A			Installed
/dev/ser2 (1)	N/A	Spare RS232	232			N/A
/dev/ser3 (2)	31500	Condensation Particle Counter (CPC)	232	8-N-1	115,200	Installed
/dev/ser4 (3)	11100	Aircraft GPS (Trimble 2000)	232	8-N-1	9,600	Installed
/dev/ser5 (4)	65001	CPC Alicat Volume Flow Meter	232	8-N-1	19,200	Installed
/dev/ser6 (5)	12000	Laser Hygrometer (TDL)	232	8-N-1	9,600	Installed
/dev/ser7* (6)	52000	Spare RS232	232			N/A
/dev/ser8* (7)	51000	Spare RS232	232			N/A
/dev/ser9 (8)	63501	Gust Probe Honeywell Transducer (Nose)	232	8-N-1	19,200	Installed
/dev/ser10 (1)	11000	Time Code Generator -NMEA GPS	232	8-N-1	19,200	Installed
/dev/ser11 (2)	N/A	Spare RS232	232			N/A
/dev/ser12 (3)	N/A	Output TAMDAR Heading Data	232	8-N-1	9,600	Installed
/dev/ser13 (4)	N/A	Spare RS232	232			N/A
/dev/ser14 (5)	N/A	Data Radio Output (465 MH)	232	8-N-1	9,600	Installed
/dev/ser15 (6)	N/A	Spare RS232	232			N/A
/dev/ser16 (7)	N/A	Spare RS232	232			N/A
/dev/ser17 (8)	N/A	Spare RS232	232			N/A
/dev/ser18 (1)	N/A	Spare RS232	232			N/A
/dev/ser19 (2)	51004	OID Gen 4 Serial A	232	8-N-1	115,200	Installed
/dev/ser20 (3)	51014	OID Gen 4 Serial B	232	8-N-1	230,400	Installed
/dev/ser21 (4)	41401	Ozone Analyzer	232	8-N-1	9,600	Installed
/dev/ser22 (5)	N/A	Spare RS422	422			N/A
/dev/ser23 (6)	N/A	Spare RS422	422			N/A
/dev/ser24 (7)	6200	Cloud Droplet Probe (422)	422	8-N-1	230,400	Installed
/dev/ser25 (8)	10100	Rosemount Ice Detector (422)	422	8-N-1	230,400	Installed

M300 Network Acquisition

Network Port	Tag	Instrument Description	Packet Type	Status
30132		PHIPS Network Serial Data	UDP	Installed

Network (32 Port Router)

Channel	Instrument Description	IP Address	Status	Owner
1-15	Field Mills	192.168.2.85-99	Installed	UAH
N/A	Dell Network Switch Access (Modify)	192.168.2.109	Install	WMI
21	M300	192.168.2.110	Installed	WMI
22	Flight Scientist Laptop	192.168.2.111	Not on Flights	UND
23	PHIPS	192.168.2.120	Installed	SCH
24	PHIPS Laptop	192.168.2.121	Installed	UND/SCH

Data System Cards

Interface	Tag	Instrument Description	Serial Number	Status	Owner
0x4B00	9000-9255	Applanix	1011	Installed	WMI
0x7B02	32000,33000	CAPS Card for CAPS probe	1019	Installed	UND9255
0x7702	30000,31000	CAPS Card for PIP	1028	Installed	WMI
0x7302	32100,33100	CAPS Card for CIP	1004	Installed	WMI
0x4B001	100-131	SBus A/D Board	1021	Installed	WMI
ser2-ser9		BTG Serial Board (Channels 2-9)	1243	Installed	WMI
ser10-ser17		BTG Serial Board (Channels 10-17)	5138	Installed	WMI
ser18-ser25		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	Port Location	Type	Pump	Status
1	Spare	Tap1 (Manifold)	1/4 Swagelok	External	N/A
2	37 mm Filter Sampler Inlet	Tap 2 (Manifold)	1/4 Swagelok	External	Installed
3	Broken	Aft 1 (Manifold)	1/4 Swagelok	External	N/A
4	Condensation Particle Counter Inlet	Aft 2 (Manifold)	1/4 Swagelok	External	Installed
5	Condensation Particle Counter Exit	Tap 3 (Manifold)	1/4 Swagelok	External	Installed
6	37 mm Filter Sampler Exit	Tap 4 (Manifold)	1/4 Swagelok	External	Installed
7	Spare (Plugged)	FWD1 (Manifold)	1/4 Swagelok	External	N/A
8	Spare (Plugged)	FWD2 (Manifold)	1/4 Swagelok	External	N/A
9	0zone Analyzer Inlet	Tap 5 (Manifold)	1/4 Swagelok	External	Installed
10	CO Analyzer Inlet	Tap 6 (Manifold)	1/4 Swagelok	Internal	Installed
11	Ozone Analyzer Exit	Tap 1e (Exit)	1/4 Swagelok	Internal	Installed
12	CO Analyzer Exit	Tap 2e (Exit)	1/4 Swagelok	Internal	Installed
13	Spare (Plugged)	Tap 3e (Exit)	1/4 Swagelok	N/A	N/A

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	Installed
Outboard Down Strut	Rosemount Temperature Probe	WMI	Installed
Inboard Down Strut	Pitot Tube	WMI	Installed
Inboard PMS Can	CAPS	Army	Installed

Right Wing Pylon

Location	Instrument	Owner	Status
Outboard PMS Can	PIP	WMI	Installed
Outboard Down Strut	King Probe	WMI	Installed
Inboard Down Strut	CDP	UND	Installed
Inboard PMS Can	CIP	NRC	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	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

Fuselage Window Ports

Location	Description	Instrument	Status
Front Left	Metal Plate	None	Installed

Back Left	Metal Plate	None	Installed
Front Right	Clear Glass	None	Install
Back Right	Collins OID Special Glass	OID Gen 4	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

Fuselage Racks

Location	Rack Number	Instrument	Owner	Status
Back Left	04	TDL, CO	UND	
Back Right	05	O3	UND	
Side Rack Back	03	DC Power Distribution Box, A/C Power Distribution Box, A/D Board, King Probe -Viper Box, M300 DAS, Applanix Box, VIPER Modem, King Probe, Time Code Generator - NMEA GPS - Static Pressure Transducer Box	WMI, WMI, WMI, WMI, WMI, WMI, WMI, WMI, WMI	
Side Rack Middle	02	VHF Radio, Monitor, CPC Box, Filter Sampling Box	UND	
Side Rack Front	01	OID with Data Box, Nevzorov, Network Switch	WMI, COL, WMI	
Half Rack		Field Mills		

Note: Ended project using SN369 Nev. Probe sampling head.