



N49RF ERROR SUMMARY HRD TDR TS CRISTOBAL



Flight ID: 20140825N1

<u>Sensor or system</u>	<u>Number or Name</u>
INE (for wind derivation)	INE1
Accelerometer	ACCZI.1X
Temperature Probe	TTM.4X
Dew Point Probe	TDM.2X (EdgeTech)
Altitude (for vertical wind)	GPS.3 (Novatel)
Static Pressure	PSM.2
Dynamic Pressure	PQM.2
Attack Angle	AA.2
Slip Angle	SA.2
Project Directory	/acdata/2014/MET/20140825N1

Notes:

During the mission the G4 diverted around 60 – 66 Dbz thunderstorms located southeast of the storm's center.

During the post-flight debrief the pilots mentioned a discrepancy had occurred between the two FMS indicated airspeed outputs. Post-flight analysis showed the discrepancy began at about 224720Z and continued during the pilot's troubleshooting of the problem until the FMS indicated airspeed #1 was shut off at 232146Z.

During the days following, AOC avionics personnel did discover some water in the dynamic pressure lines and was determined to be the cause of the indicated air speed issue. The lines were blown out removing all moisture.

There were no data gaps.

It was noted that for the corrected radar altimeter (AltRa1.c) output, there were data dropouts at approximately every 90 seconds. This was a very consistent pattern throughout the flight.

Also there were sporadic occurrences, ranging from 1 to 3 seconds, of missing radar altimeter (AltRa.1) values in both the "_A.nc" and "_RAW1Hz.nc" netcdf files. This occurred during the 1754Z – 1755Z and 004951Z – 004954Z time periods.

Inertial acceleration #1 (ACCZI.1) had erroneous values during the following time periods: 191325Z – 191333Z, 192535Z – 192546Z, 192840Z – 192847Z, 193731Z – 193807Z, 224554Z – 224930Z and 234039Z - 234050Z. For the aforementioned time periods, the erroneous data was replaced via direct substitution with output from Inertial acceleration #3 (ACCZI.3),

$$\text{ACCZI.1} = \text{ACCZI.3}$$

Dynamic attack pressure #2 (PQALPHA.2) had an erroneous values and a large spike between 235003Z - 010239Z. The erroneous output was replaced via direct substitution referencing dynamic slip pressure #2 (PQBETA.2) with an offset,

$$\text{PQALPHA.2} = \text{PQBETA.2} - 12.50$$

Also observed during this time period was erroneous output from dynamic attack pressure #1 (PQALPHA.1) and dynamic slip pressure #1 (PQBETA.1).

Both dewpoint sensors exhibited anomalous warming, producing values greater than ambient temperature during the time periods 190800Z – 191300Z, 193300Z – 194800Z, 211700Z – 213700Z, 223800Z – 230900Z and 233400Z – 235600Z when the G4 was flying through the tops of thunderstorms. Because of the magnitude and variability of the values, only slight modifications were made to the selected dewpoint #2 (TDM.2) sensor output.

Dewpoint sensor #2 (TDM.2....EdgeTech) output was modified during the time period 190924Z – 195806Z using direct substitution of values from dewpoint sensor #1 (TDM.1....EdgeTech) output,

$$\text{TDM.2} = \text{TDM.1}$$

Total Temperature sensor #4 (TTM.4) output was modified during the time periods 224350Z – 230717Z and 233625Z – 234622Z. The erroneous output was replaced via direct substitution referencing total temperature #3 (TTM.3) with an offset:

$$\begin{aligned} \text{First time period } \text{TTM.4} &= \text{TTM.3} - 0.6 \\ \text{Second time period } \text{TTM.4} &= \text{TTM.3} - 1.0 \end{aligned}$$

All other instrumentation worked optimally.

Twenty-five (25) dropsondes were deployed; 23 were good; 2 had questionable data; 25 tempdrop messages were transmitted and received at NHC.

SPECIAL NOTE!!! The variable names DPJ_GSZ, DPJ_ASZ and DPJ_WSZ in the netCDF file represent vertical ground speeds, vertical air speeds and vertical wind speeds, respectively, computed using Dave Jorgensen's vertical wind algorithm. It is recommended that these values be used for vertical wind analysis.

	Takeoff (1723Z)	Landing (0106Z)
Aircraft Static Pressure	1008.5 mb	1007.0 mb
Corrected Tower Pressure	1009.7 mb	1010.0 mb

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