U.S. Dept. of Commerce/NOAA/Aircraft Operations Center

AOCWF1

Flt ID: 000609N	From: KMCF	To: KMCF
Flt No.:	Blk In: 1549Z	ATA: 1539Z
ETD: 12Z	Blk Out: 1232Z	ATD: 1244Z
ETE: 1530Z	Blk Time: 3.17 3.3	Flt Time: 2.55 2.9
Sponsor Org: NOAA	Program:	Purpose:

AOC Personnel

AC: MAXSON, B	Sys Eng: SMITH, J
CP: MCCANN, B / FINKE, M	Data Sys: PRADAS, C / GOLDSTEIN, A
Nav:	Radar: HILL, J
FE:	GPS/BT:
Avionics:	Cld Phys: KITSON, G
FD: CZYZYK, S / SHEPHERD, T	PARRISH, J

Participating Scientists/Visitors/AOC

Name (Last, First)	Activity on Aircraft	Affiliation
BLACK, M	HAPS	HRD

Proposed/Actual Mission/Remarks (Recco, Fixes, Storm, PENET, NHOP #)

BUOY 41009 28 30 01 N
80 10 03 W

USE PITR(?) FOR GSF
USE 1 FOR POSITION

RUSKIN 27 42 20 N
82 24 06 W

1408Z CPA CAPE

DATA SYSTEM DOWN AT TAKEOFF
UP AT ~1255Z
API DAP2 BAD
TT4 OFF BY 1°C
4-MIN DELAY IN VIEWING DROPSONDE DATA
AT4 WARM
SLOW SPEEDS SPREAD TEMPS

U.S. Dept. of Commerce/NOAA/Aircraft Operations Center

AOCWF2

Flt ID: 000609N	Time Off: 1244Z	Time On: 1539Z

	A/C (Take Off)	Wx Stn (Take Off)	A/C (Land)	Wx Stn (Land)
Pressure	1019.1	30.14	1019.5	30.15

	Number	Data Disposition/Date/Quality
Slow/Fast Flt Lvl Tapes	1	
Radar Tapes		
Cloud Physics Tapes		
Video Tapes		
Flt Lvl Data Printout		
AXBT		
AXCP		
AXCTD		
GPS		

Video

	Forward	Left Side	Right Side	Down	Remarks
Time On					
Time Off					
Rate					

Remarks

000609N

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TIME	LAT	LON	TK	HD	TA	TD	WD	WS	PA	GA	PS	SP	REMARKS
1258													DIP
125920											OVR KMCF		500 FT + CLIMB
134700	2701	8224	TURN		-61.2	-70.1	311	9.0	42817	13562	158.8		LEVEL 43K
135140	2720	8211	56	52	-61.3	-71.1	358	9.5	42825	13584	159.7		
141025	2828	8009											DROP 1 BUOY 41009
141028	"	"	54	52	-61.1	-72.2	41	14.1	42839	13567	159.6	1021.0	DROP 2
141345	2844	7949											DESCEND
141545	2857	7939	33	30	-60.1	-71.9	006	14.9	39068	12375	193.9		BEGIN LEG1 250 IAS
													END LEG1 DO OVER
141935	2919	7927	355	354	-60.2	-71.7	009	12.1					BEGIN LEG 1
142220	2939	7929											END LEG 1
142800	2945	7931	177	174	-59.7	-71.6	40.7	9.1	39087	12397	193.7		BEGIN LEG2
1432													END LEG 2
143239	2906	7929	176	174	-60.1	-72.0	17	14.8	39085	12394	193.8		DROP 3
143530	2849	7940	263	265	-60.1	-72.0	14	13.7	39079	12396	193.8		BEGIN LEG 3
143730	2847	7956											END LEG 3
144330	2845	8004	90	85	-59.8	-72.0	21	16.6	39083	12397	193.8		BEGIN LEG 4
144630	2845	7937											END LEG SLOW
144820	2856	7933											BEGIN YAW MAN
14520													END YAW
145520	2942	7938	354	355	-60.4	-73.1	47	8.5	38944	12351	194.3		BEGIN LEG5 SLOW 200 IAS
145720													END LEG 5
150000	2947	7949	177	174	-60.5	-74.4	54	8.0	38998	12372	193.9		BEGIN LEG 6
150331	2927	7948											END LEG 6

1454:50 - 1457:20

Date: Thu, 08 Jun 00 16:42PM EDT
From: jack parrish <jackparrishweather@netscape.net>
To: stanleyczyzyk@netscape.net
Subject: Fwd: [G-IV Test Flight Plan]

Jack Parrish
Manager, G-IV Projects
Flight Director, Heavy Aircraft
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Attached Message

N49RF Systems Test and Evaluation Flight

As early as 9 June, when the G-IV systems are certified ready to fly by SED, we will conduct a test and evaluation flight. This flight should take about three hours to complete, with a desired additional hour of fuel available in case unexpected troubleshooting is needed in-flight. The three primary goals of the mission are, (1) to test the dropsonde capability of N49RF, including test drops, data acquisition, processing from AVAPS to HAPS to Sat Comm, and the transmission and distribution of the temp drop messages throughout the ground receiving stations, (2) MADS checkout of flight level parameters, including comparison of on-board wind calculations using reciprocal legs, and (3) basic sounding comparison between the on-board instruments and the 12Z Ruskin radiosonde. Listed below is the sequence of events we desire on this test flight in order to certify the aircraft for Hurricane Surveillance (times are EDT).

0600 - Arrive at work, tow out N49RF, power on and begin preflight.

0800 (or whenever the aircraft systems are ready) - Take off.

0805 - Go into holding pattern as low as practical in the vicinity of Ruskin, FL (27 42'20"N, 82 24'06"W). Balance the dewpointers. This should take about ten minutes.

0815 - Perform an ascent sounding in a box pattern, centered on Ruskin, low as practical to 43,000 feet. Ascent rate ~2000 ft/minute. Level in the turns if possible. The radiosonde will have been launched at 0700, so there is no possibility of encountering the balloon.

0900 - Proceed to vicinity of NOAA Buoy 41010 (28 53'23"N, 78 32'23"W), ~120 miles east of Cape Canaveral.

0930 - Drop two dropsondes close together in the vicinity of Buoy 41010. Actual drop point to come from the Flight Director.

0945 - After verifying good drops and data communications, descend to 39,000 feet for wind legs. Op area near Buoy 41010 or nearby is fine. Level off at 39,000 feet to obtain a good wind direction from MADS.

0955 - Fly high speed (~250 knots IAS) reciprocal direction wind legs. Legs will be flown into/away from the MADS wind direction. Legs are two minutes each direction. Fly 90/270 turn at end point to fly between the two points of the previous leg. Flight Director determines wind on which tracks are based.

1005 - Fly crosswind reciprocal legs (~250 knots IAS). Flight Director calls the tracks.

1015 - Slow to standard Surveillance cruise speed. Conduct brief yaw maneuver, gradual left/right rudder while maintaining wings level. Repeat about 5 cycles.

1020 - Slow to slowest comfortable speed at 39,000 feet (~190 knots IAS). Fly low speed reciprocal direction wind legs.

1030 - Systems testing completed. Return to MCF.

1100 - Land MCF

Times are approximate.

28 45

79 40

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1021.0 SPLASH
1021.4 SPLASH

http://www.hurricanehunters.noaa.gov

NOAA/AOC/SED N49RF Flight Performance log

N49RF Project: Surveillance 2000 Project No. 006 Flight No. TF1 Flight ID: 000609N

SED Crew: Goldstein, Hill, Prados, Smith (using 435 on tape) Mission: Test - flight

Pre-Flight: 1100 Z Take-Off: 1243 Z Landing: 1539 Z

	SYSTEM	Pre-Flight Check	In-Flight	Post-Flight Check
NAV	IRS #1	✓		
	IRS #2	✓		
	IRS #3	✓		
	GPS Honeywell #1	✓		
	GPS Honeywell #2	✓		
	GPS Collins	✓		Off? ☐
	Nose Radar - Collins	✓		Off? ☑

		Time	Temp °C	Pre-Flight Check	In-Flight	Time	Temp °C
TEMP	Temp #1	1102	24.6	✓		1549	30.59
	Temp #2	↓	23.8	✓		↓	29.50
	Temp #3		24.1	✓			29.131
	Temp #4		25.9	✓			33.2
	DP Left		15.9	✓	Cal. Time: 1252		15.89
	DP Right		15.2	✓	Cal. Time: 1252		15.140

	SYSTEM	Pre-Flight Check	In-Flight	Post-Flight Check
PRESS	Attack Angle (ADCAOA)	✓		
	Slip Angle (BPx/DxPx)	✓		
	Differential (PQ1/PQ2)	✓		
	Absolute (PS1/PS2)	✓		
	Check Radome Press. Lines ☑	Date: 060900		
SYSTEMS	DOWN PRT-5 ⇨ Open? ☐	Not installed		Closed? ☐
	MADS (WINDS/DISCWIN)	✓		# DATs:
	MADS Printer ⇨ Paper? ☐	N/A		Printer Power off? ☐
	MADS Cal. Date: 060800	QC time: 1217	Cal 1352Z 060900	QC time: 1541
	WINDS ⇨NET BCAST ☑	✓	QC 1354Z	
	HAPS System / Time set? ☑	✓		# Msg.: 2 # Fail: 1 Retry
	AVAPS System	JAS		
	K2 Printer ⇨ Paper? ☐	N/A		Printer Power off? ☑
	Exterior Walk Around ☑	JAS/JCPB		
	Inspect DropSonde Chute Bolts	GH		
MISC	Satcom (Flight Phone) ☑	✓ JH		Off CB? ☐
	Call COMSAT? ☐ (*292#)	✓ JH		
	FCU/UPS/CB	CB's Checked? ☑		UPS off? ☐
	AVAPS Sondes	# On Board: 12	# Dropped: 3	# Good: 2
	AXBT	# On Board: ∅	# Dropped: —	# Good: —
	APN-232 Altimeter	✓ JCPB		
	Modem Power On? ☑	✓		

1	DAT Tape #1	On: D09/1257	Type: 60M	Off: 1549
2	DAT Tape #2	On:	Type:	Off:

Comments:

Need wait for DiscWin Message, "DsmDisk: Removable drive r1 Mounted"

DAD2 55 mbars on Ground, -34 in flight

Dewpointers balanced 1252Z

API -22 mbar 1349 MANEUVERS

LIGHT L3 NOT WORKING

01/12/00 JCPB

Please Note Any Discrepancies

Item No.	Zulu Time	Problem Description & Observations	Emp. Initials
1	1305	API -6 to -22 mbar -34 @ level flight	JCPB
2	1250	DAP2 -50 @ Ground -393+ @ air	JCPB
3	1308	BP1 needs looking -3 mb @ level flight.	JCPB
4	1530	DPRC is about 1°C less than DPLC	JCPB
5	—	AVAPS data delay (5-9 seconds) to WINDS Display	JCPB
6	—	WINDS Track display stops updating	

N49RF AVAPS DropSonde Log

N49RF Project: Hurr '00 Flight ID 000609N

Mission: Flight #: Ø System Status: ✓

Drop #	Sonde Serial Number	Chn. #	Time (Zulu)	Press. offset	Winds time	Operator Initials	Comments / Drop Status/ Failure Reason	GOOD ☑/B
1	993 915 098	1	1410	Ø	—	JAS	"TOUCHY XMITTR" FAILED ON LAUNCH	
2	990 845 179	5	1410	.5	47	JAS		✓
3	990 415 004	2	1432	.4	32	JAS		✓
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
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32								
33								

— MWG PI DATA COLLECTION INOP CH #5

— WINDS DISPLAY DELAYED 4+ minutes - HAPS has no delay

Aircraft Operations Center
P.O. Box 6829
MacDill AFB, FL 33608-0829

July 10, 2000

MEMORANDUM FOR: Alan Goldstein
Chief, Data and Development Branch

FROM: Stan Czyzyk
Flight Meteorologist

SUBJECT: G-IV Instrumentation Evaluation
Calibration Flight, 06/09/00

Data evaluation is based on information obtained from various radiosondes around the operating area including Ruskin, Cape Canaveral, Jacksonville, and Charleston, S.C. Weather conditions were fairly stable throughout the region and there were no significant areas of precipitation.

The Ruskin radiosonde was launched at 11Z and reached 43,000 feet at approximately 1148Z. The G-IV began its ascent at 1259Z and reached 43,000 at 1347Z. This two-hour lag in ascent between the radiosonde and the G-IV should have minimal impacts on the comparison. The only significant changes should occur in the lowest 5000 feet or up to 850 mb. There were no climbs made during any of the turns. All of the data was collected within 30 nm of the Ruskin launch site.

not true

The instrumentation on the G-IV (or P3) is not intended or calibrated for use during significant aircraft maneuvers (i.e., climbs, descents, turns). Therefore, degradation of the data during the ascent sounding is expected. ~~However~~, results from this particular mission can be used as an estimate of error if the request for such data is made.

The Cape Canaveral radiosonde was launched at 14Z and should have reached 39,000 feet by 1445Z. The G-IV began its first leg at 1419Z and completed its last leg at 1504Z. The legs were conducted within 100 nm northeast of Cape Canaveral. The proximity in time and space to the Cape Canaveral radiosonde provide an excellent data set for comparison with the G-IV data.

The first set of legs was performed into and out of the wind (north and south) with an indicated airspeed of 250 kts and was flown over the same airspace (within 1 nm). The second set of legs was performed perpendicular to the wind (east and west), again, with an indicated airspeed of 250 knots and was flown over the same airspace (within 5 nm). The third set of legs was performed into and out of the wind (north and south) with an indicated airspeed of 200 kts and was flown over the same airspace (within 10 nm).

All sensors performed extremely well throughout the three sets of legs. The only notable problems occurred in the wind direction and wind speed. The estimated errors in wind direction during the mission (wind speeds of 12-14 m/s) were typically 15-35 degrees with wind speed errors of 2-4 m/s (occasionally higher). The winds were fairly steady across the region from the north-northeast. A possible source of error may be in the slope and intercept values of the attack and sideslip angles. These values have not been adjusted since January 1997.

There were several sensors that were not functioning properly during the flight. The following is a summation:

AP2 and DAP2 - They were not connected properly and the problem was corrected following the flight.

AT4 - Had the poorest performance. This sensor was not calibrated this year due to AOC's financial situation.

ADCSAT - Warmer throughout the flight, 2-5°C too warm during the leg maneuvers.

INE1 ground speeds (VEW, VNS, VSPD) had extremely small oscillations.

None of the above instrumentation was used in deriving additional parameters.

The sensors that were chosen to calculate the derived parameters are as follows:

AT1	DPLC	PS1M	QC1M
TAS1	AP1	DAP1	BP2
DBP2	THDG_PITR	VEW_PITR	VNS_PITR
VSPD_PITR	AKRD2	SSRD2	

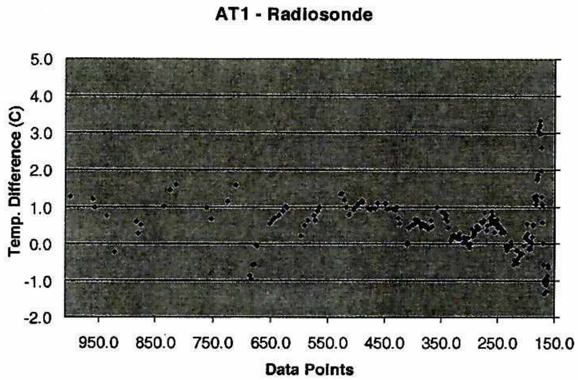
The attached documentation offers a detailed summary of various meteorological and aircraft instrumentation during the G-IV mission on June 9, 2000. Numerous plots are available upon request.

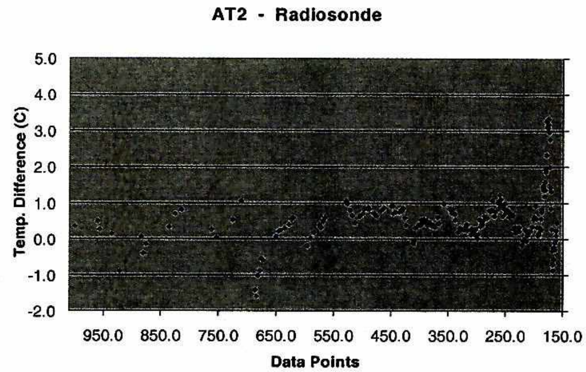
Attachment

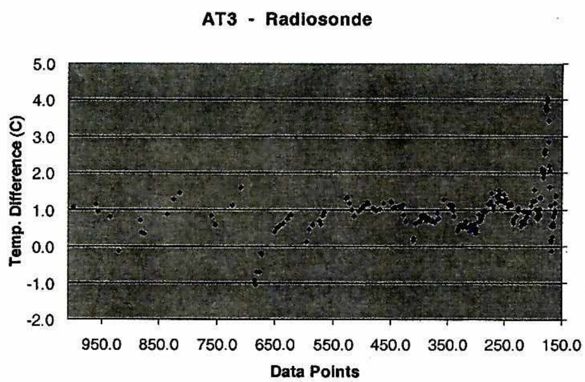
Distribution:
J. Dugranrut - Chief, SED
J. McFadden - Program Manager
J. Parrish - G-IV Project Manager
B. Maxson - Chief, OPS
J. Hill - G-IV, Systems Engineer
R. McNamara - Calibrations

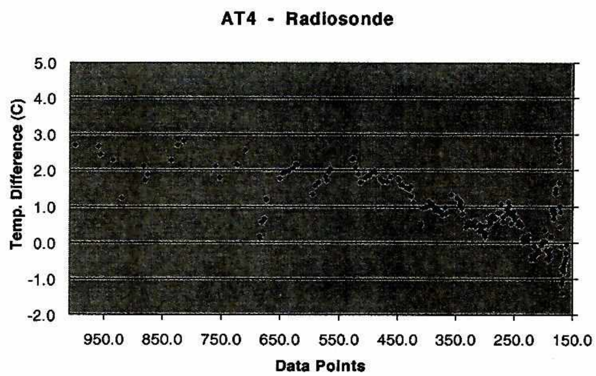
The following plots are aircraft probes vs. the radiosonde probes. The data points were chosen by comparing the static pressure on the radiosonde with the static pressure (PS1M) on the aircraft. All values of static pressure that were within 0.11 mb of each other were then plotted.

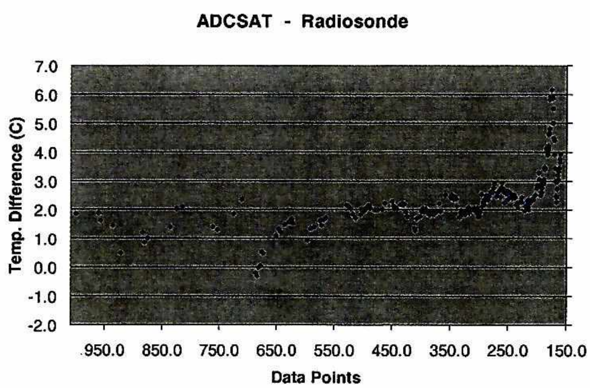
Temperature:





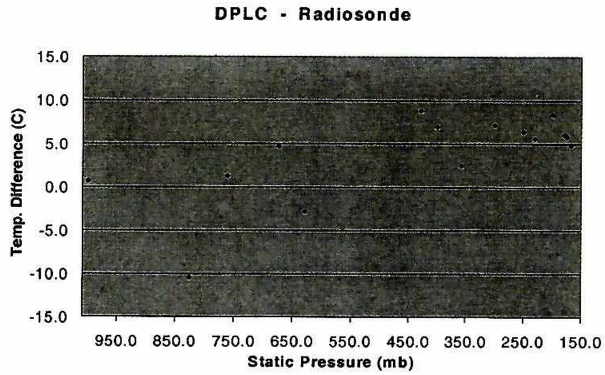


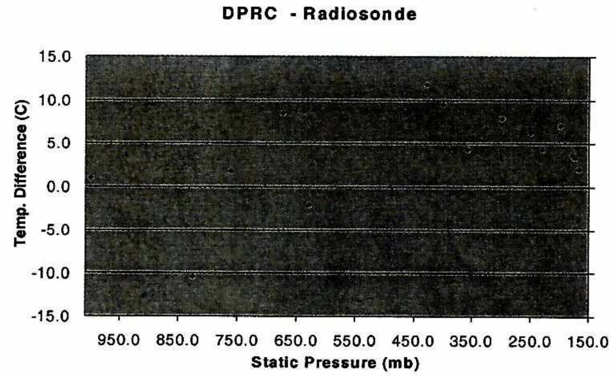




AT1 and AT2 average 0.5°C difference from the radiosonde and AT3 and AT4 averaged 1.0°C difference. AT4 averaged over 2°C different from the radiosonde (similar to the wind legs). One can notice a slope in height in the plots on all temperature probes, except AT2.

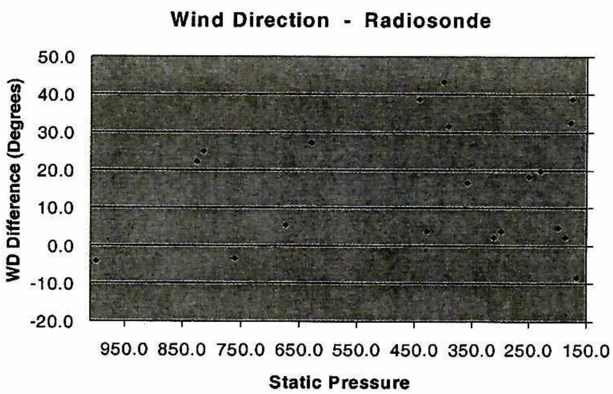
Dewpoint:

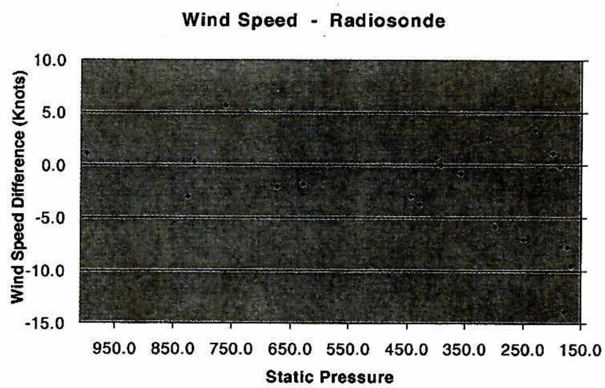




As you can tell by both plots, the average difference between the aircraft dewpoint and the radiosonde dewpoint is around 5°C. This is due to the longer duration for the aircraft sensors to "cool" down. Once the aircraft leveled out at its cruising altitude, it took approximately 15 minutes for the sensors to cool to the correct temperature.

Winds:





The mean difference in the aircraft scientific wind direction and the radiosonde is 15 degrees with a maximum error of over 40 degrees. The mean difference in the wind speed is 2 m/s with a maximum error of 14 knots.

DROPSONDE COMPARE TO XMR RADIOSONDE

Ambient Temperature

Leg 1 - 250 kts IAS

	Northbound Into the Wind (Mean / S.D.)	Southbound Out of the Wind (Mean/S.D.)
AT1 -	-60.5 / 0.1	-60.4 / 0.1
AT2 -	-60.2 / 0.1	-60.2 / 0.1
AT3 -	-59.6 / 0.1	-59.5 / 0.1
AT4 -	~~-60.9~~ / 0.1	~~-60.8~~ / 0.1
ADCSAT -	-57.7 / 0.1	-57.7 / 0.1

Leg 2 - 250 kts IAS

	Westbound Perpendicular to the Wind (Mean / S.D.)	Eastbound Perpendicular of the Wind (Mean / S.D.)
AT1 -	-60.5 / 0.1	-60.3 / 0.1
AT2 -	-60.3 / 0.1	-60.1 / 0.1
AT3 -	-59.5 / 0.1	-59.3 / 0.1
AT4 -	~~-60.9~~ / 0.1	~~-60.6~~ / 0.1
ADCSAT -	-57.8 / 0.1	-57.6 / 0.1

Leg 3 - 200 kts IAS

	Northbound Into the Wind (Mean / S.D.)	Southbound Out of the Wind (Mean / S.D.)
AT1 -	-61.0 / 0.0	-61.0 / 0.1
AT2 -	-60.0 / 0.0	-59.9 / 0.1
AT3 -	-58.4 / 0.0	-58.4 / 0.1
AT4 -	~~-61.5~~ / 0.1	~~-61.3~~ / 0.1
ADCSAT -	-55.7 / 0.1	-55.6 / 0.1

The ambient temperature (-59.6°C) indicated for the Cape Kennedy radiosonde was interpolated from an ambient temperature of -58.5°C at 200.0 mb and -61.1°C at 189.0 mb. Ambient temperatures AT1, AT2 and AT3 fall within 1.0°C of the Cape Kennedy reading (-59.6°C) for legs 1 and 2.

The findings from these legs are the following:

1) The ambient temperature from the aircraft (pilot's) flight data system is 2-4°C warmer than the scientific sensors.
2) Due to AT4's lack of calibration, it had the poorest performance of the four scientific sensors and was consistently cooler.
3) The temperatures of all sensors were quite stable between legs 1 and 2.
4) AT1 and AT4 were cooler when the airspeed was decreased (Leg 3). (Negative effect)
5) AT2, AT3 and ADCSAT were warmer when the airspeed was decreased (Leg 3). (Negative effect)
6) Flying into or out of the wind did not effect any of the sensors.
7) The temperature sensors appear to have an error that is location and airspeed dependent.

Cape Kennedy Radiosonde 15Z
Ambient Temp. (Interp.) -59.6°C

Ruskin Radiosonde 12Z
Ambient Temp. -59.2°C

Dewpoint Temperature

Leg 1 - 250 kts IAS

	Northbound Into the Wind (Mean / S.D.)	Southbound Out of the Wind (Mean/S.D.)
DPLC -	-69.4 / 0.0	-69.1 / 0.0
DPRC -	-71.7 / 0.0	-71.7 / 0.0

Leg 2 - 250 kts IAS

	Westbound Perpendicular to the Wind (Mean / S.D.)	Eastbound Perpendicular of the Wind (Mean / S.D.)
DPLC -	-69.2 / 0.0	-69.3 / 0.0
DPRC -	-72.0 / 0.0	-71.9 / 0.0

Leg 3 - 200 kts IAS

	Northbound Into the Wind (Mean / S.D.)	Southbound Out of the Wind (Mean / S.D.)
DPLC -	-70.5 / 0.2	-71.4 / 0.0
DPRC -	-73.0 / 0.2	-74.5 / 0.0

Interpolating dewpoint temperatures around Florida, the best estimate of dewpoint temperature is -71.0°C. The dewpoint temperatures (DPLC and DPRC) were within 1-2 C of the radiosonde data throughout legs 1 and 2 and were very stable. The dewpoint temperatures (DPLC and DPRC) performed similarly to the ambient temperatures with respect to airspeed.

The findings from these legs are the following:

1) The air upstream of the operating area was drier, therefore it is my estimate that DPRC was the "better" sensor.
2) The dewpoint temperatures were quite stable between legs 1 and 2.
3) Flying into or out of the wind did not effect either sensor.
4) The dewpoint temperatures were 1-3 C cooler when the airspeed was decreased (Leg 3). (Negative effect)
5) The dewpoint sensors appear to have an error that is airspeed dependent.

Cape Kennedy Radiosonde 15Z Dewpoint Temp.		n/a
Ruskin Radiosonde 12Z Dewpoint Temp.	(Interp.)	-71.0°C
Jacksonville Radiosonde 12Z Dewpoint Temp.	(Interp.)	-69.8°C
Jacksonville Radiosonde 00Z Dewpoint Temp.	(Interp.)	-71.8°C

Winds

Leg 1 - 250 kts IAS

	Northbound Into the Wind (Mean / S.D.)	Southbound Out of the Wind (Mean/S.D.)
WD -	19.9 / 6.8	42.0 / 9.2
WS -	13.0 / 0.7	8.3 / 0.5
UI -	-4.3 / 1.3	-5.4 / 0.8
VI -	-12.2 / 1.2	-6.1 / 1.2

Leg 2 - 250 kts IAS

	Westbound Perpendicular to the Wind (Mean / S.D.)	Eastbound Perpendicular of the Wind (Mean / S.D.)
WD -	0.6 / 2.2	27.3 / 3.6
WS -	12.9 / 0.3	15.1 / 0.6
UI -	-0.1 / 0.5	-6.9 / 1.0
VI -	-12.9 / 0.3	-13.4 / 0.4

Leg 3 - 200 kts IAS

	Northbound Into the Wind (Mean / S.D.)	Southbound Out of the Wind (Mean / S.D.)
WD -	31.2 / 1.2	76.0 / 3.3
WS -	9.9 / 0.5	5.2 / 0.3
UI -	5.1 / 0.2	5.1 / 0.3
VI -	-8.5 / 0.5	-1.3 / 0.3

Interpolating winds from various radiosondes at various times during the day, the estimate of wind direction is between 010-040 degrees and the estimate of wind speed is 12-14 m/s in our operating area. The Cape Kennedy radiosonde which was released during our mission (14Z) indicated a wind direction of 020 with a wind speed of 12.3 m/s.

The findings from these legs are the following:

1) Leg 1 into the wind, the WD varied from 008 to 031 with a mean of 020. This mean value was identical to the Cape Kennedy sounding (020).
2) Leg 1 into the wind, the WS varied from 12.0 to 14.3 m/s with mean of 13.0. This mean value was very close to the Cape Kennedy sounding (12.3 m/s).
3) When the aircraft turned into the wind during Leg 1, the WD veered by more than 20 degrees (mean) and the WS decreased by nearly 5 m/s.
4) The estimated error in WD ranged from 0-30 degrees during Leg 1.
5) The estimated error in WS ranged from 0-5 m/s during Leg 1 (up to 40%).
6) The majority of the error in Leg 1 occurred in the VI component.
7) Leg 2, perpendicular to the wind, the WD and WS did not vary as significantly as during Leg 1.
8) The estimated error in WD ranged from 0-20 degrees during Leg 2.
9) The estimated error in WS ranged from 0-4 m/s during Leg 2 (up to 30%).
10) The majority of the error in Leg 2 occurred in the UI component.
11) The estimated error in WD ranged from 5-60 degrees during Leg 3.
12) The estimated error in WS ranged from 1-7 m/s during Leg 3 (up to 55%).
13) The majority of the error in Leg 3 occurred in the VI component.
14) Pitch, roll, true airspeed, heading, dynamic pressure, and static pressure were very steady throughout all of the legs.

Cape Kennedy Radiosonde 15Z

Wind Direction	020	
Wind Speed	12.3 m/s	
X-Component (RUI)	-5.0	-4.21
Y-Component (RVI)	-11.3	-11.6

Other Sensors Performance:

Pitch

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	2.7 / 0.0	2.7 / 0.0
Leg 2:	2.7 / 0.1	2.6 / 0.1
Leg 3:	4.6 / 0.1	4.5 / 0.1

Roll

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	-0.1 / 0.3	-0.1 / 0.3
Leg 2:	0.0 / 0.2	-0.1 / 0.3
Leg 3:	0.0 / 0.2	0.0 / 0.2

True AirSpeed

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	237.9 / 0.6	237.9 / 0.5
Leg 2:	238.1 / 0.4	238.6 / 0.6
Leg 3:	196.1 / 1.2	197.4 / 0.5

Attack

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	2.9 / 0.0	2.9 / 0.0
Leg 2:	2.9 / 0.0	2.9 / 0.0
Leg 3:	4.5 / 0.1	4.4 / 0.0

Sideslip

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	1.3 / 0.0	1.2 / 0.0
Leg 2:	1.2 / 0.0	1.3 / 0.0
Leg 3:	1.3 / 0.0	1.3 / 0.0

Static Pressure

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	193.9 / 0.0	193.9 / 0.0
Leg 2:	193.9 / 0.0	193.9 / 0.0
Leg 3:	194.5 / 0.0	194.0 / 0.0

Dynamic Pressure

	(Mean / S.D.)	(Mean / S.D.)
Leg 1:	105.7 / 0.5	105.7 / 0.5
Leg 2:	106.0 / 0.4	106.3 / 0.6
Leg 3:	68.6 / 1.0	69.5 / 0.4

Yaw Maneuver

Temperatures:

AT1 - had minimal effects from the yaw (0.1°C), more significant effects from changes in airspeed (0.5°C).

AT2 - had more significant effects from the yaw (0.5°C), and similar effects from changes in airspeed (0.4°C).

AT3 - had more significant effects from the yaw (0.7°C), and similar effects from changes in airspeed (0.5°C).

AT4 - had minimal effects from the yaw (0.2°C), more significant effects from changes in airspeed (0.4°C).

ADCSAT - had significant effects from the yaw (1.1°C), and smaller effects from changes in airspeed (0.3°C).

Dewpoint:

The yaw maneuver had negligible impact on either dewpoint temperature.

Winds:

The yaw maneuver did not significantly impact the winds until the sideslip exceeded 4.5 degrees.

When the sideslip exceeded 4.5 degrees, UI was significantly impacted (2 m/s difference when sideslip changed from 4.5-5.5 degrees). In turns, the wind was changed by approximately 10 degrees and 1 m/s.