To: Jack R. Parrish@AOC1@NOAA
From: A. Barry Damiano@AOC1@NOAA
Cc:
Subject: format for AA and SA write-up
Attachment: BEYOND.RTF
Date: 9/2/99 2:28 PM

N43RF CALIBRATION RESULTS
FROM AUGUST 6 1998 FLIGHT

N43RF flew a five-hour mission on August 6, 1998 over the southeast Gulf of Mexico. Several maneuvers were executed that would determine the coefficients for the attack and slip angles. A yaw maneuver was done at 1500 feet and 15000 feet to provide input for deriving the slope for slip angle. Several speed runs, into and out of the wind, were flown at five altitudes and the data collected from those maneuvers were used to determine the slope and intercept for attack angle.

The slow data was stored on the HP system and the Sun System (Everest) via UCI's AOCPROC program. Through AOCPROC the flight level data was stored as a netCDF file. This allows the NCAR-provided plotting program, NCPLOT, not only to view the flight level parameters, but also store user-selected portions of the data as ASCII files. These ASCII files are used as input to the attack/slip angle derivation program ABD_TPCAL.o located in /home/users/barryd/cprog on Everest.

For the attack angle coefficients four separate ASCII files (one for each speed run) were created for each altitude. Each file was edited to remove data points that did not fit the specs for that particular run. Approximately one hundred (100) points are required for each speed run to make it statistically sufficient. After each file was edited, the four files were merged into one ASCII file. ABD_TPCAL.o uses that merged file as input to determine the attack angle coefficients for that altitude. The following table shows the attack angle coefficients for each of the five altitudes:

	Slope	Intercept		
1500 feet	6.69712	1.1149	5.28818	1.09432
5000 feet	6.75386	1.1075	5.01513	1.07520
10000 feet	6.70276	0.9862	5.48983	1.02008
15000 feet	6.66549	1.0463	5.04155	1.01007
20000 feet	6.70470	1.0326	5.26896	0.96028

The above table is for reference purposes only. To obtain the "final" slope and intercept for attack angle all five ASCII files (one for each of the five altitudes) are merged into a single ASCII file, and that file would be used as input by ABD_TPCAL.o. For this calibration flight the slope and intercept for attack angle are as follows:

For all levels Slope: 6.73176 Intercept: 1.0564 5.36262 1.03375

The program also computes a correlation coefficient and it is .99755 for this data. .98769

The input data to determine the slope for slip angle comes from the two yaw maneuvers. Each maneuver has its own ASCII file. Each file is edited to remove unwanted data. Approximately one hundred (100) points are required per maneuver. ABD_TPCAL.o computes a slope for slip angle for each maneuver. For this flight the slip angle slopes are as follows:

1500 feet	Slope: 7.25118	7.37928
15000 feet	Slope: 7.36462	7.32547

As was for the attack angle derivation, the two files are merged into one ASCII file.
The "final" slip angle slope is 7.33486. 7.35756

To determine the slip intercept, a subjective technique is employed using plots of wind direction, wind speed and vertical wind from the circle maneuvers made at 5000 feet. Several plots of the aforementioned parameters are made varying the intercept value for slip angle. Through some simple statistics and a "meteorological eyeballing" of the plots, a determination for the slip angle intercept is made. For this flight the slip angle intercept is +0.475. As stated previously this method is very subjective, but it does provide a hands-on view of what is happening to the wind values when modifying the value for the slip angle intercept.

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U.S. DEPT. COMM./NOAA/OAO - DATA SECTION WORK FORM NO.1 OAOWF1 FILE

FLT ID: 990816I	FM: MCF	TO: MCF
FLT NO: 99-45	BLK IN: 1913	ATA: 1904
ETD: 12Z	BLK OUT: 1459	ATD: 1508
ETE: 6	BLK TIME: 4:14 (4.2)	FLT TIME: 3:56 (3.9)
SPONSOR ORG: AOC	PROGRAM: Calibration	PURPOSE: Wind Tracks, Drops.

OAO PERSONNEL

AC Philipsborn ✓	SYS ENG Barr ✓ / Lynch ✓
CP McKim ✓ / O'Mara ✓	DATA SYS Carpenter ✓
NAV Neaman ✓	RADAR ~~Dafoe~~
FE Moore ✓ / Wade ✓	DT/ODW Smith ✓
RADIO ~~Fuchs~~	CLD PHYS
FD Parrish ✓	DOPPLER Floyd ✓

PARTICIPATING SCIENTIST/VISITORS/OAO

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
Walsh, Ed ✓		
Wright, Wayne ✓		
30.3		
22.9		
1020.3		
120/5		

T.O. ATIS

PROPOSED/ACTUAL MISSION/REMARKS (RECCO, FIXES, STORM, PENET, NHOP #)

Fly calibration sequence, radar tests, SRA tests, drops. 81/23 120/5 30.16 1020.3

Delays due to servicing oxygen, VHF failure.

#2 dewpoint inop. Vert wind stays at +0.5 W/s SE at 5K.

Winds light easterly at 5K - decided to do circles at 10K. Fleet dip to 250' for AD.

Wind ~140/13.5 at 10K. Good AAD test 5K.

15K WD ~130

Data system crash 182200Z. Dropped 2 sondes from 20K, 2nd one worked. 1st bad GPS module.

LAND 30.14
1016.5
200/4
1018.5

U.S. DEPT. COMM./NOAA/OAO - DATA SECTION WORK FORM NO.2 OAOWF2

FLT ID: TIME OFF: TIME ON:

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE				

	NO	DATA DISPOSITION/DATE/QUALITY
1/SEC FLT LVL TAPES		
FAST FLT LVL TAPES		
RADAR TAPES		
DOPPLER TAPES		
ODW CASSETTES		
HARD COPIES		
AXBT		
AXCP		
ODW		

PHOTOGRAPHY

	FWD	LS	RS	VERT	
ON					
OFF					
RATE					

REMARKS

990816I Calibration Flight

Time	LAT	LON	TR	WD	WS	PA	GA	TA	TD	SP	PS			
1459	2751	8229.6				-59		35	22.9		1020.5	3CK		
150915	2749	8233	194	114	7.8	265	656	24.8	17.3	1019.8		↑		
1512	2741.6	8238.5	227	155	5.8	846	960	23.1	15.7	1020.7	9.5.9	—		
151910	. STARTED YAW													
152030	↑ MORE YAW		152330		Flew then at 2300'									
152730	2659.6	8318.2	145	146	7.6	368	445	25.8	22.7	1019.6	969.9	240 IAS	LEG 1	30301
153230	2649.7	8316.9	323	135	8	365	446	25.8	22.8	1020.0	970	LEG 2	153600	
153640	2704	8328	325	YAW MANEUVERS					153940					1.5K
154230	2707.8	8335.5	145	145	7	363	444	26.0	22.9	1020.2	970.3	180 IAS	LEG 1	154530
154720	2720.9	8333.7	325	139	9.0	361	443	25.9	22.8	1020.2	970.5	"	LEG 2	155020
155215	↓			RD	28.7 at 1500'			29.0	1K	29.1	.75K	29.1	.5K	29.4 .25K
160450	2633	8327	CLOUD PUNCH			FOR JIM BARR								
161030	2627	8352	250	70	4	1387	1521	18.9	12.3	1020.4	857.4	240 IAS LEG		
161530	26186	8402.0	70	77	2.8	1386	1522	19.1	12.2	1020.2	857.6	27.5		5K
162140	2625	8356	255	80	5.1	1381	1515	19.1	12.3	1020.3	858	180 IAS	2440	
162645	2625	8404	76	90	2.7	1381	1518	19.1	12.2	1020.4	858.2	"	2945	
163625	2646	8347	320	141	15	2819	3036	10.7	1.1	1020.2	717.3	180 IAS	163925	
164200	2650	8356	140	143	14.4	2816	3031	10.6	1.5	1020.3	717.7	25.8	164500	
164735	2647	8348	320	141	15	2817	3030	10.8	1.1	1019.7	717.5	240 IAS	165035	10K
165245	2700	8352	140	138	12.2	2817	3032	10.7	1.6	1019.8	717.5	25.5	165545	
165630	2649	8345	3 circles R, then 3 left				Flew @	240	IAS			170615		
			WINDS	SPD VARIES	from	12-17 kt	in R circles			DIR.		120-136°		
170625	CIRCLES		L	LITTLE	SPEED VAR	~2KT	MUCH UNSTEADIER		WD CHANGES				171650	
172530	2710	8347	140	146	17.7	4594	4909	-1.1	-10.6	1019.6	570	180 IAS	172830	
173125	2705.1	8348.2	321	140	21.5	4596	4910	-0.9	-10.0	1019.4	570	24.8	173425	15K
173840	2711	8346	139	151	19.2	4595	4907	-0.9	-9.8	1019.3	570.1	240 IAS	174140	
174345	2658	8344	321	147	21.8	4594	4904	-1.2	-9.0	1019.8	570.2	24.7	174645	
174855	2719	8403		YAW	5R → 5L		SP VARIES		-62 mb to	+ 40 mb				
175931	2659	8414	131	Drop 1										
180007	2658	8412	130	126	10.8	6127	6523	-10.6	-18.0	1017.5	463.6	ABANDON DUE TO WD SHIFT		
180145	2653	8406	120	125	10.2	6126	6522	-10.4	-17.1	1016.6	463.7	180	180445	
180640	2652	8355	300	115	13.3	6123	6522	-10.2	-16.5	1016.8	463.8	23.9	180940	20K
180856	2654	8359	Drop 2		126/13			-10.4	-16.5	1016.7	463.8	RD ↑		
181345	2648	8355.5	120	125	10.8	6129	6520	-10.0	-20.0	1015.5	463.6	240	181645	A little more dir shift on this leg.
181900	2647	8344	300	124	13.7	6128	6521	-10.1	-17.0	1015.5	463.6	24.2 ↓	1822	
183627	2714	8330	PITCH	MANEUVERS			183910							
184700	2721	8306	26	102	8.4	1475	1620	19.1	11.3	1020.2	846	Drop	6T	
1913	2751	8229.6				-49		35.4	20.9		1019.2	BLOCK	IN	

MISSION DATA

'N' NUMBER	MISSION:
N3RF	CALIBRATION

TASK NO.	SPSA43C	HOURS	.	TASK NO.		HOURS	.
TASK NO.		HOURS	.	TASK NO.		HOURS	.

DATE	FLIGHT NUMBER	FROM	TO	OUT	OFF	ON	IN	FLIGHT	BLOCK
8/16/99	99-45	KMCF	KMCF	1459	1508	1904	1913	3.9	4.2
ADDITIONAL CREW CODES								.	.
PI – PRINCIPLE INVESTIGATOR								.	.
SC – SCIENCTIST								.	.
NM – NEWS MEDIA								.	.
VP – VIP								.	.
AA – ADDITIONAL AIRCREW								.	.
CARRY FORWARD FLIGHT TIME TOTAL TO BLOCK 8 OF FLIGHT STATUS DOCUMENT							TOTAL	3.9	4.2

FLIGHT CREW DATA

CREW POS.	FLIGHT CREW LAST NAME, INT.	FLIGHT HOURS PIC	SIC	IP	NIGHT	LANDINGS DAY	NT	INST. HOURS ACT	HOOD	SIM	APPROACHS PREC	NP
AC	PHILIPSBORN, R.	4.2	.	.	.			0.1	.	.		
P	McKIM, G.	2.5	1.7	.	.	1		.	.	.		
P	O'MARA, T.	1.7	2.5	.	.			.	.	.		
FE	MOORE, A.		.									
FE	WADE, S.		.									
NAV	NEWMAN, C.		.									
NAV			.									
RO/PH			.									
MECH	FLOYD, D		.									
FD	PARRISH, J.											
~~FD~~ IFT	LYNCH, T.											
IFT	BAER, J.											
IFT	SMITH, J.											
IFT	~~DAVIS, D.~~											
IFT	CARPENTER, D.											

CODE	ADDITIONAL CREW MEMBERS, LAST NAME, INT. & ORG.
PI	WALSH, E.
SC	WRIGHT, W.
SC	
SC	
SC	

REMARKS:

1st SOB

Weather Briefing	Location	MCF
	Date	8/16/99
	Time	1500

AC SIGNATURE:

All listed crew members have been briefed and manifest is correct.

AC SIGNATURE:

HAZARDOUS DUTY	YES	X	NO	

AC SIGNATURE:

WEIGHT & BALANCE	ON FILE		HAZARDOUS DUTY	APPROVED		DISAPPROVED	
	ATTACHED		CHIEF FLIGHT OPS SIGNATURE:				

NOAA FORM 56-49
(2-95)

MISSION PREFLIGHT LOG

DESTINATION	MISSION	NAVIGATOR	AIRCRAFT COMMANDER	FLIGHT DIRECTOR	SCHEDULED / ACTUAL TAKEOFF Z	DATE OF TAKEOFF
MCF → MCF	CAL FLIGHT	NEWMAN	PHILIPSBORN	PARRISH	1400Z'	16 AUG 99

WP	LAT / LON	RTE	MH	VAR +E==>	TH	DR +R==>	TRK	GS	WD	WS	ALT	TAS	LEG / TOT DIST	LEG / TOT TIME	PROP ETA	ETA	ATA	REMARKS
ϕ																		
1	26 30N 84 00W		227	2W	225	2	225	250	4V	4V	7	250	114 / 114	+28 / +28				
ϕ	27 51N 82 29W												114 / 228	+28 / +56				
	BLOND																	

INS PERFORMANCE

	INS 1	INS 2
BEGIN ALIGN TIME	1300	1300
ALIGN STATUS (0-5)	0	0
END NAV TIME	1930	1930
START NAV TIME	1430	1430
DELTA T	5+00	5+00

TERMINAL ERRORS

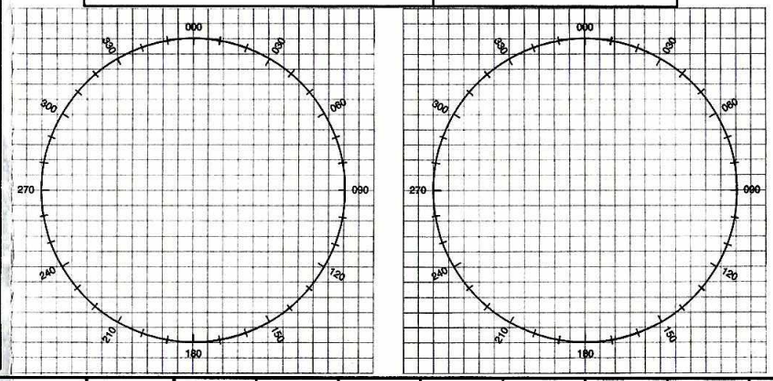
	INS 1	INS 2
DELTA LAT	+.6	+3.2
DELTA LON	-.2	+.8
RGS	1	1
RADIAL ERROR	1	4.

REMARKS

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
AIRCRAFT OPERATIONS CENTER

CLEARANCES			
FREQ	ALT	HDG	OTHER
			RWY 22 TAXI 6 CLOSED "J"
			125.5 Z 120/Z 30.14
			MIAMI CTR

MISSION LOG PAGE ___ OF ___



POSITION REPORT

1. POSITION
2. TIME
3. ALTITUDE
4. NEXT POSITION
5. ETA
6. NEXT POSITION

EMERGENCY MESSAGE

TRANSMIT THE FOLLOWING MESSAGE TO ANY AGENCY ON THE AIR-GROUND FREQUENCY IN USE. IF UNABLE TO ESTABLISH COMMS, ATTEMPT CONTACT ON ANY OF THE FOLLOWING EMERGENCY FREQUENCIES:

UHF/VOICE	VHF/VOICE	MF/VOICE	HF/CW	MF/CW
243.0	121.5	2182 KHZ	8364 KHZ	500 KHZ

MAYDAY, MAYDAY, MAYDAY
THIS IS NOAA _____, NOAA _____, NOAA _____

- POSITION _____ N / S _____ E / W AT _____ Z
- HEADING _____ TRUE/MAG
- AT _____ KTS TRUE/INDICATED
- FLIGHT LEVEL OR ALTITUDE _____
- WE ARE A P-3 AIRCRAFT WITH _____ SOULS ON BOARD
- NATURE OF EMERGENCY
- ASSISTANCE DESIRED
- PILOT INTENTIONS
- WE HAVE _____ ENDURANCE REMAINING

TIME	FIX TYPE	POSITION	INS 1 POSITION	K ERR	INS 2 POSITION	K ERR	MH	VAR +E==>	TH	DR +R==>	TRK	GS	WD	WS	ALT	TAS	NEXT PT	DIST	TIME	ETA	REMARKS
1459																					43,000 1.5 TAXI 22 30.15
1508																					TOFF
1530	GPS FMI	2652.3 8312.7	2652.3 8312.7	0 0	2652.2 8312.7	+.1 0						242	121	8	1.5	247					
1630	GPS FMI	2627.9 8354.9	2628.1 8354.5	+.2 +.4	2627.4 8354.7	+.5 +.2	144	2W	142	1L	141	200	130	11	10K	210					
1734	GPS FMI	2705.2 8348.0	2705.4 8348.1	-.2 -.1	2704.1 8347.5	+1.1 +.5			322	1L	321	255	1:41	22	15K	232					
1759:34		2659.584 8414.762																			DROP WINASONDE
1808:00		2654.436 8359.296																			DROP WINDSONDE
1830	GPS FMI	2711.7 8351.1	2711.6 8351.1	+.1 0	2709.6 8350.5	+2.1 +.6			079	3L	074	292	175	16	200	297					
1847		2720.364 8306.393																			DROP AXBT
1904																					LAND
1913																					CHOCK