

ENGINEERING EVALUATION OF THE MODIS-N AIRBORNE  
SIMULATOR (MAS) REMOTE SENSOR PERFORMANCE  
DURING THE FIRE CAMPAIGN

April 14, 1992

by  
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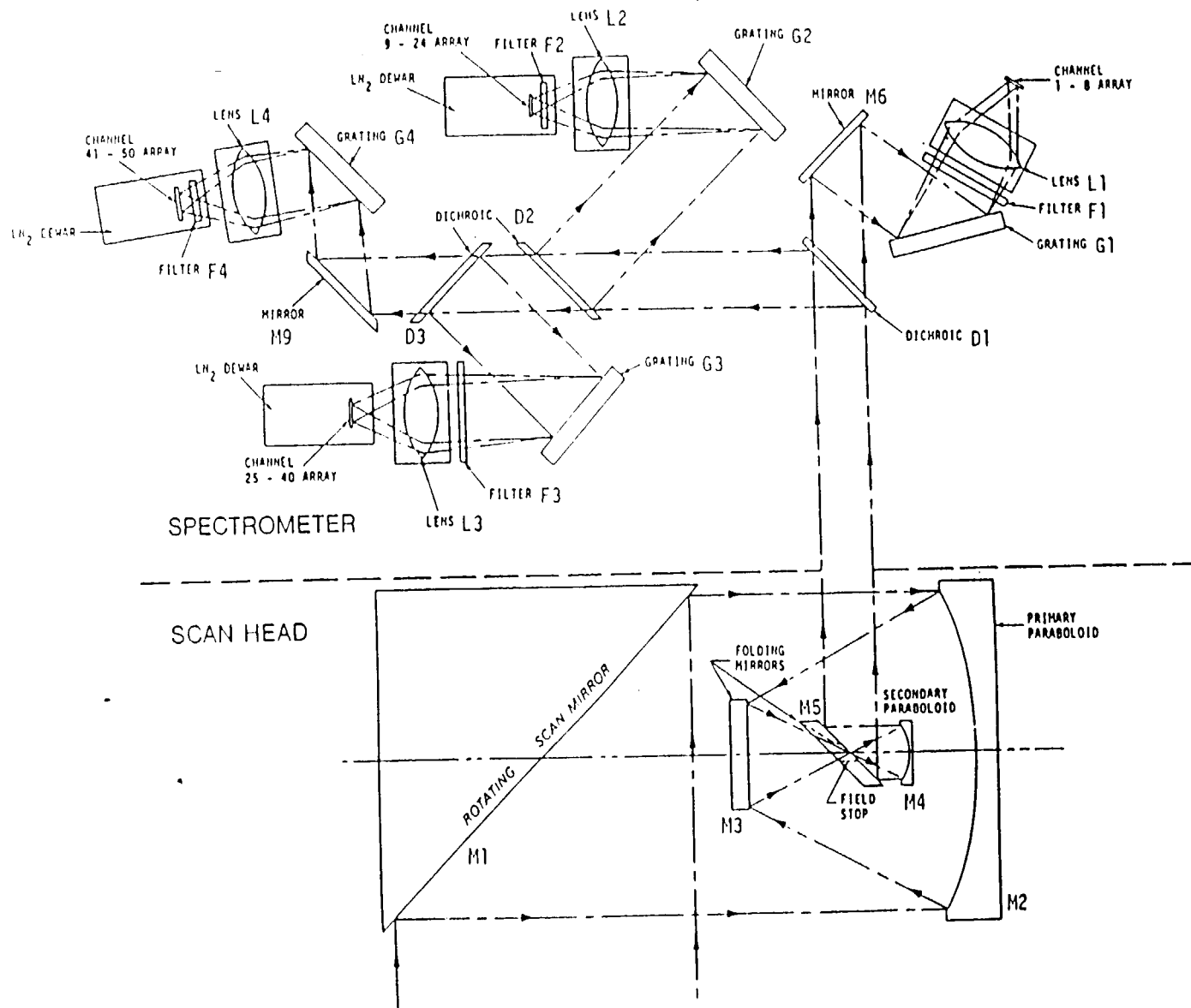


Figure 1 Spectrometer and Scan Head Configuration

Figure 2  
 MODIS-N Airborne Simulator (MAS)  
 channels and performance goals  
 2-20-92

No	band (um)	edges (um)	width (um)	radiance w/m2 um sr		snr	scene temp (K)		netd (K)
				max	typ		max	typ	
1	.555	.535-.575	.04	64	21	--			
2	.659	.634-.684	.05	685	21.8	260			
3	.705	.685-.725	.04						
4	.745	.725-.765	.04						
5	.785	.765-.805	.04						
6	.825	.805-.845	.04						
7*	.865	.845-.885	.04	285	24.7	270			
8*	.902	.885-.920	.035	185	10.0	80			
9	.942	.920-.965	.045	189	15.0	180			
10	1.64	1.625-1.655	.05	70	7.3	--			
11	1.68	1.655-1.705	.05						
12	1.73	1.705-1.755	.05						
13	1.78	1.755-1.805	.05						
14	1.83	1.805-1.855	.05						
15	1.88	1.855-1.905	.05						
16	1.93	1.905-1.955	.05						
17	1.98	1.955-2.005	.05						
18	2.03	2.005-2.055	.05						
19	2.08	2.055-2.105	.05						
20	2.13	2.105-2.155	.05	72	1.0	187			
21	2.18	2.155-2.205	.05						
22	2.23	2.205-2.255	.05						
23	2.28	2.255-2.305	.05						
24	2.33	2.305-2.355	.05						
25	2.38	2.355-2.405	.05						
26	3.00	2.925-3.075	.15						
27	3.15	3.075-3.225	.15						
28	3.30	3.225-3.375	.15						
29	3.45	3.375-3.525	.15						
30	3.60	3.525-3.675	.15						
31	3.75	3.675-3.825	.15	1.7	.45	115	335	300	1.0
32	3.90	3.825-3.975	.15						
33	4.05	3.975-4.125	.15						
34	4.20	4.125-4.275	.15						
35	4.35	4.275-4.325	.15	.37	.46		285	270	.6
36	4.50	4.325-4.575	.15	4.02	1.05		325	285	.5
37	4.65	4.575-4.725	.15						
38	4.80	4.725-4.875	.15						
39	4.95	4.875-5.025	.15						
40	5.10	5.025-5.175	.15						
41	5.25	5.175-5.325	.15						
42*	8.60	8.35-8.85	.5				324	300	.20
43*	9.70	9.45-9.95	.5				400	250	.25
44*	10.50	10.25-10.75	.5					300	.10
45*	11.00	10.75-11.25	.5				324	300	.15
46*	12.00	11.75-12.25	.5				324	300	.25
47*	12.80	12.55-13.05	.5					260	.50
48*	13.3	13.05-13.55	.5				285	260	.75
49*	13.8	13.55-14.05	.5				268	240	1.20
50*	14.3	14.05-14.55	.5				238	240	2.00

\*note: change in bandpass

Figure 3  
 FIRE/MODIS-N Airborne Simulator (MAS)  
 channels and performance goals  
 7-31-91

No	data chnl	band (um)	edges (um)	width (um)	radiance*		snr	scene temp (K)		netd (K)	measured		noise in signal	NER*** or NETD"	typ gain/ ofst
					max	typ		max	typ		radiance* or temp**	signal (mv)			
1	2	.68	..675-.685	.01	480	10.2	50				42.7	1.1e3	18.7	7.3E-8	
2	3	1.64	1.605-1.655	.05	70	7.3	200				27.5	1.9E3	1.4	2.0E-9	
3		1.68	1.655-1.705	.05											
4		1.73	1.705-1.755	.05											
5		1.78	1.755-1.805	.05											
6		1.83	1.805-1.855	.05											
7		1.88	1.855-1.905	.05											
8		1.93	1.905-1.955	.05							17.0	2.44E3	2	1.4E-9	
9	4	1.98	1.955-2.005	.05											
10		2.03	2.005-2.055	.05											
11		2.08	2.055-2.105	.05											
12	5	2.13	2.105-2.155	.05	22	1.0	187				14.3	1.1E3	1.2	1.6E-9	
13	6	2.18	2.155-2.205	.05							13.2	9.28E3	1.2	1.7E-9	
14		2.23	2.205-2.255	.05											
15		2.28	2.255-2.305	.05											
16		2.33	2.305-2.355	.05											
17		2.38	2.355-2.405	.05											
18		3.00	2.925-3.075	.15											
19		3.15	3.075-3.225	.15											
20		3.30	3.225-3.375	.15											
21		3.45	3.375-3.525	.15											
22		3.60	3.525-3.675	.15											
23	7	3.75	3.675-3.825	.15	.45		115	335	300		15	1.75E3	77.5	.66	
24		3.90	3.825-3.975	.15											
25		4.05	3.975-4.125	.15											
26		4.20	4.125-4.275	.15											
27		4.35	4.275-4.325	.15											
28	9	4.50	4.325-4.575	.15							15	1.8E3	28.5	.23	
29	8	4.65	4.575-4.725	.15							15	1.9E3	29.5	.25	
30		4.80	4.725-4.875	.15											
31		4.95	4.875-5.025	.15											
32		5.10	5.025-5.175	.15											
33		5.25	5.175-5.325	.15											
34	10	8.80	8.60-9.00	.4				374	300	.20	15	2.3E3	28	.18	
35		9.20	9.00-9.40	.4				400	250	.25					
36		9.60	9.40-9.80	.4					300	.10					
37		10.00	9.80-10.2	.4				324	300	.15					
38		10.45	10.2-10.7	.5				324	300	.25					
39	11	10.95	10.7-11.2	.5					260	.50	15	2.51E3	45	.27	
40		11.45	11.2-11.7	.5				285	260	.75					
41	12	11.95	11.7-12.2	.5				268	240	1.20	15	1.48E3	55		
42		12.45	12.2-12.7	.5				238	240	2.00					
43		12.95	12.7-13.2	.5											
44															

\* w/m<sup>2</sup>-um-sr  
 \*\*K-degrees  
 \*\*\*net=radiance/signal/noise  
 "netd=delta temp/signal/noise

Figure 4  
System Sensitivity Performance

data chnl	spect num	spectral chnl (um)	cal-source radiance *	measured signal (mv)	measured RMS noise		calculated NER	
					mv@scan 6.25	speed 25	@ scan speed 6.25	25
2	1	.68	4.27E-06	1.10E+03	18.7	25.2	7.3 E-08	9.8E-08
3	2	1.64	2.75E-06	1.90E+03	1.4	2.9	2.0E-09	4.2E-09
4	9	1.98	1.70E-06	2.44E+03	2.0	4.3	1.4E-09	3.0E-09
5	12	2.13	1.43E-06	1.10E+03	1.2	2.7	1.6E-09	3.5E-09
6	13	2.18	1.32E-06	9.28E+02	1.2	2.6	1.7E-09	3.7E-09
			delta temp (C)				calculated NETD (C)	
7	23	3.75	15	1.75E+3	77.5	119	0.66	1.02
8	29	4.65	15	1.90E+03	28.5	44.5	0.23	0.35
9	28	4.5	15	1.80E+03	29.5	46	0.25	0.38
10	34	8.80	15	2.30E+03	28	42	0.18	0.27
11	39	10.95	15	2.51E+03	45	70	0.27	0.42
12	41	11.95	15	1.48E+03	55	85	0.56	0.86

\* w/m^2-um-sr

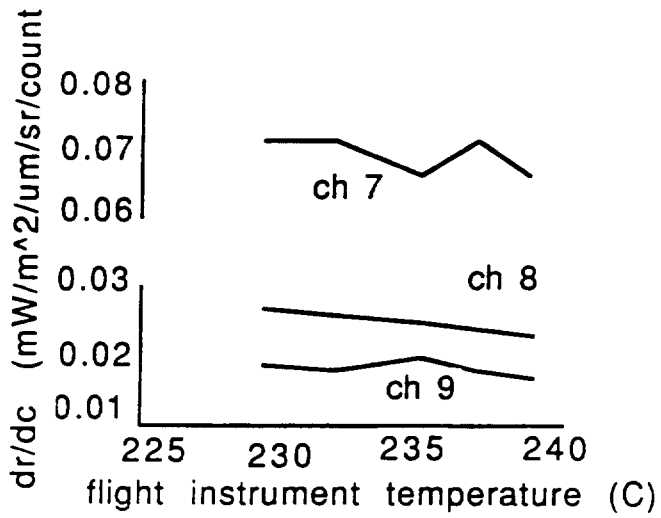


figure 5A

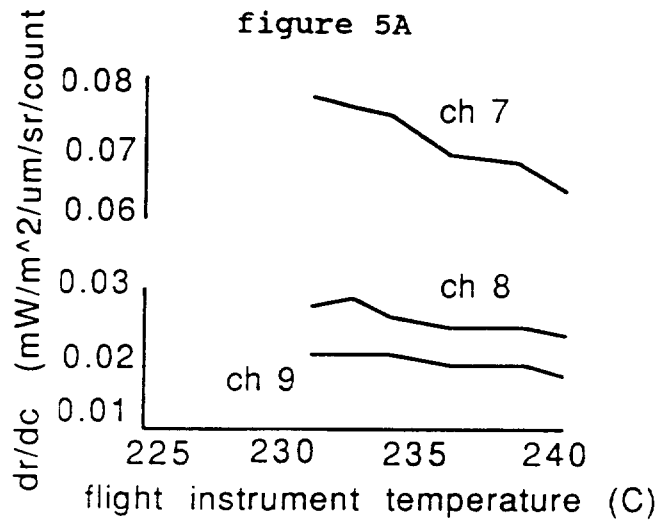


figure 5B

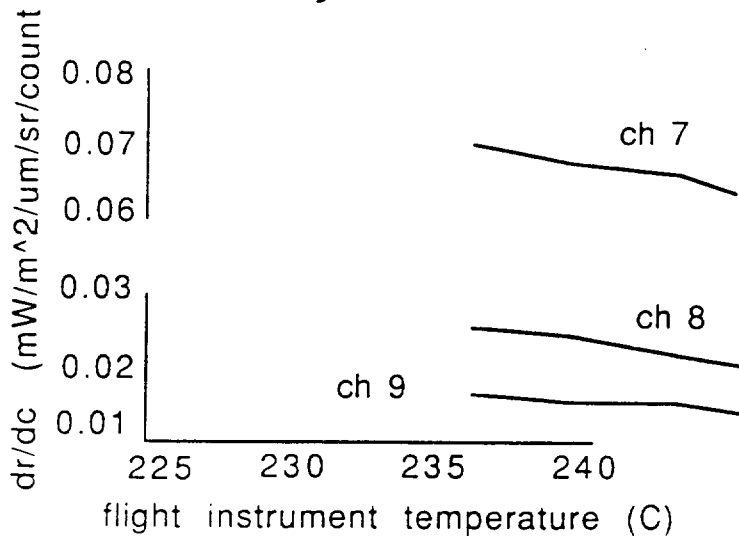


figure 5C

figure 5 Inflight Gain Change

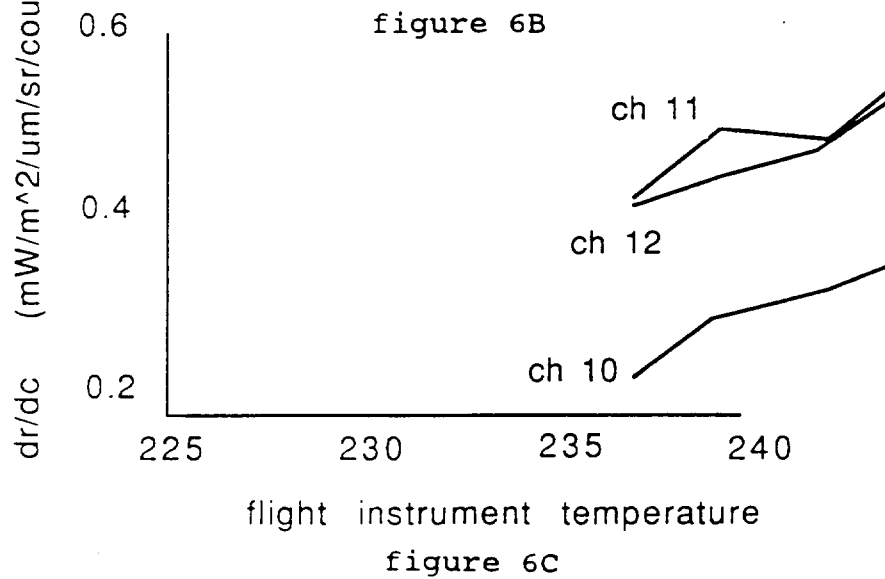
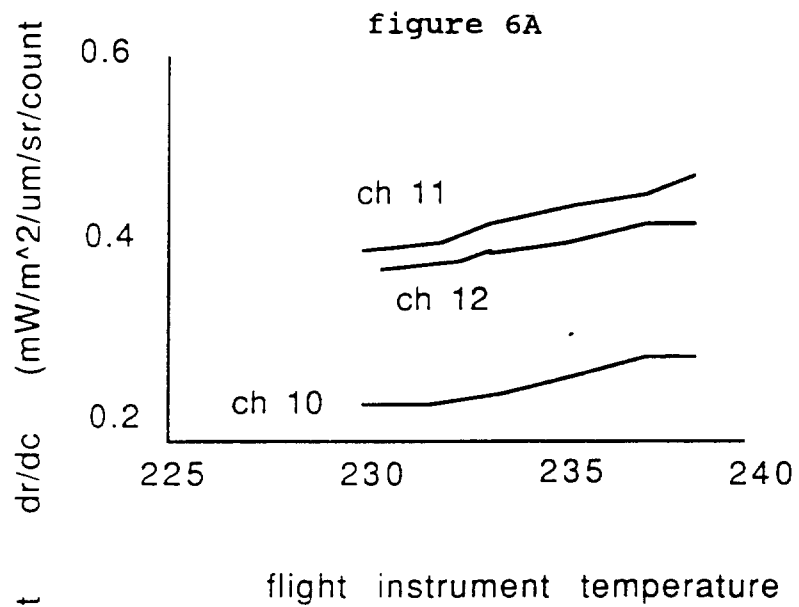
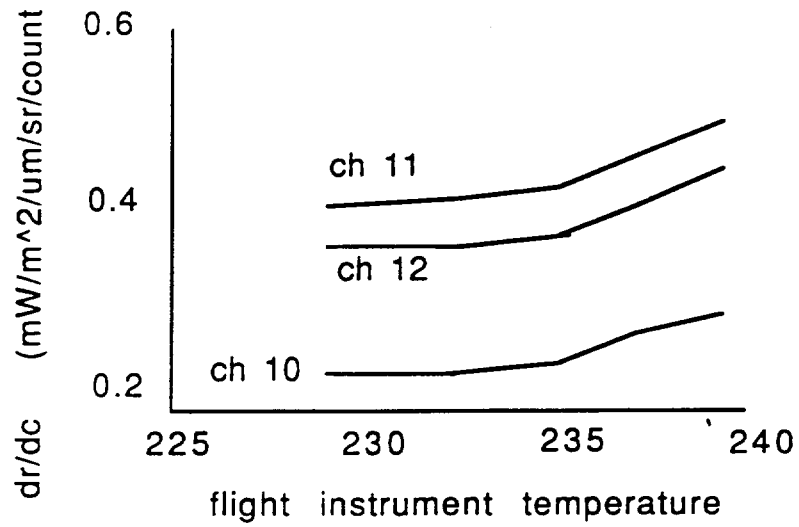


figure 6 Inflight Gain Change ch 10 ,11,& 12

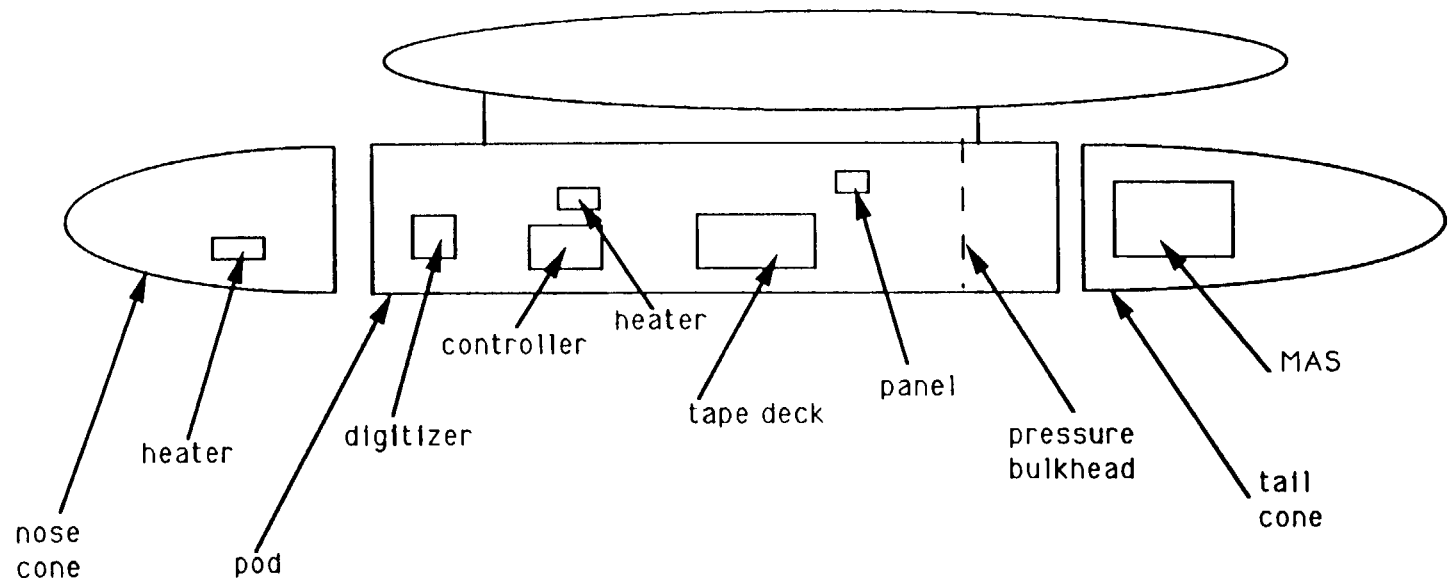


Figure 9 MAS Layout



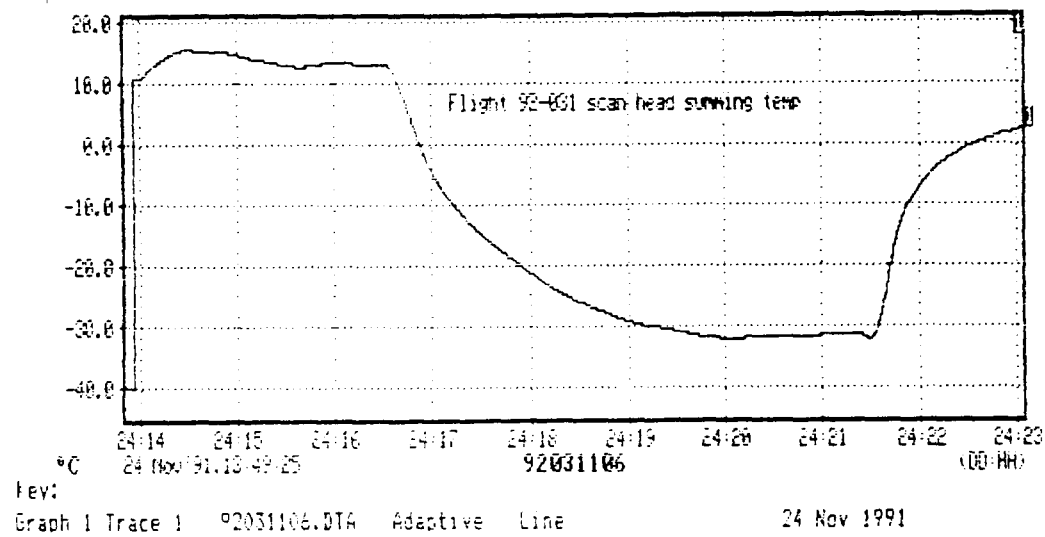
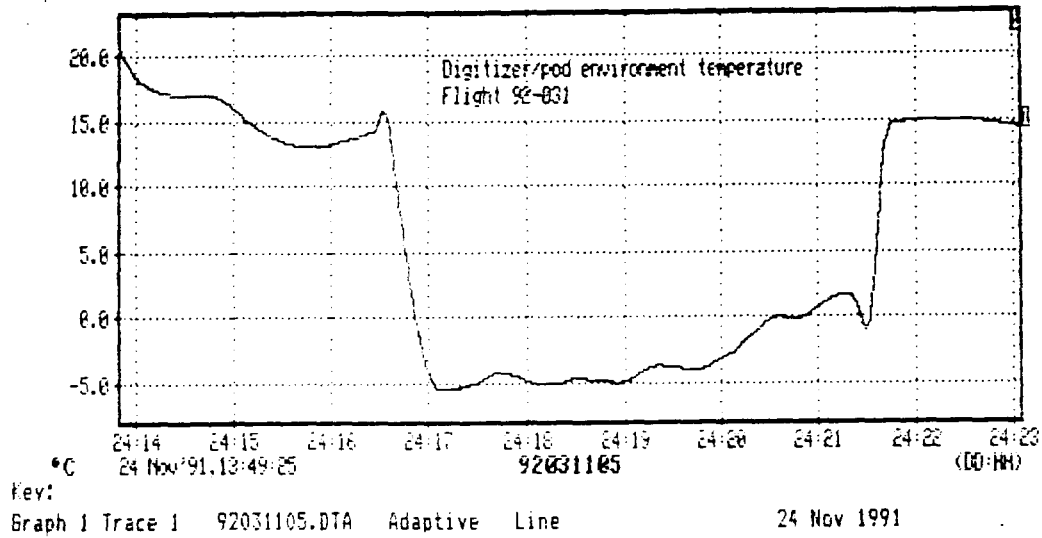
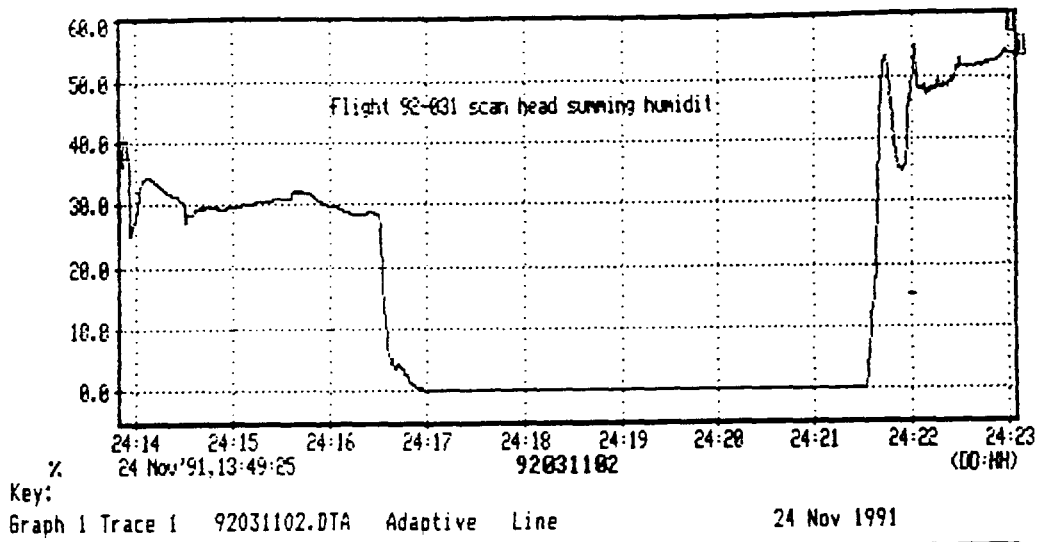


figure 10 Instrument Temperature and Humidity