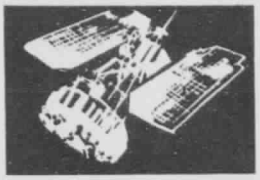
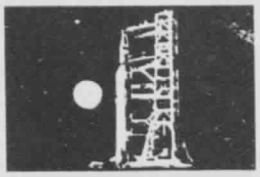
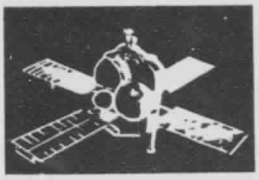
SPACE DIVISION

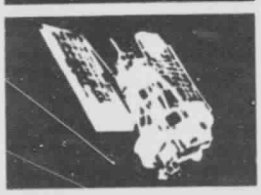
75SDS4255

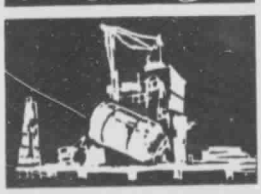
10 OCTOBER 1975











LANDSAT-1 AND LANDSAT-2 FLIGHT EVALUATION REPORT 23 APRIL 1975 TO 23 JULY 1975

Prepared By

GE LANDSAT OPERATIONS CONTROL CENTER

For

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Goddard Space Flight Center
Greenbelt, Maryland 20771

Contract NAS5-21808

GENERAL ELECTRIC

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

INTRODUCTION

This is the twelfth report in a continuing series of documents issued at launch, and thereafter quarterly, to present flight performance analysis of the Landsat-1 Spacecraft. Previously issued documents are:

72SD4255	ERTS-1 Launch and Flight Activation Evaluation Report 23 to 26 July 1972	18 October 1972
72SD4262	ERTS-1 Flight Evaluation Report 23 July 1972 to 23 October 1972	28 November 1972
72SD4224	ERTS-1 Flight Evaluation Report 23 October 1972 to 23 January 1973	27 February 1973
73SD4249	ERTS-1 Flight Evaluation Report 23 January 1973 to 23 April 1973	29 May 1973
73SD4260	ERTS-1 Flight Evaluation Report 23 April 1973 to 23 July 1973	10 August 1973
73SD4274	ERTS-1 Flight Evaluation Report 23 July 1973 to October 1973	28 November 1973
74SD4205	ERTS-1 Flight Evaluation Report 23 October 1973 to 23 January 1974	26 February 1974
74SD4217	ERTS-1 Flight Evaluation Report 23 January 1974 to 23 April 1974	18 May 1974
74SD4236	ERTS-1 Flight Evaluation Report 23 April 1974 to 23 July 1974	15 August 1974
74SD4255	ERTS-1 Flight Evaluation Report 23 July 1974 to 23 October 1974	31 December 1974
75SDS4222	Landsat-1 Flight Evaluation Report 23 October 1975 to 23 January 1975	30 April 1975
75SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1975 to 23 April 1975	15 September 1975

This report contains analysis of performance for Orbits 14000 to 15270 for Landsat-1.

SECTION 1

SUMMARY - LANDSAT-1 OPERATIONS

Landsat-1 has completed 3 years of operation and continues to perform its mission nominally.

The Landsat-1 spacecraft was launched from the Western Test Range on 23 July 1972, at 18:08:06.508Z. The launch and orbital injection phase of the space flight was nominal and deployment of the spacecraft followed predictions. Orbital operations of the spacecraft and payload subsystems were satisfactory through Orbit 147, after which an internal short circuit disabled one of the Wideband Video Tape Recorders (WBVTR-2). Operations resumed until Orbit 196, when the Return Beam Vidicon failed to respond when commanded off. The RBV was commanded off via alternate commands and since that time, Landsat-1 has performed its mission with the Multispectral Scanner and the remaining Wideband Video Tape Recorder providing image data. The remaining Wideband Video Tape Recorder experienced four suspensions of operation, the last being in Orbit 9881 on 2 July 1974, and has not been used operationally since. In Orbit 4396, an integrated circuit chip in the TMP failed, disabling four TLM functions. COMSTOR "B" has an intermittent problem with cell 12, which is not being used operationally. The "B" section of the USB with full power output of 1.5 watts was substituted for the "A" section in Orbit 10068 because of excessive decline of transmitter power. The pitch flywheel stopped for 2 minutes in Orbit 8040; and for 8 hours, 2 minutes in Orbits 11125 to 11130. It has been kept close to zero speed ever since, using pitch-bias control. The RMP was switched from B to A in Orbit 11257 as a precautionary measure after RMP B began showing operating current variations. The DCS subsystem was turned off after Orbit 12690 and the function assumed by Landsat-2. Narrow Band Recorder 2 became noisy and was turned off in Orbit 13015. Operation of NBR 2 resumed in 14116 until failure in Orbit 15253, when operation was terminated. Battery 6 was turned off in Orbit 13346 due to electrical characteristics causing high temperatures. Battery 6 was returned to operation in Orbit 14100. In Orbit 14780, Battery 6 was again turned off because of high temperature and was off to the end of this report period. The pitch flywheel duty cycle increased and was abnormally high with erratic operation and brief flywheel stoppages between Orbits 15191 through the end of this report period. MSS operation was suspended while the pitch flywheel operation is under observation. See Figure 1-1 for three-year history of equipment failures, and Table 1-1 for a summary of in-orbit operation.

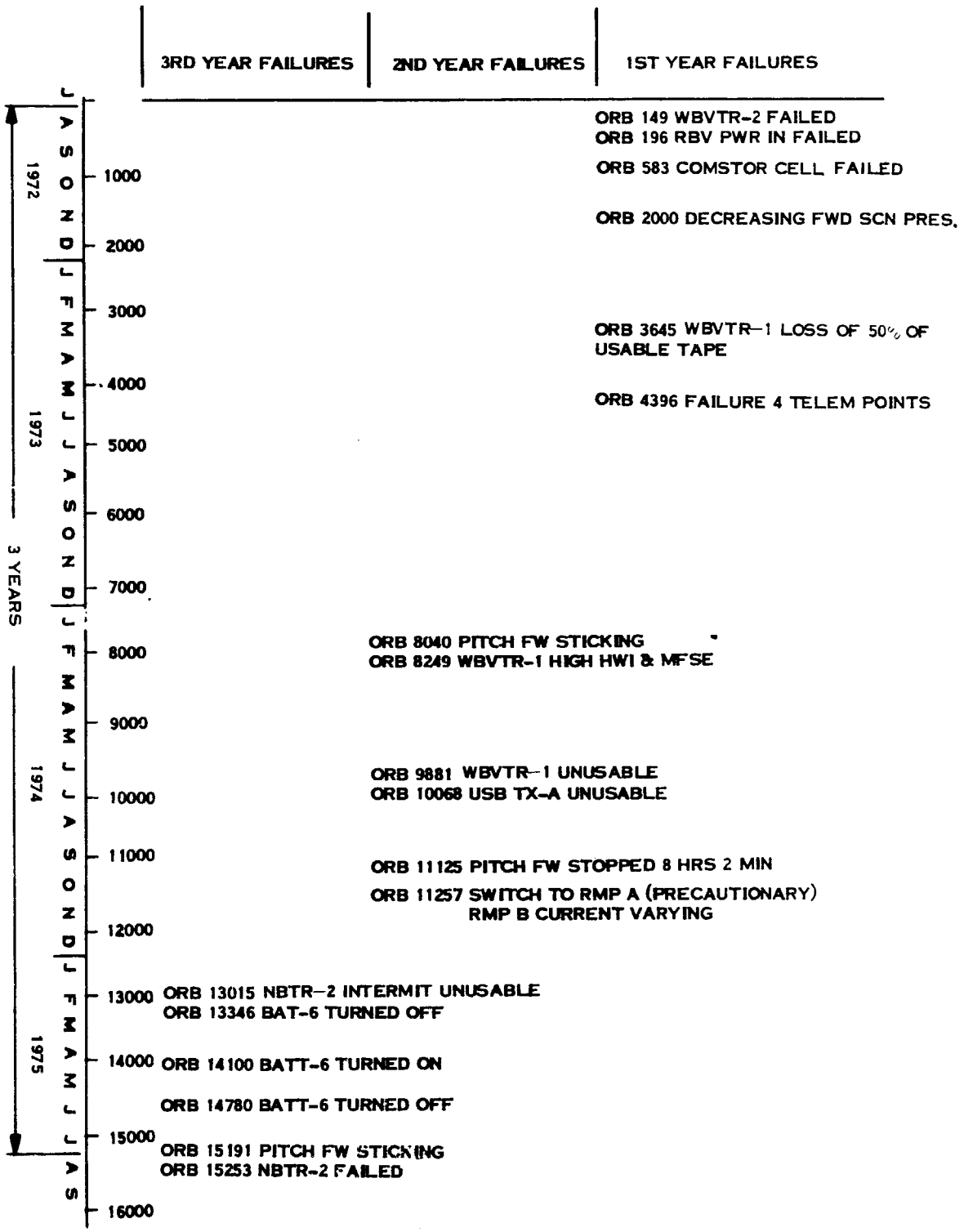


Figure 1-1. Three-Year History of Landsat-1 Equipment Failures

Table 1-1. IN-ORBIT PAYLOAD SYSTEM PERFORMANCE
LAUNCH THRU ORBIT 15270 (7/23/75)
LANDSAT-1

RBV	Total Scenes Imaged	1690
	AVG. Scenes/Day	139
	Total Area Imaged (millions of sq. mi.)	14.7
	ON TIME (hr.)	14.0
	ON/OFF Cycles	91
	% Real Time Images	57
	% Recorded Images	43
MSS	Total Scenes Imaged	180,572
	AVG. Scenes/Day	172
	Total Area Imaged (millions of sq. n. mi.)	1574.5
	ON TIME (hr.)	1911.8
	ON/OFF Cycles	14,611
	% Real Time Images	74
	% Recorded Images	26
DCS	Messages at OCC	1,152,045
	Non-Perfect MSGS	90,691
	Max. DCP's ACTIVE/DAY	114
	Users	44
	Avg. MSG/Orbit	181
	ON TIME (hr.)	21,820.2
WPA-1	% Real Time Mode	55
	% Playback Mode	45
	ON TIME (hr.)	31.9
	ON/OFF Cycles	311
WPA-2	% Real Time Mode	74
	% P/B Mode	26
	ON TIME (hr.)	1872.2
	ON/OFF Cycles	12,473
WBVTR-1	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	Minor Frame Sync Error Count in P/B	150
	Time Head-Tape Contact (hr.)	732.8
	Cycles Head-Tape Contact	11,954
	ON TIME (hr.)	927.6
WBVTR-2	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	MFSE Count in P/B	Failed Orb. 148
	Time Head-Tape Contact (hr.)	5.1
	Cycles Head-Tape Contact	44
	ON TIME (hr.)	6.5

SECTION 2

ORBITAL PARAMETERS

Landsat-1 launch and injection was satisfactory. After several 18-day repeat cycles, orbit maintenance burns burns were made in Orbit 938, 2416, 6390, 7826, 11367, 11464 and 13611. An unplanned orbit change occurred due to freon gas expended during the pitch flywheel emergency (Orbits 11125 to 11130).

The only orbit maintenance burn required during this report period was made in Orbit 14365 on 19 May 1975.

The orbital parameters are given in Table 2-1. Figure 2-1 shows the longitude error as a function of time and orbit maintenance burns. The longitude error has been maintained within $\pm$10 nm in the east-west direction at the equator as planned. Figure 2-2 shows the change of sun time at the descending node. Appendix B gives ground trace repeat cycle predictions.

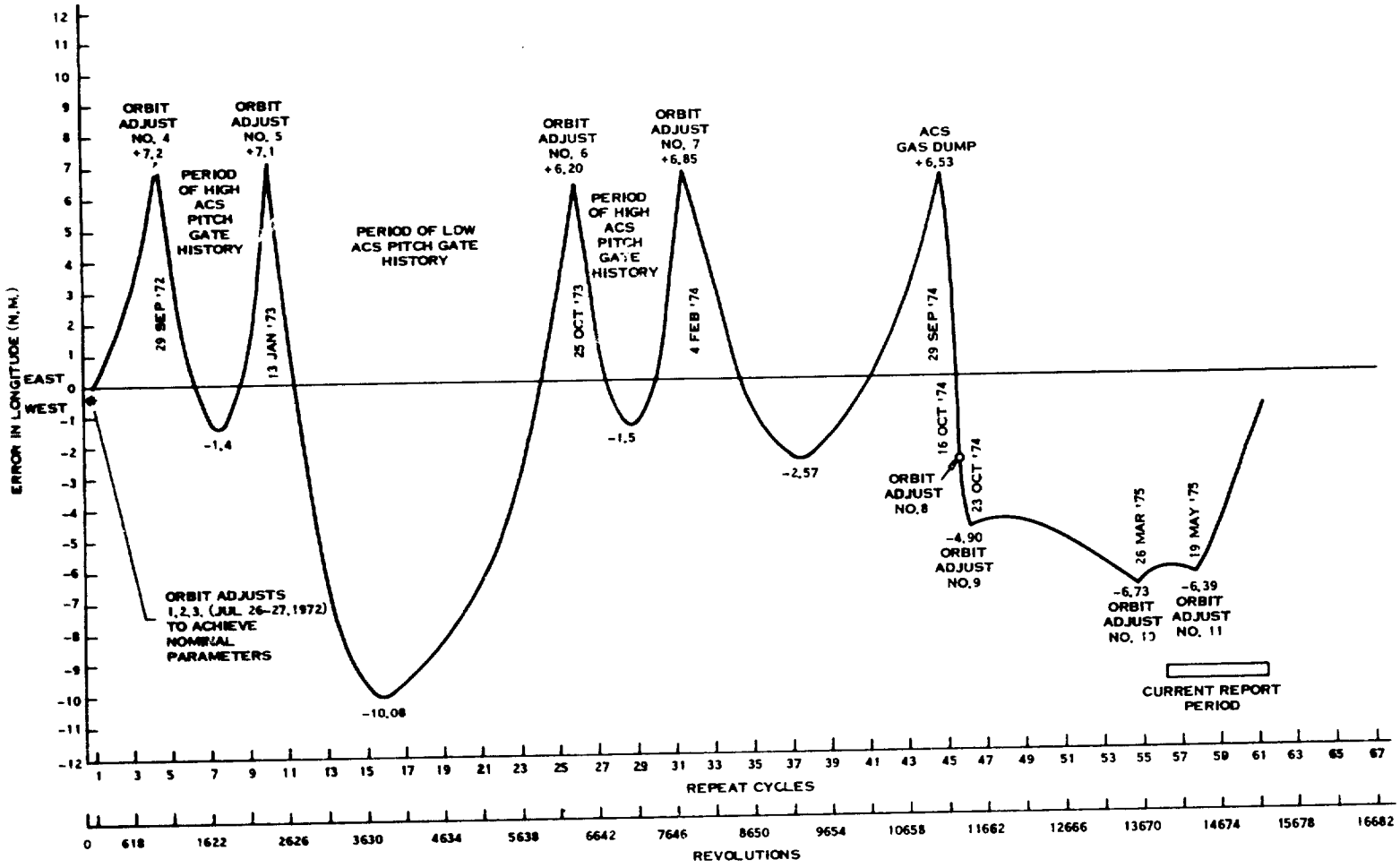


Figure 2-1. Effect of Orbit Adjusts on Landsat-1 Ground Track

Table 2-1. Landsat 1 Brouwer Mean Orbital Parameters

Element / Date	Apogee (km)	Perigee (km)	Inclination (Deg.)	Semi Major Axis (km)	Eccentricity	Two Body Period (Min)	Nodal Period (Min)	Argument of Perigee (Deg)	Right Ascension (Deg)	Mean Anomaly (Deg)
25 Oct 1972	917.3	898.1	99.103	7285.850	0.00132	103.152	103.268	93.721	1.060	86.484
25 Jan 1973	922.3	893.1	99.090	7285.865	0.00200	103.153	103.268	133.693	91.805	52.797
25 Apr 1973	911.056	888.763	99.073	7285.767	0.00073	103.151	103.267	168.857	181.411	11.098
25 Jul 1973	914.341	900.810	99.068	7285.741	0.00093	103.150	103.266	95.602	268.944	84.301
25 Oct 1973	922.013	893.229	99.056	7285.786	0.00198	103.151	103.266	65.071	0.291	301.002
25 Jan 1974	915.873	899.111	99.041	7285.657	0.00115	103.148	103.264	160.866	88.606	19.049
24 Apr 1974	920.090	912.672	99.023	7285.691	0.000802	103.149	103.265	117.631	176.743	62.319
23 Jul 1974	922.363	892.629	99.017	7285.661	0.002041	103.148	103.264	109.225	269.779	70.540
23 Oct 1974	918.657	896.316	99.004	7285.652	0.00153	103.148	103.264	150.750	354.743	29.110
24 Jan 1975	914.18	900.67	98.990	7285.590	0.000928	103.147	103.262	278.848	85.403	261.138
24 Apr 1975	914.74	900.05	98.972	7285.559	0.001008	103.146	103.262	37.047	173.043	142.764
25 Jul 1975	915.12	899.63	98.964	7285.541	0.001063	103.145	103.261	138.138	262.528	41.661

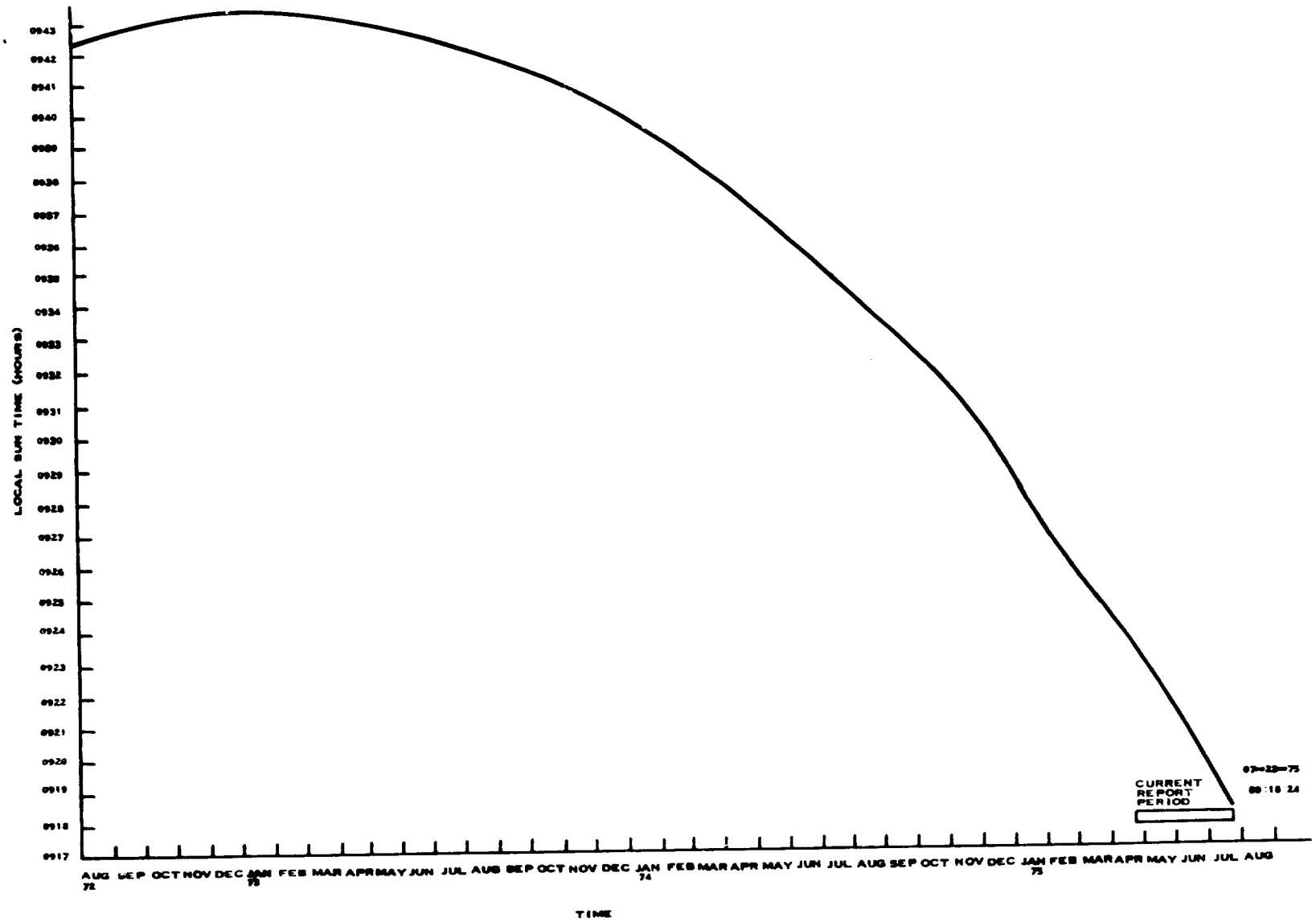


Figure 2-2. Local Sun Time Equator Crossing-Descending Node

SECTION 3

POWER SUBSYSTEM (PWR)

The solar array continued to provide excess energy for the payload and spacecraft load throughout this report period. Compensation loads and auxiliary loads dissipated the excess power above the battery and load requirements using Landsat-1 power management procedures. Mid-day measured solar array current tracked slightly below the values predicted earlier due to higher than predicted beta angle variations. Solar array degradation was -26.4 percent at the end of 36 months in orbit. The power subsystem is predicted to have adequate power through 1976 for the present Landsat-1 payload configuration, and may extend to 1977 and 1978 depending on the electro-chemical degradation of the battery packs for that period.

A plot of measured and predicted mid-day solar current is shown in Figure 3-1. Figure 3-2 shows actual and predicted solar array current degradation. Figure 3-3 shows actual sun angles to the spacecraft and solar panels.

It is noted on Figure 3-1 that the high noon solar array current is slightly lower than predicted. This is due to slightly different solar panel sun angles and operating point high noon solar array degradation than initially predicted.

During Orbit 14246 (11 May 1975) Landsat-1 passed through the partial solar eclipse over the Northern Hemisphere. Real Time adjustments to the auxiliary loads were made to compensate for the loss in array energy.

Battery 6, turned off in Orbit 13346 (7 March 1975) because of abnormal load sharing and temperature, was restored to service in Orbit 14100 (30 April 1975) when its voltage had dropped to about 26.3 volts. However, during the next 600 to 700 orbits of operation, the battery showed a recurrence of low load sharing and high C/D ratios accompanied by increased temperature. Therefore, in Orbit 14780 (18 June 1975), it was taken off line for a second time and has remained off through the end of this report period. Temperature spread between the batteries have ranged from 4 to 8^{o}C during the current report period. Battery packs averaged a typical 9 percent Depth of Discharge (DOD) when all batteries were on line. With Battery 6 off line, the DOD has ranged from 10.2 to 10.8 percent.

The power system electronics performed well in this report period with all voltages stable. Table 3-1 shows major power subsystem parameters and Table 3-2 shows power subsystem telemetry for selected orbits. Some parameters in Table 3-2 may be slightly different from Table 3-1, because Table 3-1 uses a power management time span (night followed by a day); whereas, the time span used in Table 3-2 is the playback period from the NBR. The Shunt Limiter has not operated since Orbit 3 because the unregulated voltage has been held below cut-in voltage by power management.

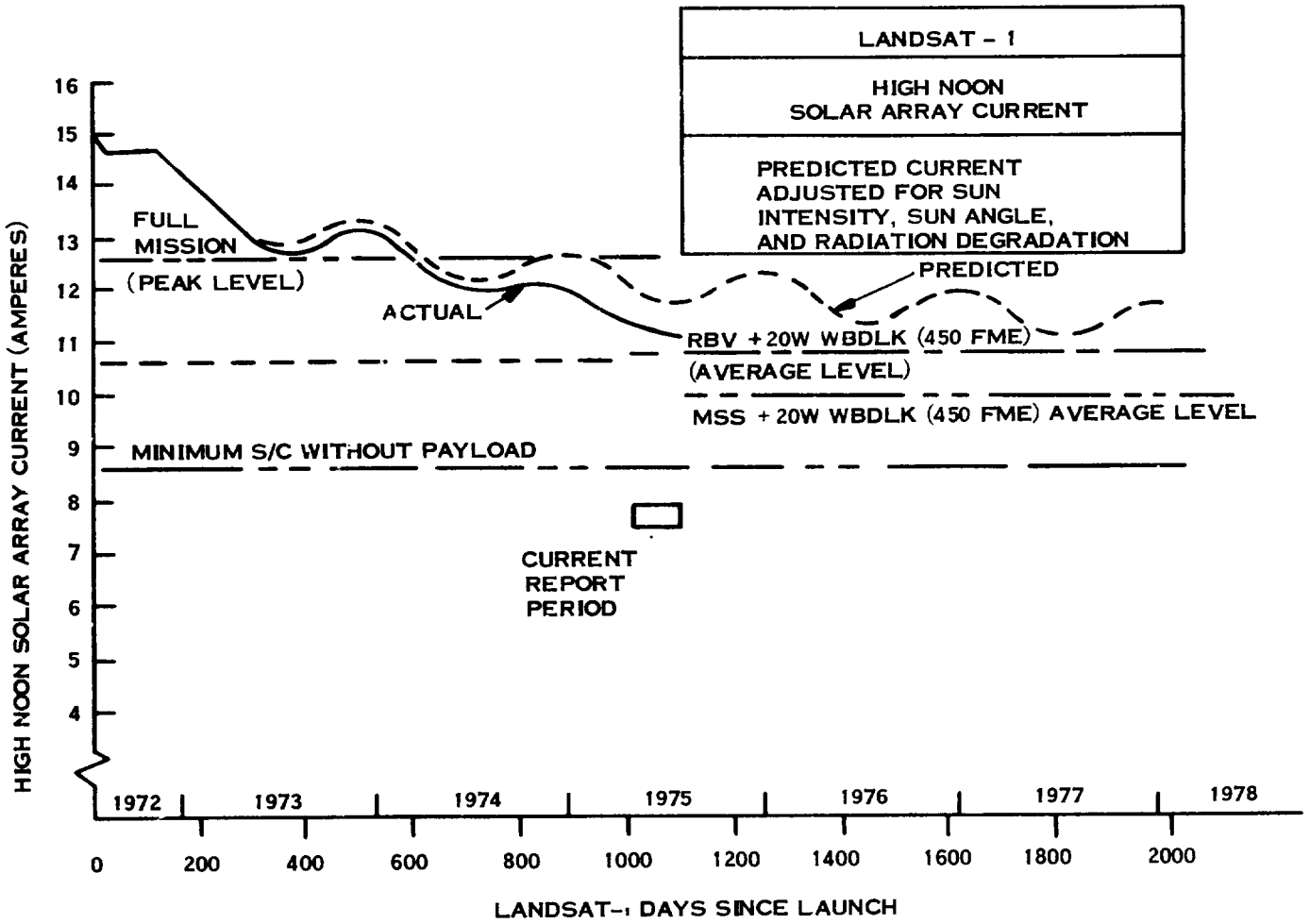


Figure 3-1. Midday Solar Current

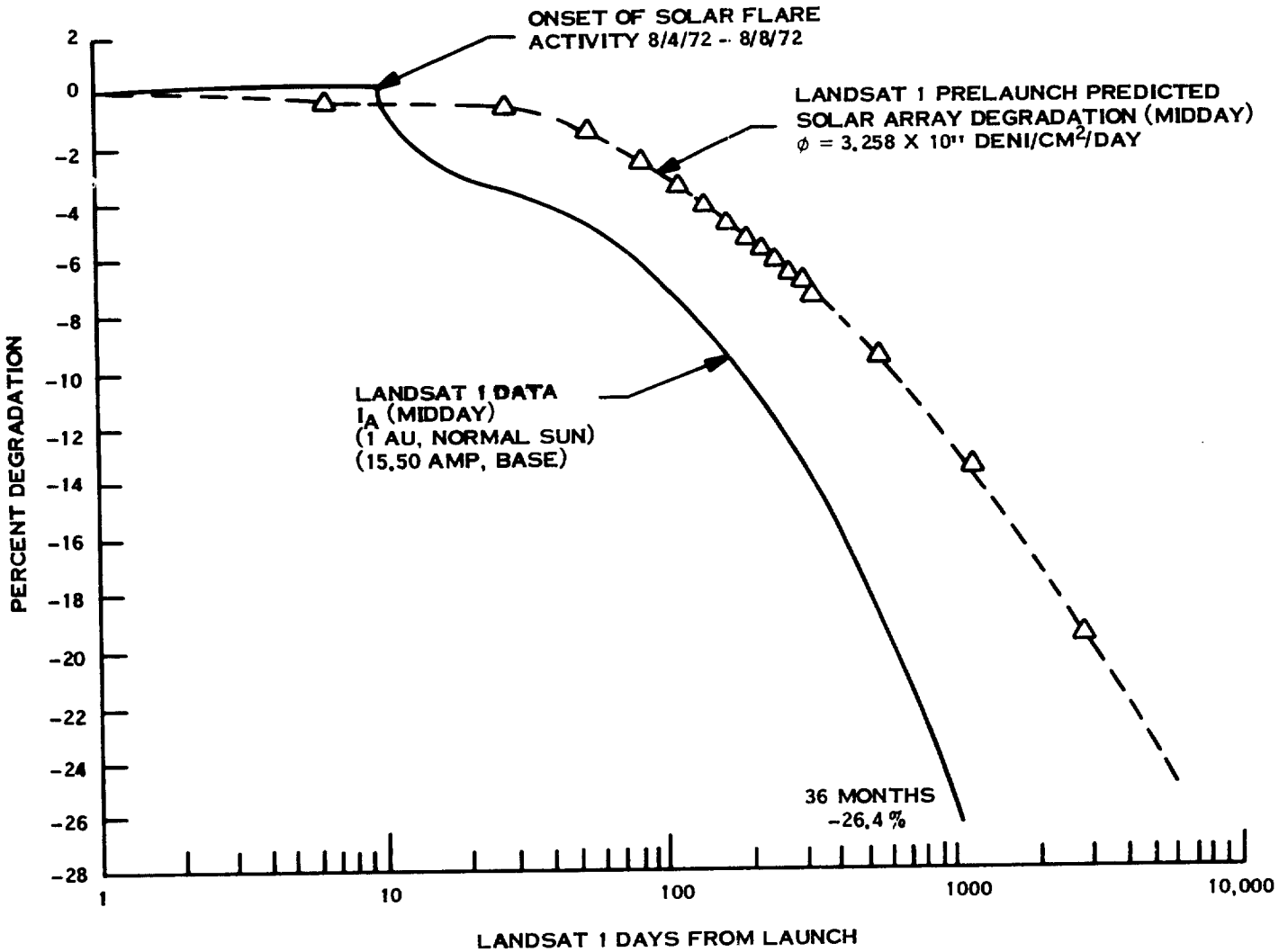


Figure 3-2. IA (Midday) Degradation vs. Days

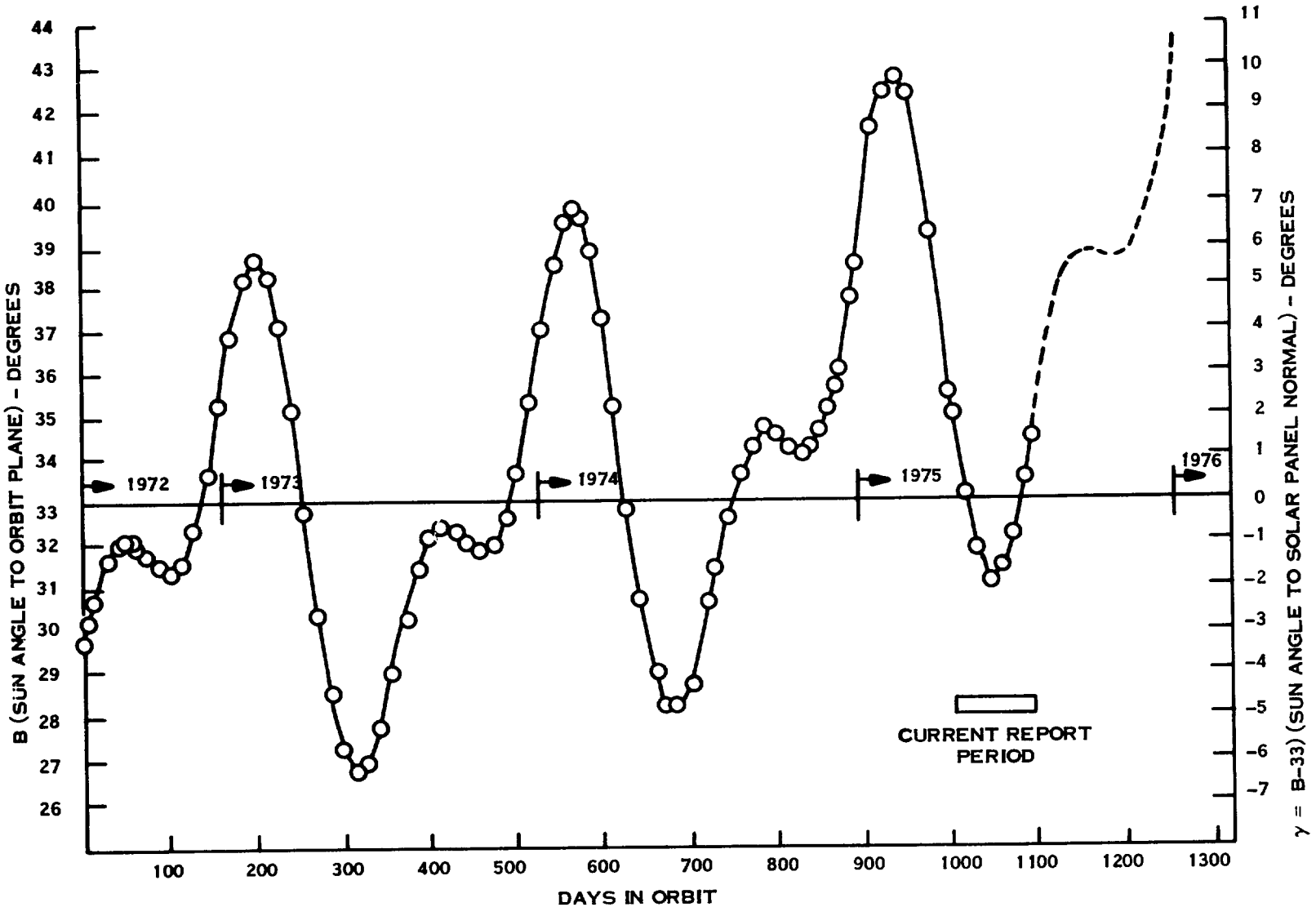


Figure 3-3. Actual β and γ (Paddle) Sun Angles, Landsat-1

Table 3-1. Landsat-1 Major Power Subsystems Parameters

ORBIT NO.		26	5098	10178	12565	14417	14835	15254
BATT 1	MAX	32.48	32.91	33.25	32.73	32.91	35.08	33.16
2	CHGE	32.48	32.91	33.16	32.73	32.82	33.08	33.16
3	VOLTS	32.48	32.99	33.25	32.73	32.91	33.16	33.16
4		32.48	32.99	33.25	32.82	32.91	33.16	33.16
5		32.48	32.99	33.33	32.82	32.99	33.25	33.26
6	**	32.31	32.91	33.25	32.73	32.82	29.23	28.21
7		32.22	32.91	33.25	32.73	32.91	33.16	33.16
8		32.14	32.91	33.25	32.73	32.91	33.16	33.16
	AVERAGE	32.38	32.92	33.25	32.77	32.90	32.66	32.56
BATT 1	END-	28.81	28.30	28.98	28.72	29.06	29.06	29.15
2	OF-	28.81	28.30	28.98	28.72	29.06	29.06	29.15
3	NIGHT	28.81	28.30	28.98	28.72	29.06	29.06	29.15
4	VOLTS	28.89	28.38	28.98	28.72	29.06	29.15	29.15
5		28.89	28.38	29.06	28.81	29.15	29.15	29.23
6	**	28.81	28.30	28.98	28.64	29.06	29.15	28.12
7		28.81	28.30	28.98	28.72	28.98	28.98	29.15
8		28.81	28.30	28.98	28.72	28.98	28.98	29.15
	AVERAGE	28.84	28.32	28.99	28.72	29.05	29.07	29.03
BATT 1	(*) CHGE	13.11	13.58	13.96	13.71	12.98	15.18	15.27
2	SHARE	12.93	13.58	* 13.96	13.71	12.98	15.18	15.27
3	(%)	11.38	11.38	11.95	11.77	11.87	13.62	13.59
4		12.39	11.95	12.28	12.26	12.11	13.97	14.06
5		12.32	11.85	11.93	12.25	11.44	13.32	13.63
6	**	12.80	12.35	11.79	11.64	15.46	**	**
7		12.62	12.42	12.13	12.52	11.43	13.87	13.59
8		12.45	12.10	11.98	12.13	11.72	14.80	14.54
BATT 1	LOAD	12.71	12.44	12.58	13.21	12.50	14.35	14.67
2	SHARE	12.90	13.62	13.70	14.00	13.82	16.30	15.88
3	(%)	11.43	11.91	12.23	12.26	12.12	14.17	13.85
4		12.77	13.01	13.12	13.10	12.63	14.77	14.91
5		12.54	12.42	12.60	12.71	11.68	13.90	14.02
6	**	12.53	12.21	11.30	10.24	14.59	**	**
7		12.80	12.41	12.50	12.46	11.61	13.76	13.77
8		12.32	11.98	11.97	11.92	11.05	12.75	12.88
BATT 1	TEMP	21.11	24.65	24.76	24.64	22.66	24.66	23.12
2	IN	18.74	21.42	20.89	20.72	20.04	21.39	19.32
3	(°C)	18.77	20.29	20.16	19.40	18.67	20.01	18.77
4		21.57	23.17	23.32	22.93	22.05	23.39	22.71
5		21.82	23.85	24.09	27.70	23.05	23.98	23.69
6	**	21.21	24.37	24.78	27.93	23.55	22.83	22.10
7		21.41	25.01	24.96	27.32	23.44	25.12	23.75
8		21.82	25.14	25.24	26.41	23.66	25.82	24.59
	AVERAGE	20.81	23.49	23.53	24.63	22.14	23.40	22.26
S/C REG BUS PWR (W)		176.8	153.4	165.0	157.6	153.6	145.0	137.9
COMP LOAD PWR (W) (P/O S/C REG BUS PWR)		49.0	34.8	41.9	29.4	29.4	29.4	29.4
P/L REG BUS PWR (W)		16.2	13.7	8.9	9.2	8.9	8.9	8.9
C/D RATIO		1.06	1.13	1.21	1.27	1.14	1.17	1.18
TOTAL CHARGE (A-M)		309.2	290.21	*256.3	*249.89	*231.81	*229.36	*229.29
TOTAL DISCHARGE (A-M)		290.9	256.28	214.2	196.64	202.51	195.87	194.13
SOLAR ARRAY (A-M)		1044.0	908.0	832.0	879.0	795.0	778.0	786.0
S. A. PEAK I (AMP)		15.8	13.68	12.44	12.80	11.92	11.68	11.60
MIDDAY ARRAY I (AMP)		15.01	12.80	N/A	11.92	11.20	11.04	11.04
SUN ANGLE (DEG)		-3.33	-3.54	-1.82	7.32	-1.33	-1.22	1.49
MAX R PAD TEMP (°C)		+62.00	+68.00	63.20	66.80	63.20	62.00	63.00
MIN R PAD TEMP (°C)		-62.00	-59.00	-42.79	-39.75	-41.57	-42.79	-42.18
MAX L PAD TEMP (°C)		+57.90	+60.50	56.00	62.00	56.00	56.00	56.00
MIN L PAD TEMP (°C)		-67.00	-64.00	47.00	-42.18	-45.50	-47.75	-46.25

* After the telemetry failure in Orbit 4396 Battery 2 charge share was taken equal to Battery 1 charge as an approximation in order to derive a charge share value of each battery.

** Note: Battery 6 remained off from Orbit 14780 through the end of this report period.

Table 3-2. Landsat-1 Power Subsystem Analog Telemetry (Average Value for Data Received in NBTR Playback)

Function	Description	Unit	Orbits						
			26	5089	10162	12565	14417	14835	15254
6001	BATT 1 DISC	AMP	0.94	0.81	0.81	0.65	0.62	0.84	0.91
6002	2		0.95	*	*	*	*	*	*
6003	3		0.84	0.78	0.80	0.61	0.60	0.79	0.86
6004	4		0.93	0.86	0.86	0.65	0.62	0.87	0.92
6005	5		0.82	0.82	0.82	0.63	0.58	0.87	0.87
6006	6 ↔		0.91	0.78	0.72	0.50	0.72	0.00	0.00
6007	7		0.94	0.82	0.80	0.62	0.57	0.85	0.85
6008	8		0.91	0.77	0.78	0.59	0.56	0.80	0.90
6011	BATT 1 CHG	AMP	0.58	0.58	0.59	0.33	0.49	0.56	0.52
6012	2		0.57	*	*	*	*	*	*
6013	3		0.50	0.48	0.60	0.46	0.45	0.50	0.40
6014	4		0.54	0.51	0.60	0.47	0.46	0.52	0.48
6015	5		0.54	0.50	0.58	0.47	0.43	0.49	0.46
6016	6 ↔		0.57	0.52	0.58	0.45	0.59	0.00	0.00
6017	7		0.55	0.53	0.60	0.48	0.43	0.51	0.46
6018	8		0.55	0.52	0.58	0.46	0.44	0.54	0.49
6021	BATT 1 VOLT	VDC	30.87	31.24	31.64	30.94	31.29	31.61	31.62
6022	2		30.87	31.25	31.66	30.94	31.29	31.62	31.62
6023	3		30.87	31.25	31.66	30.94	31.28	31.61	31.62
6024	4		30.90	31.26	31.70	30.97	31.33	31.65	31.65
6025	5		30.93	31.33	31.75	31.03	31.37	31.70	31.71
6026	6 ↔		30.86	31.24	31.65	30.93	31.26	29.20	28.18
6027	7		30.89	31.27	31.68	30.97	31.31	31.61	31.64
6028	8		30.89	31.27	31.68	30.96	31.30	31.62	31.63
6031	BATT 1 TEMP	DGC	21.17	24.48	26.09	24.61	22.61	24.49	23.02
6032	2		18.80	21.29	22.81	20.67	20.00	21.07	19.28
6033	3		18.76	20.17	21.26	19.39	18.63	19.88	18.76
6034	4		21.57	23.04	23.63	22.94	22.05	23.26	22.68
6035	5		21.84	23.77	24.78	27.61	23.02	23.88	23.64
6036	6 ↔		21.24	24.27	25.78	27.87	23.50	22.74	22.08
6037	7		21.43	24.88	26.09	27.24	23.39	24.95	23.67
6038	8		21.86	25.02	26.21	26.37	23.59	25.73	24.51
6040	RT PAD TEMP	DGC	25.82	27.22	27.16	35.19	28.31	27.86	27.29
6041	R PAD V N	VDC	33.40	33.85	34.36	32.72	33.76	34.26	34.18
6042	R PAD V M	VDC	29	33.50	33.60	31.63	33.06	33.49	32.92
6044	LT PAD TEMP	DGC	14.14	16.61	19.11	27.58	20.37	19.95	19.84
6045	L PAD V F	VDC	33.69	34.16	34.67	33.64	34.12	34.63	34.63
6046	L PAD V G	VDC	33.68	34.19	34.72	33.70	34.16	34.68	34.68
6050	S/C UR BUS V	VDC	31.24	31.68	32.60	31.32	31.63	32.03	32.07
6051	S/C RG BUS V	VDC	24.54	24.55	24.55	24.54	24.54	24.54	24.54
6052	AUX REG A V	VDC	23.41	23.48	23.47	23.47	23.48	23.48	23.49
6053	AUX REG B V	VDC	23.50	23.50	23.50	23.50	23.50	23.50	23.50
6054	SOLAR I	AMP	14.67	12.69	11.60	11.78	11.15	10.89	10.83
6055 +	S/C RG BUS I	AMP	7.11	6.27	6.80	6.51	6.27	5.92	5.63
6056 +	S/C RG BUS I	AMP	7.11	6.27	6.78	6.51	6.27	5.91	5.62
6066	PC MOD T 1	DGC	21.63	22.23	23.22	22.00	21.13	21.43	20.63
6069	PC MOD T 2	DGC	21.66	22.83	23.00	22.06	21.66	21.80	21.17
6070	P/L RG BUS V	VDC	24.66	24.68	24.66	24.67	24.67	24.68	24.68
6071	P/L UR BUS V	VDC	31.08	31.83	31.92	31.17	31.48	31.88	31.92
6072 +	P/L RG BUS I	AMP	0.37	0.36	0.36	0.38	0.37	0.36	0.36
6073	P AUX A V	VDC	23.51	23.51	23.50	23.50	23.50	23.50	23.50
6074	P AUX B V	VDC	23.51	23.51	23.50	23.50	23.50	23.50	23.50
6075	PR MOD T 1	DGC	21.50	23.13	23.62	23.50	22.39	22.84	21.44
6076	PR MOD T 2	DGC	20.34	21.46	21.84	21.15	20.72	20.63	19.88
6079	FUSE BLOW V	VDC	34.58	34.57	-34.60	34.59	34.59	34.60	34.59
6080	SHUNT 1 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6081	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6082	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6083	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6084	5		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6085	6		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6086	7		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6087	8		0.00	0.00	0.00	0.00	0.00	0.00	0.00
6100	P/L RG BUS I	AMP	0.56	0.36	0.36	0.38	0.37	0.36	0.36
Total No.	MAJOR FRAMES	FRM	764.0	380.0	384.0	760.0	760.0	760.0	765.0

* Function 6002, 6013; missing data resulted from disabled telemetry resulting from IC chip failure which affected charge current directly and discharge current indirectly

\+ FUNC 6056, 6056, 6072 data is derived from Pseudo FUNC 6155, 6156, 6172 used after change to Mode 11

↔ BATT 6 was turned off in orbit 14760 for a second restoration cycle and remained off for the rest of this report period

SECTION 4

ATTITUDE CONTROL SYSTEM (ACS)

Landsat-1's ACS system maintained spacecraft attitude even though a Pitch Flywheel malfunction occurred during this report period.

The pitch motor driver duty cycle began increasing in Orbit 15191 (18 July 1975), and in subsequent orbits many prolonged Pitch Flywheel stoppages occurred, lasting from 15 minutes to 202 minutes in duration.

The ACS Norml mode was only employed during periods of MSS activity.

During periods of non-MSS activity, the spacecraft's attitude was maintained by commanding the ACS system into the Roll Diff Tach High Gain with Roll Wheel Unload disabled. In addition, Pitch Position Bias was employed to maintain the Pitch Wheel's speed between -10 RPM and -100 RPM in order to prevent it from seizing with an excess of stored momentum.

MSS operations were suspended from Orbit 15304 (26 July 1975) to Orbit 15350 (29 July 1975) due to the severity of the Pitch Wheel problem. When conditions lessened, MSS operations were resumed in Orbit 15351 (29 July 1975) with the ACS system controlling as previously described.

The Pitch Wheel began clearing itself in Orbit 15365 (30 July 1975) and by Orbit 15393 (1 August 1975) the Pitch Motor Driver Duty returned to its pre-emergency average level of 7 to 10 percent.

Use of pneumatics to stabilize the spacecraft during the Pitch Flywheel emergency was not required.

The spacecraft's pre-anomaly routine was resumed in Orbit 15393 (1 August 1975) with the ACS system commanded into the Normal mode only during the six daily orbits of MSS activity. For the remaining eight daily orbits of non-MSS activity, the spacecraft is flown in the Roll Diff Tach High Gain mode and with 0 to .6° Pitch Position Bias employed to maintain the Pitch Flywheel Speed between -20 and -100 RPM.

Both Solar Array Drives performed normally as shown in Figures 4-1 and 4-2. Motor voltages and temperatures were normal and the SADS tracked at orbit rate with no requirement for phase switching.

Referring to Figure 4-3, LANDSAT-1's pneumatic gating pattern is stable and the need for pneumatics is nearly eliminated. Remaining usable impulse has decreased slightly from 31.46 LB SECS in Orbit 14001 (23 Aug., '75) to 30.51 LB SECS in Orbit 15254 (22 July, '75), indicating the remaining freon should be adequate for at least four more years.

RMP 1 is functioning normally.

Pressure/temperature ratios have all been satisfactory. The forward scanner pressure decreased from 3.08 PSIA in Orbit 13970 (21 Apr. '75) to 3.00 PSIA in Orbit 15254 (22 July '75) and is following the leak pattern described in previous reports.

Tables 4-1, 4-2 and 4-3 are a summary of LANDSAT-1's Attitude Control Subsystem telemetry.

Table 4-1. Landsat-1 ACS Temperature and Pressure Telemetry Summary

Function	Units	Orbit						
		31	5099	10182	12565	14417	14835	15254
1084 RMP 1 Gyro Temperature	DGC	44.5	23.06	21.22	43.37	41.85	41.51	42.40
1094 RMP 2 Gyro Temperature	DGC	74.3	75.10	43.45	25.48	23.52	23.14	24.05
1222 SAD RT MTR HSING Temp	DGC	21.1	22.00	20.55	23.84	22.30	21.96	22.89
1242 SAD LT MTR HSING Temp	DGC	27.0	30.38	28.18	31.15	28.89	28.43	29.53
1223 SAD RT MTR WNDNG Temp	DGC	25.3	26.54	24.63	27.62	26.48	26.00	27.06
1243 SAD LT MTR WNDNG Temp	DGC	28.7	32.92	30.32	33.67	31.44	30.87	31.98
1228 SAD RT HSG Pressure	PSI	7.6	7.35	7.12	7.06	6.95	6.94	6.88
1248 SAD LT HSG Pressure	PSI	7.0	6.86	6.47	6.41	6.24	6.24	6.18
1007 FWD Scanner MTR Temp	DGC	19.8	19.88	18.46	21.00	19.51	19.17	20.36
1016 Rear Scanner MTR Temp	DGC	20.5	19.83	17.86	20.36	18.53	18.51	19.24
1003 FWD Scanner Pressure	PSI	4.6	4.02	3.50	3.33	3.02	3.00	3.00
1012 Rear Scanner Pressure	PSI	7.8	7.67	7.44	7.38	7.00	7.00	6.97
1212 Gas Tank Pressure	PSI	1988.0	1702.34	1454.19	260.19	235.44	235.55	235.44
1210 Gas Tank Temperature	DGC	22.6	24.30	22.56	25.66	23.73	23.23	24.36
1213 Manifold Pressure	PSI	56.7	57.44	58.73	61.26	61.28	61.45	61.67
1211 Manifold Temperature	DGC	21.9	23.62	21.77	25.23	23.12	22.70	23.82
1059 CLB Power Supply Card Temp	DGC	37.1	40.54	38.83	41.68	39.91	39.42	40.58
1260 ACS Baseplate 1	DGC	25.4	27.93	25.36	28.13	25.89	25.45	26.54
1261 ACS Baseplate 2	DGC	22.9	24.73	23.00	26.38	24.32	23.89	25.09
1262 ACS Baseplate 3	DGC	23.4	23.69	21.97	25.96	24.28	23.83	24.95
1263 THO1 STS	DGC	- 6.8	- 0.97	- 3.41	3.91	0.29	- 0.40	1.22
1264 THO2 STS	DGC	-14.6	- 9.42	- 8.27	- 2.71	- 5.35	- 5.38	- 4.50
1265 THO3 STS	DGC	- 3.1	9.31	7.58	16.25	11.79	11.09	12.92
1266 THO4 STS	DGC	-13.9	2.85	- 1.85	5.16	1.97	0.95	2.40
1267 THO5 STS	DGC	- 8.9	- 1.16	- 5.17	6.41	0.81	- 0.54	2.92
1224 SAD R FSST	DGC	39.5	60.21	63.25	64.31	65.59	65.03	64.74
1244 SAD L FSST	DGC	27.1	51.11	53.21	57.65	54.51	54.09	54.69

Table 4-2. Landsat-1 ACS Voltages and Currents

Function	Units	Orbit						
		31	5099	10182	12565	14417	14835	15524
1057 CLB Power Supply Volts	TMV	2.8	2.78	2.78	2.79	2.78	2.78	2.78
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	-30.14	-30.14	-30.14	-30.14
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	0.11	0.11	0.11	0.11
1080 RMP 1 Supply Volts	VDC	OFF	OFF		-23.77	-23.78	-23.79	-23.78
1091 RMP 2 MTR Volts	VDC	-29.7	-29.63	-29.63	OFF	OFF	OFF	OFF
1092 RMP 2 MTR Current	Amps	0.10	0.10	0.11	OFF	OFF	OFF	OFF
1090 RMP 2 Supply Volts	VDC	-23.4	-23.41	-23.50	OFF	OFF	OFF	OFF
1320 SAD RT MTR WNDNG Volts	VDC	- 4.8	- 4.25	- 3.89	- 3.74	- 3.67	- 3.69	- 3.85
1240 SAD LT MTR WNDNG Volts	VDC	- 4.8	- 4.09	- 3.36	- 3.21	- 3.58	- 3.39	- 3.43
1227 SAD RT -15 VDC Conv.	VDC	14.9	14.88	14.89	14.89	14.88	14.88	14.89
1247 SAD LT -15 VDC Conv.	VDC	15.2	15.13	15.14	15.13	15.13	15.13	15.06
1056 CLB $\pm$6 VDC	TMV	2.4	2.35	2.35	2.35	2.35	2.35	2.35
1055 CLB $\pm$10 VDC TMV	TMV	2.75	2.75	2.74	2.75	2.74	2.74	2.74

Table 4-3. Landsat-1 ACS Attitude Errors and Driver Duty Cycles

Function	Units	Orbit					
		13198	13569	14001	14417	14835	15245
1141 Pitch Fine-Error	DEG	- 0.40	- 0.08	- 0.02	0.05	- 0.06	- 2.13
1143 Pitch Flywheel Speed	RPM	- 10.49	- 26.86	- 1.21	39.73	- 8.66	12.92
1038 Pitch MTR DRVR CCW	PCT	4.96	5.81	4.55	1.12	4.09	3.28
1039 Pitch MTR DRVR CW	PCT	2.29	2.17	5.10	5.74	2.10	19.65
1030 Roll Fine Error	DEG	- 2.25	- 0.20	- 0.20	- 0.20	- 0.20	- 2.52
1127 Roll Rear Flywheel Speed	RPM	715.78	756.92	782.08	775.56	768.94	714.05
1126 Roll Fwd Flywheel Speed	PRM	641.82	674.47	693.31	700.43	682.96	641.32
1022 Roll Rear MTR DRVR CCW	PCT	0.01	0.68	0.90	0.09	0.22	0.13
1025 Roll Rear MTR DRVR CW	PCT	4.26	5.22	5.52	4.59	4.73	4.17
1023 Roll Fwd MTR DRVR CCW	PCT	0.01	0.66	0.72	0.22	0.20	0.08
1024 Roll Fwd MTR DRVR CW	PCT	4.15	4.94	5.35	4.75	4.75	4.24
1035 Yaw Tach	RPM	-206.08	-116.50	- 93.72	-102.00	- 86.80	-169.52
1033 Yaw MTR DRVR CW	PCT	0.04	1.53	1.84	0.81	0.88	0.09
1034 Yaw MTR DRVR CCW	PCT	0.07	1.60	1.76	0.97	0.96	0.68
1221 SAD Right Tach	DEG/MIN	3.37	3.37	2.81	3.38	3.39	3.37
1241 SAD Left Tach	DEG/MIN	2.80	2.81	2.81	2.82	2.83	2.79

NOTE: Tabulation of these functions began after the pitch flywheel anomaly (stopped) in Orbit 11125.

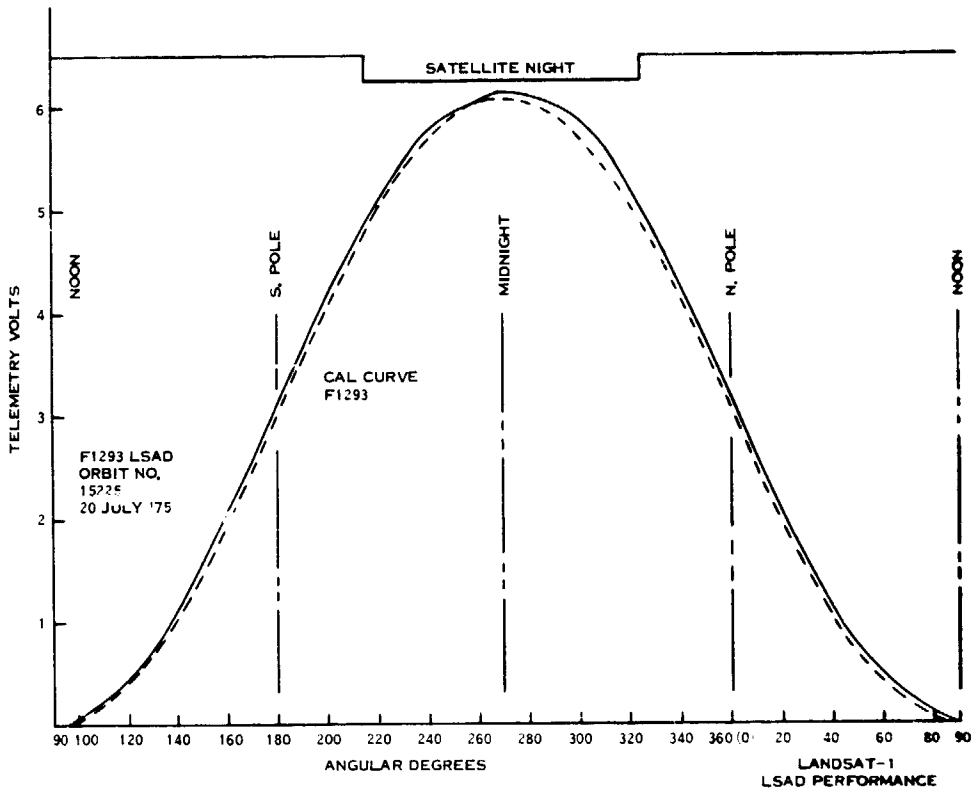


Figure 4-1. Landsat-1 SAD Performance

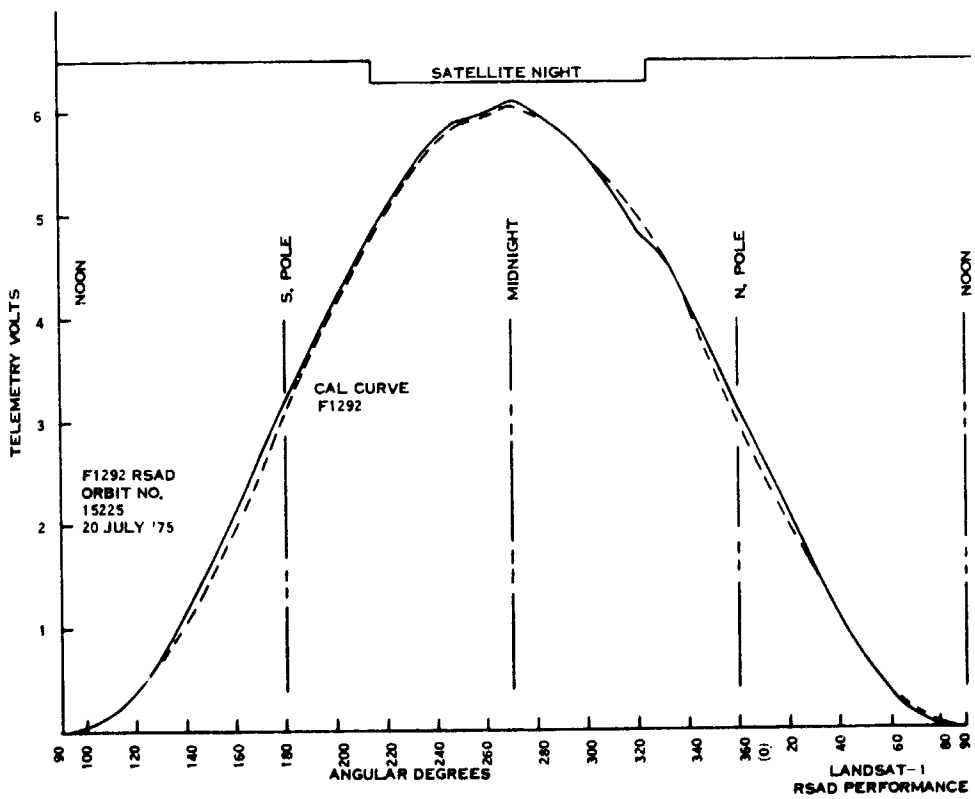
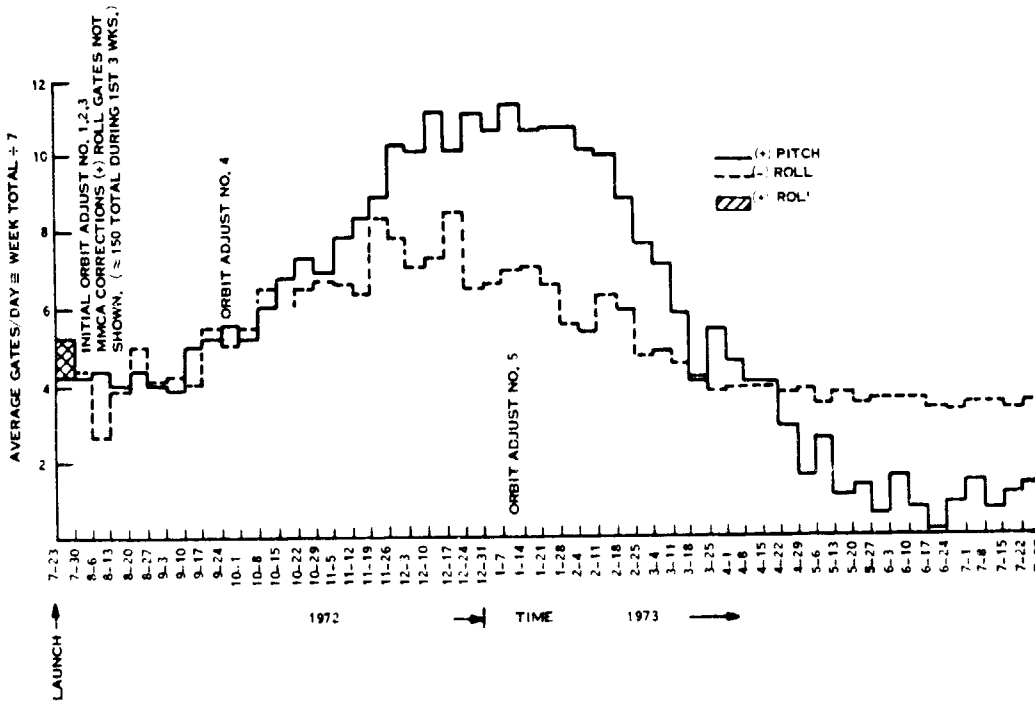
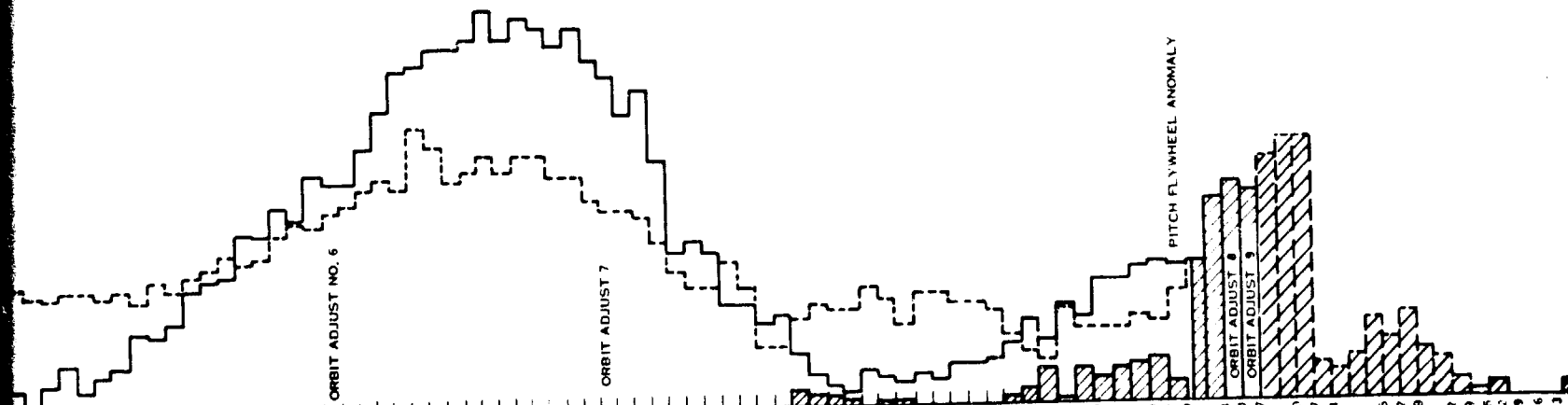


Figure 4-2. Landsat-1 R SAD Performance



FOLDOUT FRAME /



FOLDOUT FRAME 2

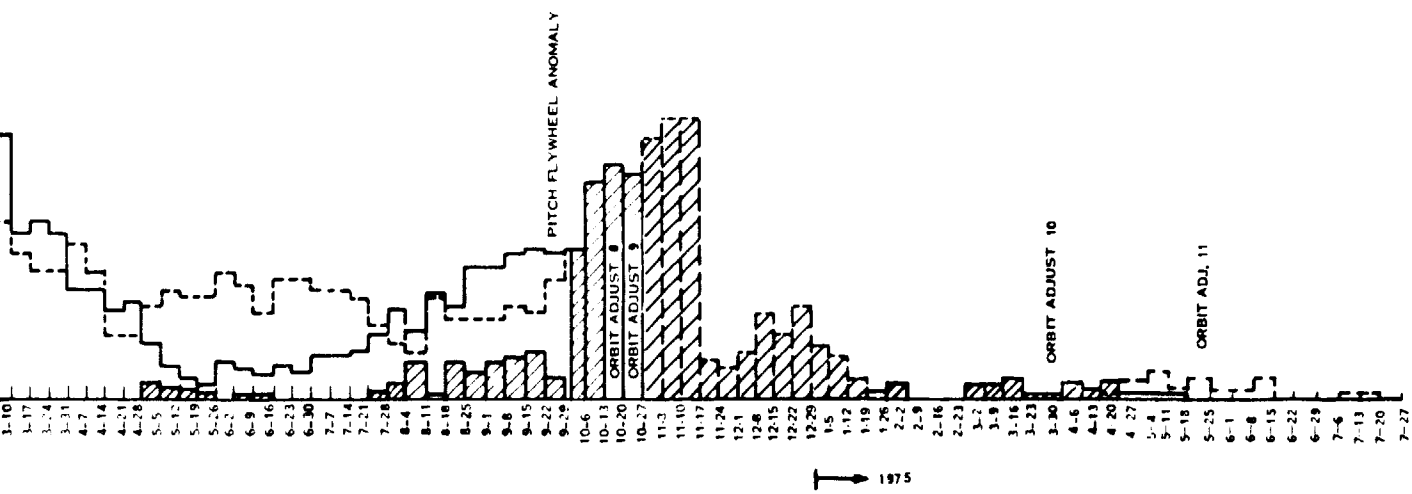


Figure 4-3. Landsat-1 Gating Frequency vs. Time

FOLDOUT FRAME 2

SECTION 5

COMMAND CLOCK SUBSYSTEM (CMD)

The Command Clock Subsystem operated nominally in this report period. Table 5-1 shows typical telemetry values since launch. All are nominal. Figure 5-1 shows the history of the S/C clock drift since launch.

Table 5-1. Landsat-1 Command Clock Telemetry Summary

Function No.	Name	Mode	Units	Orbit						
				35	5099	10182	12565	14158	14619	15233
8005	Pri. Power Supply Temp	-	°C	37.31	39.37	39.50	39.02	38.40	38.35	38.26
8006	Red. Power Supply Temp	-	°C	35.73	38.08	38.38	38.11	37.47	37.64	37.06
8007	Pri. Osc. Temp	-	°C	31.14	31.98	32.11	31.96	31.63	31.69	31.14
8008	Red. Osc. Temp	-	°C	30.47	31.39	31.42	31.38	30.91	30.88	30.46
8009	Pri. Osc. Output	-	TMV	0.95	0.9	0.97	0.97	0.97	0.97	0.97
8010	Red. Osc. Output	-	TMV	**	**	**	**	**	**	--
8011	100 kHz	Pri. - Red.	TMV	3.11	3.10	3.11	3.11	3.11	3.12	3.12
8012	10 kHz	Pri. - Red.	TMV	3.10	3.07	3.08	3.08	3.08	3.08	3.08
8013	2.5 kHz	Pri. - Red.	TMV	2.95	2.95	2.95	2.95	2.95	2.96	2.96
8014	400 Hz	Pri. - Red.	TMV	4.40	4.40	4.40	4.40	4.40	4.40	4.40
8015	Pri. +4 V Power Supply	Pri. Clk ON	VDC	4.10	4.10	4.10	4.10	4.10	4.10	4.10
8016	Red. +4 V Power Supply	Red. Clk ON	VDC	3.95	3.95	3.95	3.95	3.95	3.95	3.95
8017	Pri. +6 V Power Supply	Pri. Clk ON	VDC	6.06	6.07	6.07	6.07	6.10	6.11	6.11
8018	Red. +6 V Power Supply	Red. Clk ON	VDC	6.00	5.94	5.94	5.94	5.97	5.98	5.97
8019	Pri. -6 V Power Supply	Pri. Clk ON	VDC	- 6.02	- 6.02	- 6.03	- 6.03	- 6.04	- 6.04	- 6.04
8020	Red. -6 V Power Supply	Red. Clk ON	VDC	- 5.99	- 6.00	- 6.00	- 6.00	- 6.01	- 6.01	- 6.01
8021	Pri. -23 V Power Supply	Pri. Clk ON	VDC	-22.88	-22.89	-22.89	-22.89	-22.94	-22.95	-22.95
8022	Red. -23 V Power Supply	Red. Clk ON	VDC	-22.98	-23.00	-23.01	-23.00	-23.05	-23.06	-23.06
8023	Pri. -29 V Power Supply	Pri. Clk ON	VDC	-29.13	-29.16	-29.15	-29.15	-29.14	-29.16	-29.15
8024	Red. -29 V Power Supply	Red. Clk ON	VDC	-29.07	-29.21	-29.21	-29.21	-29.21	-29.21	-29.21
8101	CIU A -12 V	CIA A ON	VDC	-12.33	-12.33	-12.34	-12.34	-12.35	-12.34	-12.35
8102	CIU B -12 V	CIU B ON	VDC	-12.26	-12.26	-12.23	-12.22	-12.21	-12.21	-12.20
8103	CIU A -5 V	CIU A ON	VDC	- 5.32	- 5.34	- 5.34	- 5.34	- 5.34	- 5.34	- 5.34
8104	CIU B -5 V	CIU B ON	VDC	- 5.31	- 5.31	- 5.31	- 5.31	- 5.31	- 5.31	- 5.31
8105	CIU A Temp	CIU A ON	°C	24.47	24.77	25.04	24.98	24.36	24.31	24.09
8106	CIU B Temp	CIU B ON	°C	24.96	25.31	25.45	25.40	24.75	24.74	24.48
8201	Receiver RF-A Temp	-	°C	**	**	28.67	28.26	27.87	27.63	27.53
8202	Receiver RF-B Temp	-	°C	27.98	28.22	**	**	**	**	**
8203	D MOD A Temp	-	°C	25.41	25.73	37.98	37.69	37.61	37.58	37.31
8204	D MOD B Temp	-	°C	35.03	35.61	26.12	25.68	25.52	25.52	25.27
8205	Receiver A AGC	Receiver A ON	DBM	**	**	-96.77	-91.80	-80.77	-78.99	-85.62
8206	Receiver B AGC	Receiver B ON	DBM	-94.74	-84.67	**	**	**	**	**
8207	Amp. A Output	Receiver A ON	TMV	**	**	2.31	2.63	3.43	3.16	2.94
8208	Amp. B Output	Receiver B ON	TMV	2.81	3.22	**	**	**	**	**
8209	Freq. Shift Key A OUT	Receiver A ON	TMV	**	**	1.10	1.11	1.11	1.10	1.11
8210	Freq. Shift Key B OUT	Receiver B ON	TMV	1.10	1.11	**	**	**	**	**
8211	Amp. A Output	Receiver A ON	TMV	**	**	1.10	1.11	1.11	1.14	1.16
8212	Amp. B Output	Receiver B ON	TMV	1.13	1.13	**	**	**	**	**
8215	D MOD A -15 V	Receiver A ON	TMV	**	**	5.00	5.00	5.00	5.00	5.00
8216	D MOD B -15 V	Receiver B ON	TMV	5.00	5.00	**	**	**	**	**
8217	Regulator A -10 V	Receiver A ON	TMV	**	**	5.40	5.40	5.40	5.40	5.30
8218	Regulator B -10 V	Receiver B ON	TMV	5.50	5.50	**	**	**	**	**

** Units not in use

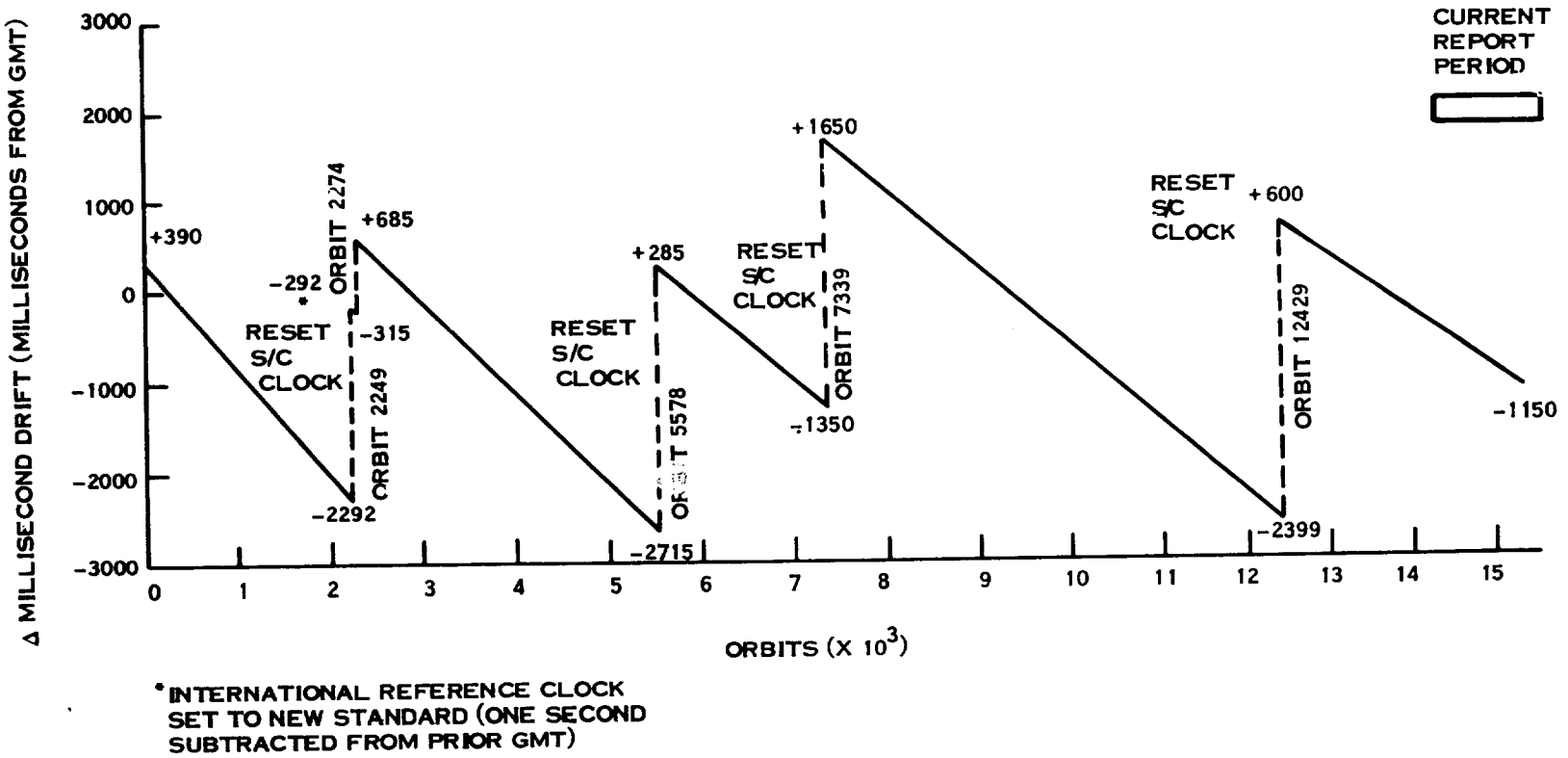


Figure 5-1. Landsat-1 Spacecraft Clock Drift History

SECTION 6

TELEMETRY SUBSYSTEM (TLM)

The Telemetry Subsystem has performed nominally in this report period. Table 6-1 shows typical telemetry values since launch. All are nominal.

Table 6-1. TLM Telemetry Summary

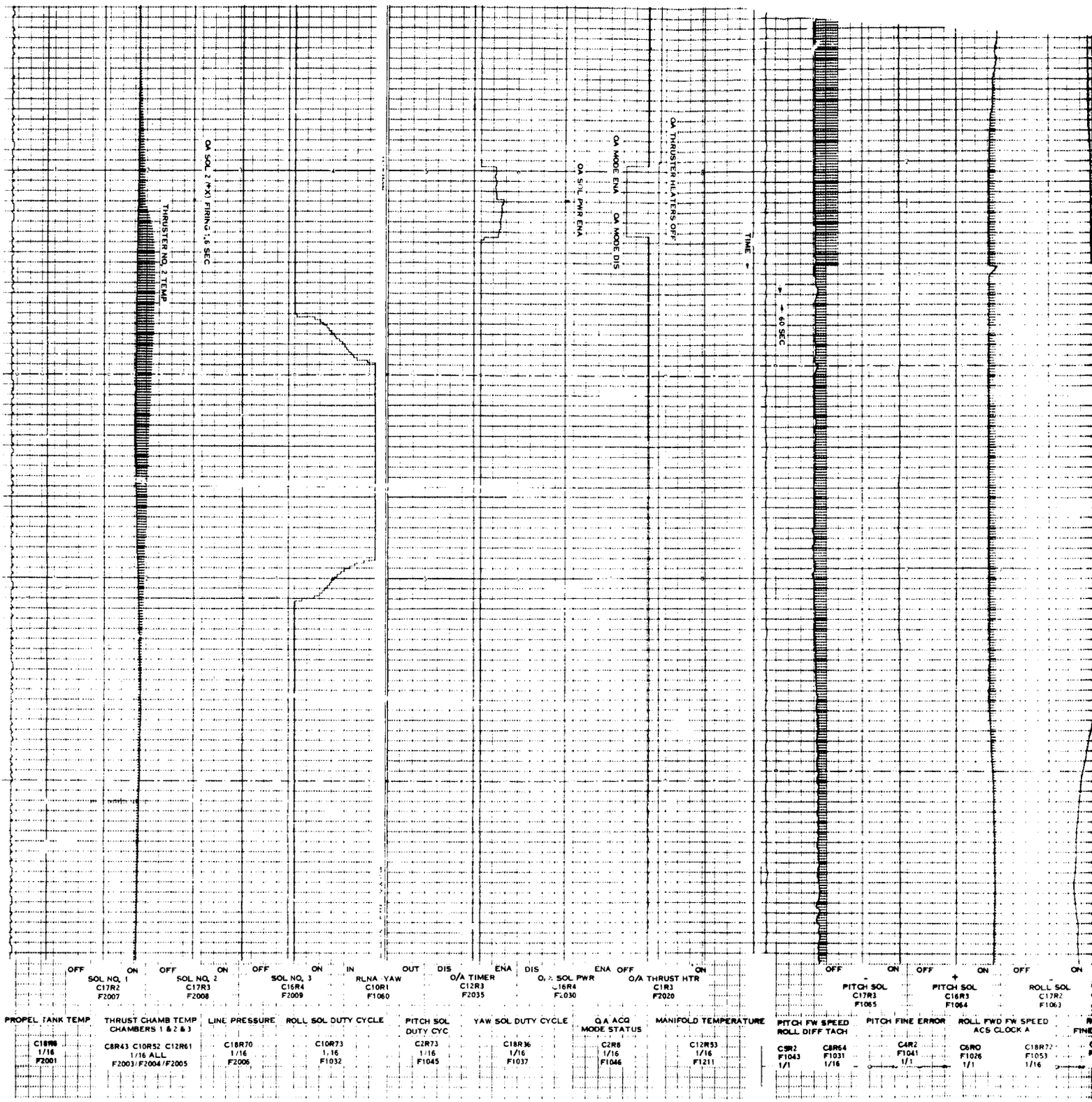
Function No.	Function Name	Unit	Orbit						
			35	5099	10592	12565	14158	14619	15233
9001	Memory Sequencer A Converter	VDC	6.35	6.33	6.33	6.33	6.33	6.33	6.33
9002	Memory Sequencer B Converter	VDC	**	**	**	**	**	**	**
9003	Memory Sequencer Temp	°C	19.59	21.06	21.30	22.20	21.13	21.69	21.94
9004	Formatter A Converter	VDC	5.99	5.99	5.99	5.93	5.99	5.99	5.99
9005	Formatter B Converter	VDC	**	**	**	**	**	**	**
9006	Dig. Mux A Converter	VDC	10.01	10.04	10.07	10.07	10.07	10.07	10.07
9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**
9008	Formatter/Dig. Mux Temp	°C	22.50	24.89	25.00	28.19	24.78	24.58	23.55
9009	Analog Mux A Converter	VDC	26.01	21.18	26.20	26.23	26.24	26.30	26.32
9010	Analog Mux B Converter	VDC	**	**	**	**	**	**	**
9011	A/D Converter A Voltage	VDC	10.00	10.07	10.07	10.07	10.07	10.07	10.07
9012	A/D Converter B Voltage	VDC	**	**	**	**	**	**	**
9013	Analog Mux A/D Converter	°C	25.00	26.83	27.49	28.66	26.18	25.63	25.63
9014	Preregulator A Voltage	VDC	19.93	19.95	19.94	19.99	19.98	19.98	19.98
9015	Preregulator B Voltage	VDC	**	**	**	**	**	**	**
9016	Reprogrammer Temp	°C	22.00	22.50	22.53	25.80	22.50	22.50	22.50
9017	Memory A Converter	VDC	6.00	5.99	6.00	6.00	5.97	5.97	5.97
9018	Memory A Temp	°C	17.51	17.50	17.50	18.49	17.50	17.50	17.50
9019	Memory B Converter	VDC	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.68	17.63	17.51	19.06	17.50	17.50	17.50
9100	Reflected Power (Xmtr A)	dBm	11.95	12.32	12.38	13.05	12.08	11.47	11.37
9101	Xmtr A -20 VDC	VDC	-19.75	-19.76	-19.75	-19.78	-19.82	-19.84	-19.84
9102	Xmtr B -20 VDC	VDC	**	**	**	**	**	**	**
9103	Xmtr A Temp	°C	20.95	21.14	22.01	26.01	22.04	21.51	21.98
9104	Xmtr B Temp	°C	21.69	21.95	22.76	27.18	22.97	22.39	22.91
9105	Xmtr A Power Output	dBm	25.12	25.35	25.24	25.27	25.23	25.13	25.00
9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**

** Units not used since prelaunch

SECTION 7

ORBIT ADJUST SUBSYSTEM (OAS)

The Orbit Adjust Subsystem has been fired eleven times, seven times using the -X thruster and four times using the +X thruster. Three -X firings were for initial orbit correction and four -X for orbit maintenance. The four +X firings were for orbit maintenance. The only orbit maintenance maneuver in this report period occurred in Orbit 14365 (19 May 1975) utilizing the +X thruster. The burn lasted for 1.6 seconds and performance was normal in all respects as seen in Figure 7-1. The ACS pneumatics was not enabled during this maneuver in view of the short duration of the burn and the low availability of freon. The Subsystem pressure/temperature parameters continue to be normal. There is 64.85 pounds of hydrazine fuel remaining from an initial prelaunch load of 67.00 pounds. Figure 2-2 shows spacecraft ground track drift from standard orbit tracks and the effects of orbit adjustment. Table 7-1 is a summary of OAS performance to date, and Table 7-2 gives average telemetry values for the off quiescent state.



FOLDOUT FRAME 1

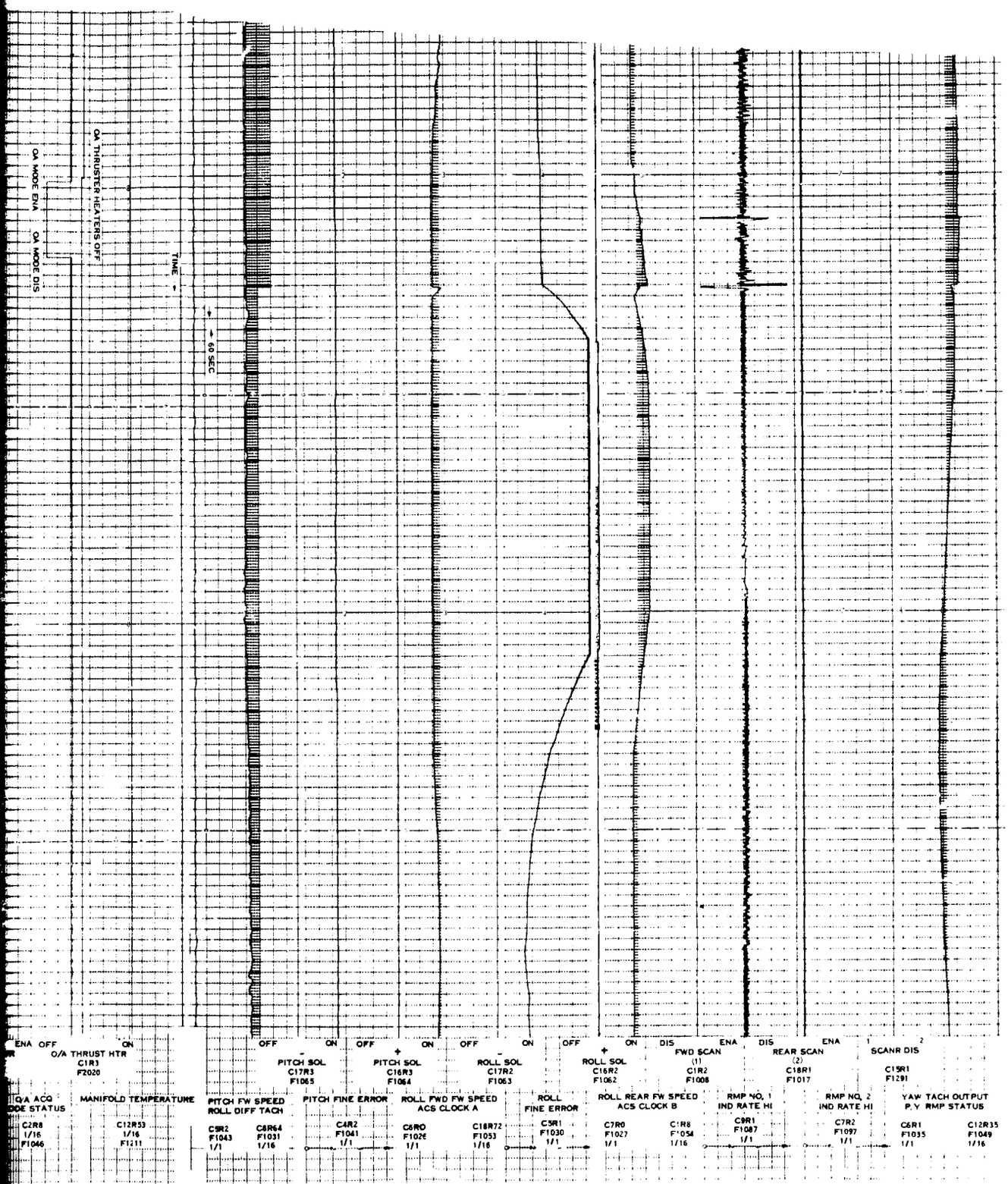


Figure 7-1. Performance Characteristics, Landsat +X Thruster Orbit Adjust, Orbit 14365 (19 May 1975)

Table 7-1. Landsat-1 Orbit Adjust Summary

Orbit	Orbit Adjust No.	Ignition Epoch	Burn Duration (Seconds)	$+\Delta a$ (Meters)	Engine Performance Efficiency	Fuel[1] Used (Lbs)	Tank Pressure (PSIA)	Tank Temperature (^{o}F)	Axis Thruster
38	1.	26 Jul 72 11:25:0.0	4.8	12	60 %		540	75	-X
44	2.	26 Jul 72 21:44:46	250.0	1975	103.4%	2.15	U[2]	U[2]	-X
59	3.	27 Jul 72 23:34:45	318.0	2391	101.5%		516	73.9	-X
938	4.	29 Sep 72 00:30:00	11.8	98	110.0 %	0.039	U[2]	U[2]	-X
2316	5.	13 Jan 73 00:21:30	20.4	154	106.0 %	0.071	489.4	75.4	-X
6390	6.	25 Oct 73 00:04:10.8	14.8	110	100.0 %	0.048	486.8	73.9	-X
7826	7.	4 Feb 74 23:27:10.4	14.7	112	101.8 %	0.048	490.59	75.4	-X
11367	8.	16 Oct 74 22:42:10.8	8.0	-65	106.0 %	0.026	490.59	74.0	+X
11464	9.	23 Oct 74	8.4	-66	102.0 %	0.027	490.58	73.9	+X
13611	10.	26 Mar 75 19:39:00.8	2.8	-22.6	102.7 %	0.01	486.86	70.9	+X
14365	11.	19 May 1975 21:19:00.8	1.6	-13	102.4 %	0.01	486.84	71.6	+X

1 Initial Fuel Capacity - 67 lbs.
2 Unavailable

Table 7-2. Landsat-1 OAS Telemetry Values

Function No.	Name	Units	Orbit						
			35	5099	10182	12743	14417	14835	15254
2001	Prop. Tank Temp	^{o}C	22.03	22.86	23.28	24.53	21.96	22.03	21.62
2003	Thrust Chamber No. 1 (-x) Temp. **	^{o}C	29.57	29.93	30.55	29.39	30.44	30.21	30.52
2004	Thrust Chamber No. 2 (+x) Temp. **	^{o}C	38.76	40.28	38.91	38.08	38.64	38.41	36.25
2005	Thrust Chamber No. 3 (-y) Temp **	^{o}C	34.55	34.41	36.09	50.63	36.77	36.32	38.45
2006	Line Pressure	psia	539.29	486.87	490.61	494.36	486.83	486.97	486.87

** Wide spread of temperature is due to nozzle locations and satellite day/night transitions relative to data averaged. Typical orbital range is from 19 to 59 DGC.

SECTION 8

MAGNETIC MOMENT COMPENSATING ASSEMBLY (MMCA)

The spacecraft was corrected for unbalanced magnetic moments in Orbits 73, 85, 110, 220, 11181, 11185, and 1186, as reported in early reports. Adjustments were made in the yaw negative dipole in Orbit 11186 and the pitch positive dipole in Orbit 220. A short roll dipole test was performed in Orbit 11185, with roll dipole returned to near zero. No adjustments were made in this report period.

The current dipole values are:

Pitch +2950 Pole-Cm

Roll -500 Pole-Cm

Yaw -3600 Pole-Cm

Telemetry measurement shown in Table 8-1 shows that the dipoles are holding steady without drift.

Table 8-1. MMCA Telemetry Summary (Landsat-1)

Number	Name	Units	Orbits						
			35	5099	10182	12743	14417	14835	15254
4001	A1 Board Temp	°C	19.77	19.03	19.11	18.52	17.59	17.87	17.59
4002	A2 Board Temp	°C	23.58	23.05	23.13	22.62	21.84	22.06	21.83
4003	Hall Current	TMV	3.48	3.48	3.48	3.48	3.47	3.48	3.47
4004	Yaw Flux Density	TMV	3.11	3.11	3.15	4.01	4.01	4.02	4.02
4005	Pitch Flux Density	TMV	3.13	2.51	2.52	2.52	2.52	2.52	2.52
4006	Roll Flux Density	TMV	3.19	3.19	3.20	3.28	3.28	3.28	3.28

SECTION 9

UNIFIED S-BAND/ PREMODULATION PROCESSOR (USB/PMP)

The USB Subsystem has operated nominally in this report period.

Table 9-1 shows telemetry values since launch. The 15-volt supply (11008) appears to be declining, but no adverse effect of system overall performance is yet apparent.

Figure 9-1 shows the USB power output history since launch. In Orbit 10068, the B Section of the transmitter was substituted, restoring full power output to the System. Figure 9-2 shows AGC readings at Goldstone for a constant reference orbit in each cycle since launch.

Table 9-1. Landsat-1 USB/PMP Telemetry Values

Function			Orbit						
No.	Name	Units	35	5099	10592	12568	14417	14619	15233
11001	USB Rcvr AGC	DBM	-122.78	-131.99	-129.81	-132.00	-126.10	-110.29	-105.41
11002	USB Xmtr Pwr	WTS	1.60	0.29	1.54	1.46	1.57	1.58	1.53
11003	USB Rcvr Error	KHZ	21.79	-21.32	-23.25	-21.82	-21.74	-23.21	-18.01
11004	USB Xpond Temp	DGC	22.92	22.64	25.64	27.36	25.01	24.64	25.11
11005	USB Xpond Press	PSI	15.91	15.91	15.92	16.10	15.94	15.95	15.94
11007	USB Xmtr A -15V	VDC	-15.20	-15.20	**	**	**	**	**
11008	USB Xmtr B -15V	VDC	**	**	-15.20	-15.20	-15.11	-15.20	-14.96
11009	USB Range -15V	VDC	-14.76	-14.76	-14.58	-14.58	-14.48	-14.58	-14.58
11101	PMP Pwr A Volt	VDC	-15.12	-15.18	**	**	**	**	**
11102	PMP Pwr B Volt	VDC	**	**	-15.12	-15.10	-15.08	-14.84	-14.82
11103	PMP Temp A	DGC	30.44	30.23	26.60	29.50	25.41	25.66	26.09
11104	PMP Temp B	DGC	**	**	31.64	34.10	30.47	31.03	31.67

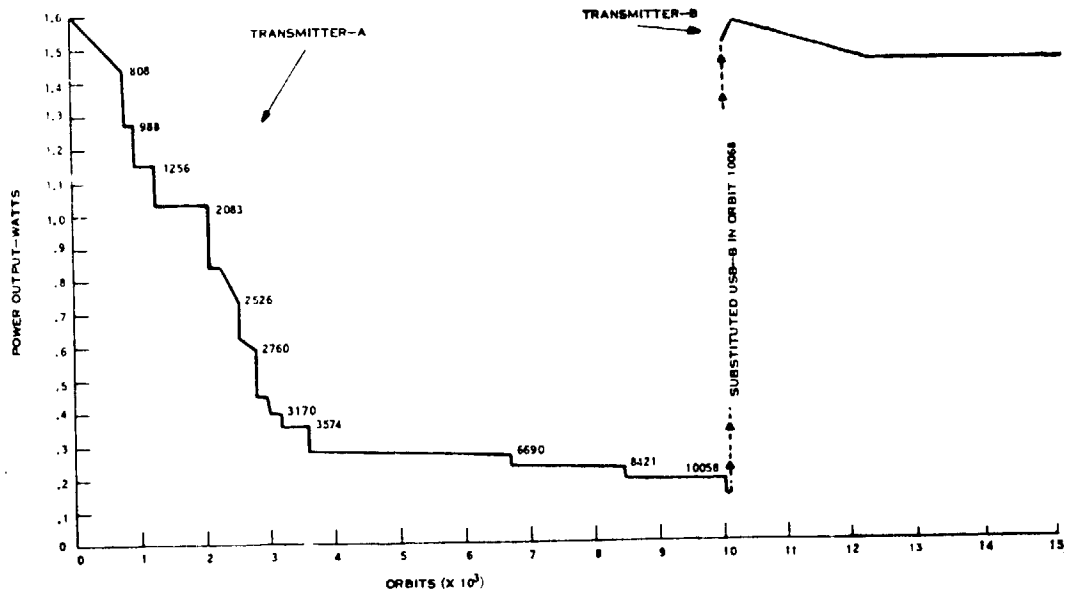


Figure 9-1. USB Power Output History (Landsat-1)

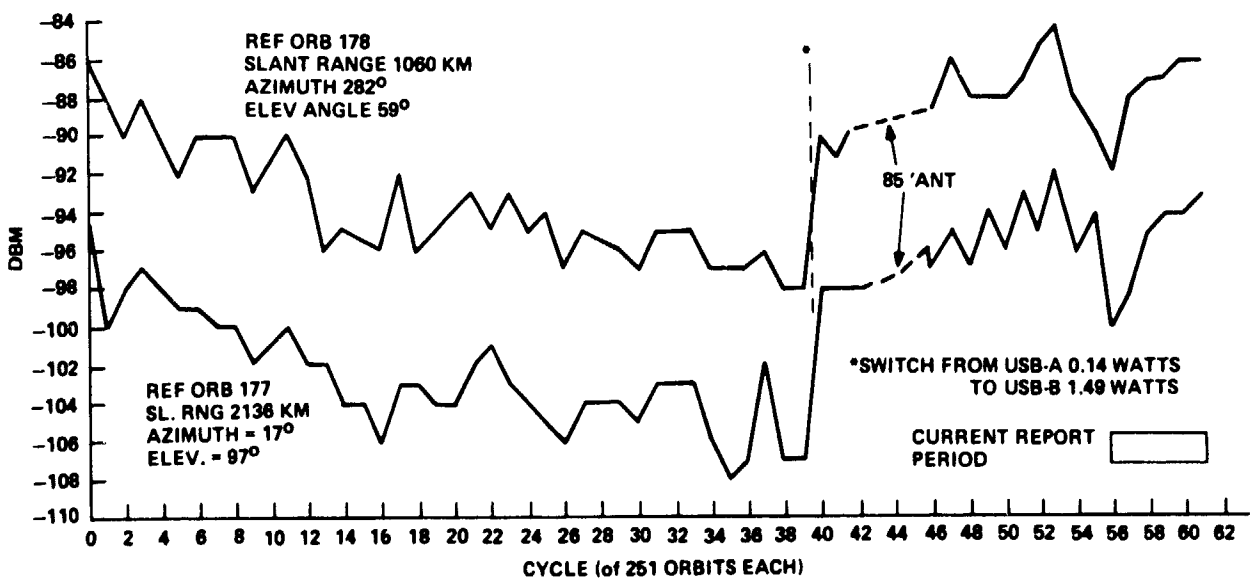


Figure 9-2. USB (Link 4) AGC Reading at Goldstone with 30-Foot Antenna, Landsat-1

SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM

Auxiliary Processing Unit (APU) consisting of Search Track Data, Time Code Data, and Backup Timers, operated satisfactorily throughout this report period. Telemetry for the APU is shown in Table 10-1. The APU is in Normal mode.

Table 10-1. Landsat-1 APU Telemetry Functions

Functions	Description	Unit	Orbit						
			7	5098	10182	12565	14417	14835	15254
13200	APU, -24.5 VDC	VDC	-24.90	-24.90	-24.91	-24.90	-24.90	-24.90	-24.90
13201	APU/ -12 Volts	VDC	-12.08	-12.08	-12.07	-12.06	-12.06	-12.06	-12.06
13202	APU Temp.	DGC	25.49	26.95	27.15	29.62	26.77	26.85	26.82

The Power Switching Module (PSM), containing the switching relays for power to Orbit Adjust, MSS, WBVTR No. 1 and No. 2, RBV and PRM, functioned normally. The MSS power dircuits have been operated on a regular basis throughout this report period. The power relay for the RBV remained in a failed closed condition since Orbit 196.

The Interface Switching Module (ISM) performed all switching normally during this report period.

SECTION 11

THERMAL SUBSYSTEM

The Thermal Subsystem of Landsat-1 has maintained spacecraft temperature control over a satisfactory range since launch. Table 11-1 shows average analog telemetry values from data recorded on the NBTR. During this report period, the sun angle varied as shown in Figure 3-3, and the intensity decreased from approximately 0.99 to 0.97 of the mean value. Figure 11-1 shows a typical thermal profile for average bay temperatures of the sensory ring in this report period. The values are consistent with the limits established over two years of orbital operation.

No switching of the compensation loads was required during this report period.

The compensation load switching history since launch is given in Table 11-2.

Table 11-1. Landsat-1 Thermal Subsystem Analog Telemetry (Average Value of Frames for Data Received in NBTR Playback)

Function		Unit	Orbits						
Function No.	Description		26	5096	10182	12743	14417	14835	15254
7001	THM TH01 ST1	DGC	19.52	20.85	21.65	21.78	19.84	20.45	19.48
7002	THM TH02 SBO	DGC	18.60	19.95	20.60	19.47	19.40	19.73	18.62
7003	THM TH03 ST1	DGC	18.48	20.16	20.87	19.70	19.19	19.35	18.11
7004	THM TH10 TCB	DGC	19.47	20.25	20.36	21.66	19.72	19.84	19.76
7005	THM TH04 ST1	DGC	18.39	19.71	20.35	18.99	18.99	18.95	17.86
7006	THM TH05 SBO	DGC	17.57	18.39	18.81	17.62	17.60	17.97	17.20
7007	OA -X THRUSTER	DGC	21.95	22.95	22.90	22.67	22.28	22.44	22.25
7008	THM TH06 STO	DGC	15.95	16.61	16.90	15.94	15.63	15.96	15.34
7009	THM TH06 SBI	DGC	19.38	20.35	20.93	19.71	19.20	19.67	18.98
7010	THM TH07 ST1	DGC	18.61	*	*	*	*	*	*
7011	THM TH08 STO	DGC	21.78	22.77	22.88	22.51	22.14	22.30	22.03
7012	THM TH09 SBI	DGC	21.81	22.87	23.08	23.23	22.21	22.48	22.20
7013	THM TH10 SBO	DGC	18.73	19.53	19.64	20.18	18.92	19.21	19.00
7014	THM TH11 ST1	DGC	22.37	23.36	23.57	25.19	22.79	22.89	22.80
7015	THM TH12 SBO	DGC	22.37	23.17	23.03	26.64	22.83	22.85	22.86
7016	THM TH13 ST1	DGC	20.95	22.02	22.47	26.15	21.97	22.03	22.00
7017	RBV BEAM CTR LN	DGC	21.53	22.62	22.84	23.60	21.87	22.06	21.88
7018	THM TH14 STO	DGC	20.38	21.40	21.93	26.87	21.52	21.54	21.83
7019	NBR RAD OUTBD B4	DGC	5.09	5.86	6.00	5.65	4.36	4.51	4.37
7020	THM TH15 SBI	DGC	21.14	23.24	23.99	27.38	22.67	22.62	22.18
7021	THM TH16 ST1	DGC	20.73	22.90	23.68	26.04	22.14	22.32	21.64
7022	THM TH17 SBI	DGC	20.22	22.76	23.56	25.22	21.84	22.44	21.47
7023	THM TH18 SBO	DGC	21.90	24.29	25.19	25.97	23.45	24.46	23.47
7030	THM TH03 BUR	DGC	16.05	17.07	17.42	15.97	16.48	16.38	15.35
7031	THM TH06 BUR	DGC	13.58	14.17	14.28	13.42	13.17	13.44	12.87
7032	THM TH09 BUR	DGC	19.92	20.75	20.74	20.91	20.18	20.34	20.17
7033	THM TH12 BUR	DGC	21.51	22.16	22.76	26.79	22.72	22.66	22.65
7034	THM TH15 BUR	DGC	19.70	21.67	22.38	25.83	21.74	21.58	21.33
7035	THM TH18 BUR	DGC	20.11	21.36	22.02	22.58	20.82	21.19	20.54
7040	THM TH01 TCB	DGC	19.27	20.46	21.26	20.91	19.71	20.19	19.19
7041	THM TH02 TCB	DGC	17.99	19.23	19.89	18.84	18.48	18.87	17.80
7042	THM TH03 TCB	DGC	18.34	19.94	20.92	18.51	19.78	19.35	17.79
7043	THM TH04 TCB	DGC	18.95	19.94	20.26	19.13	19.32	19.41	18.60
7044	THM TH05 TCB	DGC	16.27	16.98	17.32	16.40	16.14	16.50	15.90
7045	THM TH07 TCB	DGC	18.41	19.21	19.45	18.82	18.42	18.63	18.25
7046	THM TH09 TCB	DGC	19.38	20.37	20.64	20.47	19.59	20.19	19.85
7048	THM TH11 TCB	DGC	21.98	22.94	23.18	25.50	22.76	22.84	22.80
7049	THM TH12 TCB	DGC	21.92	22.46	22.35	26.52	22.34	22.30	22.36
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	27.37	22.01	22.02	22.26
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	27.75	22.47	22.87	22.74
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	26.98	23.66	23.69	22.68
7053	THM TH17 TCB	DGC	21.73	24.03	25.02	26.05	22.99	24.46	23.33
7054	THM TH18 TCB	DGC	20.02	22.20	23.35	22.85	20.99	22.15	21.04
7060	THM SHUTTER BY 1	DEG	25.85	33.12	38.62	38.70	27.02	31.40	24.41
7061	THM SHUTTER BY 2	DEG	6.62	8.65	13.25	10.38	3.05	6.38	1.73
7062	THM SHUTTER BY 3	DEG	10.96	23.58	30.24	20.77	24.12	24.20	17.30
7063	THM SHUTTER BY 4	DEG	30.60	35.71	37.92	33.33	30.70	33.44	29.50
7064	THM SHUTTER BY 5	DEG	15.03	16.25	15.00	12.69	8.70	8.68	8.08
7065	THM SHUTTER BY 7	DEG	17.14	24.64	21.96	21.43	14.50	14.51	14.50
7067	THM SHUTTER BY 9	DEG	33.26	38.44	39.50	39.16	37.97	39.37	38.24
7068	THM SHUTTER BY 10	DEG	24.68	26.68	27.31	34.58	25.98	26.01	26.03
7069	THM SHUTTER BY 11	DEG	39.66	46.49	48.96	58.72	47.10	47.09	46.97
7070	THM SHUTTER BY 12	DEG	43.81	46.63	45.68	66.18	47.24	46.56	45.95
7071	THM SHUTTER BY 13	DEG	40.39	46.38	44.79	61.72	43.22	43.02	42.84
7072	THM SHUTTER BY 14	DEG	34.20	39.70	41.91	67.08	34.00	35.20	34.28
7073	THM SHUTTER BY 15	DEG	45.40	58.74	64.79	80.73	59.15	57.41	55.15
7074	THM SHUTTER BY 16	DEG	24.50	48.46	53.54	62.03	44.08	45.61	38.76
7075	THM SHUTTER BY 17	DEG	39.06	54.96	61.88	69.19	47.86	50.72	51.06
7076	THM SHUTTER BY 18	DEG	29.70	43.15	51.20	48.64	32.98	43.12	35.12
7080	THM Q1 T ZENER V	VDC	8.19	8.19	8.19	8.19	8.19	8.19	8.19
7081	THM Q2 T ZENER V	VDC	8.40	8.40	8.40	8.40	8.40	8.40	8.40
7082	THM Q3 T ZENER V	VDC	8.31	8.31	8.32	8.31	8.32	8.31	8.31
7083	THM Q1 S ZENER V	VDC	8.31	8.32	8.35	8.36	8.32	8.32	8.31
7084	THM Q2 S ZENER V	VDC	8.19	8.19	8.20	8.21	8.19	8.19	8.19
7085	THM Q3 S ZENER V	VDC	8.15	8.15	8.15	8.16	8.15	8.15	8.15
7090	THM PSM MOUNT	DGC	21.60	22.54	22.98	24.17	21.42	21.64	21.43
7091	THM IND ATTITUDE	DGC	19.40	20.42	20.88	20.12	19.33	19.70	19.13
7092	THM RBV RADIATOR	DGC	15.65	17.22	17.47	18.61	16.73	16.80	16.55
7093	THM RBVC CTR BM	DGC	20.30	21.61	21.87	22.95	20.85	20.97	20.72
7094	THM WBVTR ROOT	DGC	12.96	15.71	16.07	16.60	14.48	14.65	13.77
7095	THM WBVTR RAD CT	DGC	4.81	8.17	8.68	8.82	7.89	7.78	6.99
7096	THM WBVTR STRAP	DGC	16.62	19.32	19.66	20.06	17.96	18.28	17.29
7097	THM WB MT BAY 1	DGC	20.56	19.52	21.37	21.73	17.45	17.83	16.97
7098	THM WB MAT BAY 1	DGC	20.22	18.90	20.39	21.25	17.46	17.91	17.12
7099	THM WBVTR SEP 3	DGC	16.60	20.55	21.05	20.29	19.29	19.60	18.45
7100	THM WBVTR SEP 17	DGC	21.31	23.66	24.23	25.61	22.30	22.99	22.02
7101	THM WBVTR 1 CENT	DGC	21.49	23.72	24.01	24.49	22.11	22.63	21.63
7102	THM WBVTR 2 BAY	DGC	17.46	18.92	19.32	18.64	17.79	17.97	17.23
7103	THM WBVTR 2 BY 15	DGC	21.00	23.16	23.82	26.10	22.16	22.33	21.73
7104	THM WBVTR 2 CTR	DGC	19.35	21.51	21.81	22.76	19.91	20.19	19.56
7105	THM NBTR B SEP 6	DGC	18.06	19.30	19.79	19.31	17.69	17.99	17.62
7106	THM NBTR B SEP 1	DGC	20.82	22.35	22.89	25.90	21.68	21.82	21.61
7107	THM NBTR BM CTR	DGC	19.37	21.06	21.34	22.37	19.61	19.82	19.51
7108	THM MSS MOUNT 14	DGC	19.18	21.15	21.70	24.68	20.39	20.45	20.06
7109	THM OA -Y THRUSTER	DGC	22.21	23.80	24.69	30.46	24.09	24.13	24.40
7110	THM MSS WBVTR BM	DGC	18.14	20.06	20.53	20.50	18.38	18.62	18.18
7111	THM OA +X THRUSTER	DGC	20.30	19.92	21.22	21.70	18.58	18.98	18.07
7130	THM AUX P1 T	DGC	15.69	8.49	-18.90	14.52	3.43	-2.26	9.68
7131	THM AUX P2 T	DGC	10.63	1.59	.41	29.90	3.01	4.50	5.64

*Function 7010 became invalid after an integrated circuit chip failure in the IMP on Orbit 4396.

Table 11-2. Landsat-1 Compensation Load History

	Compensation Load Status*							
Orbits	1	2	3	4	5	6	7	8
Launch	0	0	0	0	0	0	0	0
2	0	0	x	x	x	0	x	x
6	x	x	x	x	x	0	x	x
118	0	0	0	0	0	0	0	0
156	x	x	x	x	x	0	x	x
194	0	0	0	0	0	0	0	0
197	x	x	x	x	x	0	x	x
701	x	x	0	x	x	0	x	x
1410	x	x	0	x	x	0	0	x
3484	x	x	x	x	x	0	0	x
3644	x	x	0	x	x	0	0	x
3646	x	x	x	x	x	0	0	x
4177	x	x	0	x	x	0	0	x
6872	x	x	x	x	x	0	0	x
6966	x	x	0	x	x	0	0	x
8291	x	x	x	x	x	0	0	x
8348	x	x	0	x	x	0	0	x
8449	x	x	x	x	x	0	0	x
8472	x	x	0	x	x	0	0	x
8538	x	x	x	x	x	0	0	x
8928	x	x	0	x	x	0	0	x
9898	x	x	x	x	x	0	0	x
10410	x	x	0	x	x	0	0	x
11125	0	0	0	0	0	0	0	0
11126	x	x	0	x	x	0	0	x
11127	0	0	0	0	0	0	0	0
11133	x	x	0	x	x	0	0	x
12604	x	x	x	x	x	0	0	x
13206	x	x	0	x	x	0	0	0

*Note: x = ON
0 = OFF

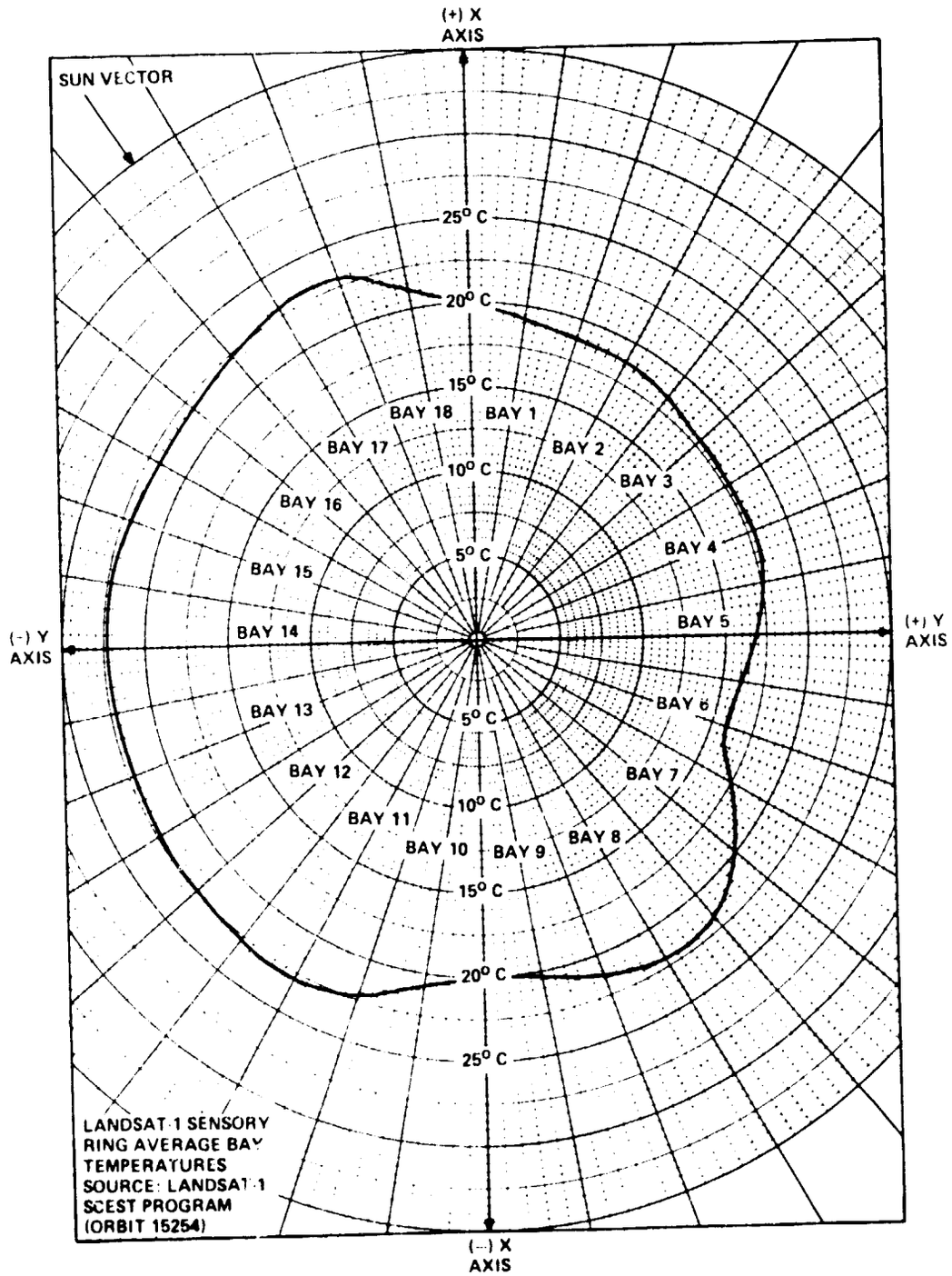


Figure 11-1. Landsat-1 Sensory Ring Thermal Profile

SECTION 12

NARROWBAND TAPE RECORDERS (NBR)

Narrowband Recorder NBR-A operated satisfactorily during this period, performing all normal orbital telemetry recording and playback functions.

Narrowband Recorder NBR-B. which had been turned off in Orbit 13015 (12 February 1975), was restored to limited operation in Orbit 14116 (2 May 1975) to provide telemetry support for MSS real-time operations. At the same time, the NBR-A schedule was modified slightly to provide 7 hours daily of telemetry recording, and 2 playbacks daily.

When NBR-B was played back in Orbit 15253 (22 July 1975), the playback ended prematurely after 3.5 minutes rather than the expected 8.75 minutes. Again, in Orbit 15256 on the same date, an 8.75 minute (anticipated) playback ended prematurely after 32 seconds.

A review of playback data and strip chart recordings showed that the NBR-B tape motion appeared intermittent and had eventually stopped. NBR-B was put into Record during Orbit 15256 so that real-time telemetry observations could be made; all values appeared normal.

NBR-B was turned off in Orbit 15256 and has remained off since that time. NBR-A has reassumed MSS real-time coverage as well as all other telemetry functions.

For further details of the NBR-B anomaly, see Appendix C Reference No. 20.

Table 12-1 identifies cumulative operating hours for both recorders by modes, and Table 12-2 gives typical telemetry values. Due to the fragmented operating schedules of the Recorders during this period, data is not available for NBR-A playback mode.

Table 12-1. NBR Operating Hours by Modes

NBR	On	Off	Playback	Record
A	12836	13440	514	12322
B	11909	12666	476	11433

Table 12-2. Narrowband Tape Recorder Telemetry Values, Landsat-1

Function		Typical Telemetry Values - Orbit					
No.	Name	6	3750-3751	7480-7481	10862	12343-12344	15256
10001	A - Motor Cur. (ma)						
	Record	190.10	189.20	186.31	186.31	186.31	192.63
	P/B	180.00	178.69	172.10	180.00	170.52	N/A
10101	B - Motor Cur. (ma)						
	Record	193.26	193.04	194.79	198.95	198.95	198.95
	P/B	188.18	185.44	186.31	187.89	189.47	202.1
10002	A - Pwr Sup. Cur. (ma)						
	Record	320.56	338.20	339.81	339.81	343.19	343.24
	P/B	535.78	568.38	569.56	567.75	569.56	N/A
10102	B - Pwr Sup. Cur. (ma)						
	Record	317.62	336.05	343.50	350.00	346.75	346.75
	P/B	570.78	555.63	574.00	567.50	567.50	580.51
10003	A - Rec. Temp. (DGC)	25.47	24.40	24.20	23.60	26.25	22.00
10103	B - Rec. Temp. (DGC)	24.58	23.41	24.54	23.41	25.38	23.18
10004	A - Supply (VDC)	-24.47	-24.44	-24.62	-24.62	-24.57	-24.62
10104	B - Supply (VDC)	-24.44	-24.51	-24.57	-24.29	-24.70	-24.57

N/A - Data Not Available

SECTION 13

WIDEBAND TELEMETRY SUBSYSTEM (WBTS)

The Wideband Telemetry Subsystem has operated nominally in this report period.

Table 13-1 shows typical telemetry values. All are nominal.

Figure 13-1 is the AGC history at Goldstone.

Table 13-1. Wideband Modulator Telemetry Values, Landsat-1

WBPA-1

Function			Orbits			
Number	Name		26	1894	1944	2095
12001	Tmpt TWT Coll.	(DgC)	35.7	39.20	39.90	39.90
12002	Helix Current	(Ma)	6.08	6.49	6.58	6.78
12003	TWT Cath. Curr.	(Ma)	45.89	43.54	43.48	45.01
12004	Forward Pwr	(DBM)	43.18	42.88	42.61	43.15
12005	Reflected Pwr	(DBM)	34.95	34.99	34.80	35.21
12227	Loop Str. AFC Con Volt (1)	(MHz)	-0.39	-1.29	-0.86	-0.67
12229	Mod Temp VCO	(DgC)	21.93	20.31	20.88	20.39
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.69	2.69	2.65	2.62
12234	-15 VDC Pwr Sup A	(TMV)	5.98	5.96	5.73	5.78
12235	+5 VDC Pwr Sup A	(TMV)	3.94	3.94	3.94	3.95
12238	-5 VDC Pwr Sup A	(TMV)	5.28	5.26	5.18	5.12
12240	-24 VDC Unreg Volt A	(TMV)	5.56	5.51	5.42	5.49
12242	Inv. Temp	(DgC)	20.60	23.43	24.71	24.04

WBPA-2

Function			Orbits							
Number	Name		33	2595	4096	10602	12565	14158	14619	15233
12101	Temp TWT Coll. (Max)	(DgC)	35.38	34.80	34.24	35.96	34.80	27.18	28.22	29.77
12102	Helix Current	(Ma)	7.32	7.46	7.70	7.67	7.80	7.76	7.90	7.90
12103	TWT Cath. Cur.	(Ma)	44.30	42.52	43.85	42.72	43.22	42.82	43.74	43.70
12104	Forward Pwr	(DBM)	43.57	43.35	43.57	43.47	43.48	43.40	43.53	43.52
12105	Reflected Pwr	(DBM)	31.59	32.11	32.79	32.62	32.83	32.70	33.01	33.07
12228	Loop Str. AFC Con Volt (1)	(MHz)	1.11	-1.01	-0.78	-1.12	-1.19	-1.26	-1.02	-1.05
12229	Mod Temp VDC	(DgC)	21.70	24.04	20.88	21.50	20.76	23.20	21.72	21.78
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.68	2.58	2.69	2.69	2.65	2.68	2.68	2.65
12234	-15 VDC Pwr Sup A	(TMV)	5.90	5.71	5.98	5.92	5.85	5.88	5.90	5.81
12235	+5 VDC Pwr Sup A	(TMV)	3.97	3.91	4.01	4.01	3.85	3.97	4.01	3.97
12239	-5 VDC Pwr Sup A	(TMV)	5.24	5.05	telemetry point defective →					
12240	-24.5 VDC Unreg Volt A	(TMV)	5.43	5.33	5.52	5.46	5.47	5.43	5.46	5.44
12242	Inv. Temp	(DgC)	23.03	22.95	22.96	23.86	23.41	23.54	23.60	23.66

(1) Satisfactory if not zero or -7.5 (2) B Power Supply not yet used in orbit

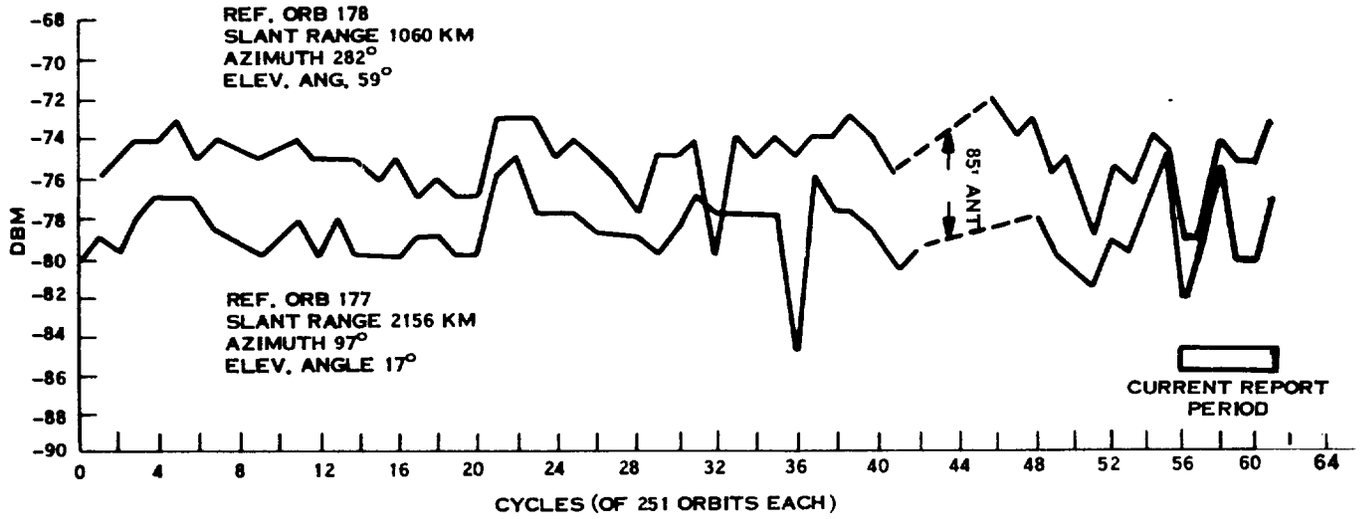


Figure 13-1. Landsat-1 AGC Readings at Goldstone with 30-Foot Antenna Wide Band Power Amp-2 (Link 3)

SECTION 14

ATTITUDE MEASUREMENT SENSOR (AMS)

Telemetry output of the AMS continues to be normal and in good agreement with the ACS subsystem.

Table 14-1 gives typical AMS telemetry values.

Table 14-1. Landsat-1 AMS Temperature Telemetry

Function	Description	Units	Orbits						
			35	5099	10182	12743	14417	14835	15254
3004	Case-Temp 1	DGC	18.92	19.42	19.71	19.93	18.76	18.89	18.54
3005	Assembly-Temp 2	DGC	19.15	19.76	19.96	20.23	18.99	19.15	18.73

SECTION 15

WIDE BAND VIDEO TAPE RECORDERS (WBVTR)

The recorders were not used during this period.

Pressure and temperature telemetry values for the Transport and Electronics Units are shown in Table 15-1.

Table 15-1. WBVTR-1 Telemetry Values

WBVTR-1 Functions		Telemetry Values in Orbits		
Number	Name	14424	14814	15260
13022	Press. Trans. (PSI)	15.73	15.79	15.73
13023	Temp. Trans. (DgC)	19.01	19.20	18.55
13024	Temp. Elec. (DgC)	15.77	15.77	15.00

SECTION 16

RETURN BEAM VIDICON (RBV)

The RBV has not been reactivated since Orbit 196, but it is capable of operation through individual component power switching. As assessment of the RBV performance was given in ERTS-1 Flight Evaluation Report 23 July to 23 October, 1972.

SECTION 17

MULTISPECTRAL SCANNER SUBSYSTEM (MSS)

The Multispectral Scanner Subsystem operated nominally in this period without incident. Figure 17-1 shows the number of scenes imaged at each geographical location in this quarter, and Figure 17-2 shows images since launch.

Table 17-1 shows typical telemetry values since launch. All values are nominal.

Table 17-2 shows the history of sensor response to a constant input radiance level. Sensor outputs have declined this quarter, but all are still satisfactory. Sensor 13, unlike the other sensors, rose steadily since launch but since September, 1974, seems to have stabilized.

Line length history is also shown in Table 17-2.

Sun Calibration, performed every two weeks, continue to show nominal performance.

FOLDOUT FRAME /

LS-1

ORIGINAL PAGE IS
OF POOR QUALITY

CYCLE 56 TO 60.
MAP SHOWS HOW MANY TAKES WERE OBTAINED FOR EACH FRAME.

I M A G E   A C Q U I S I T I O N

POSSIBLE	SCHED	ACQD	PROC	ACCEPT
151855	0842	2041	2430	2430
100.00%	4.50%	1.00%	1.60%	1.60%

FOLDOUT FRAME 2

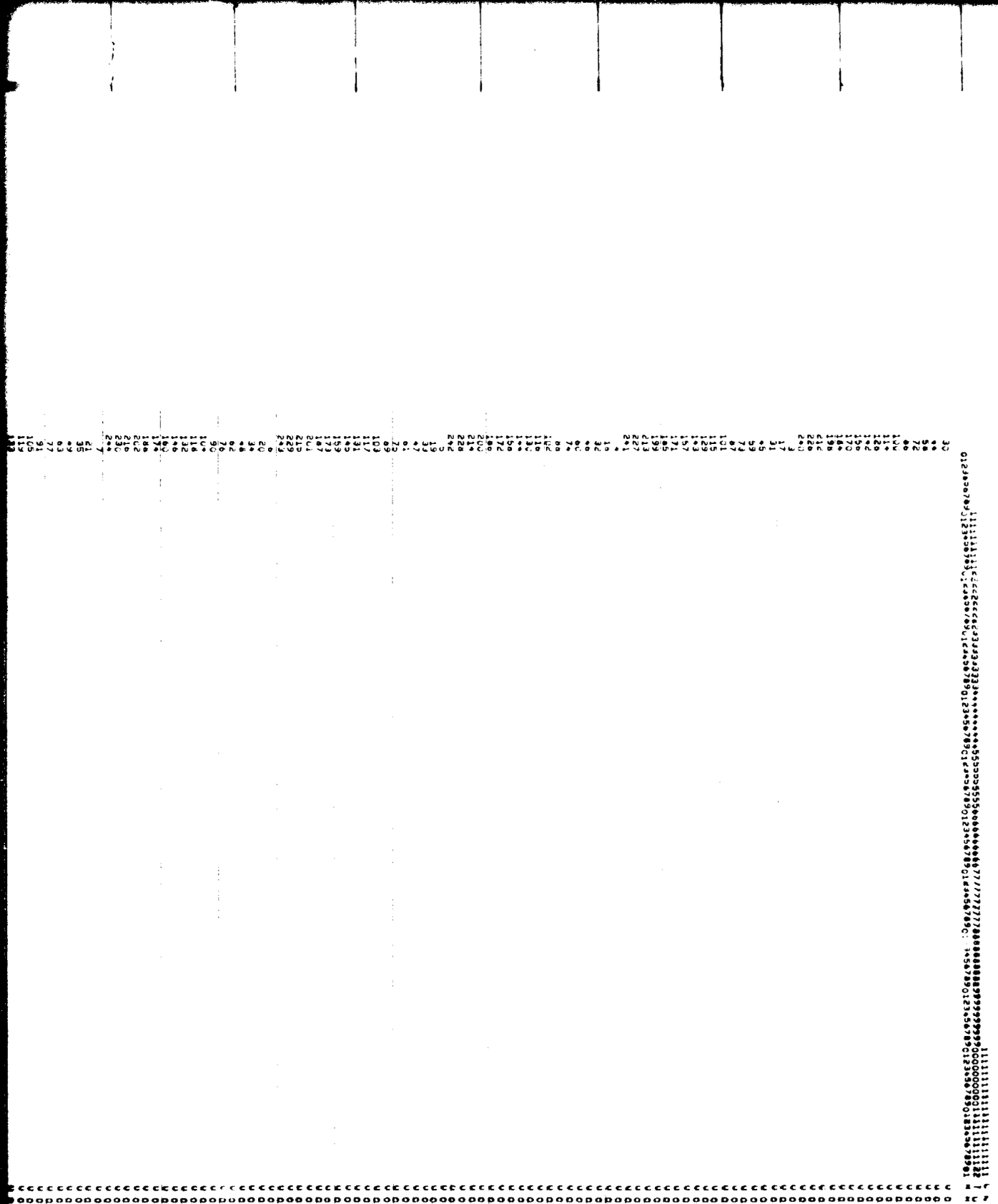
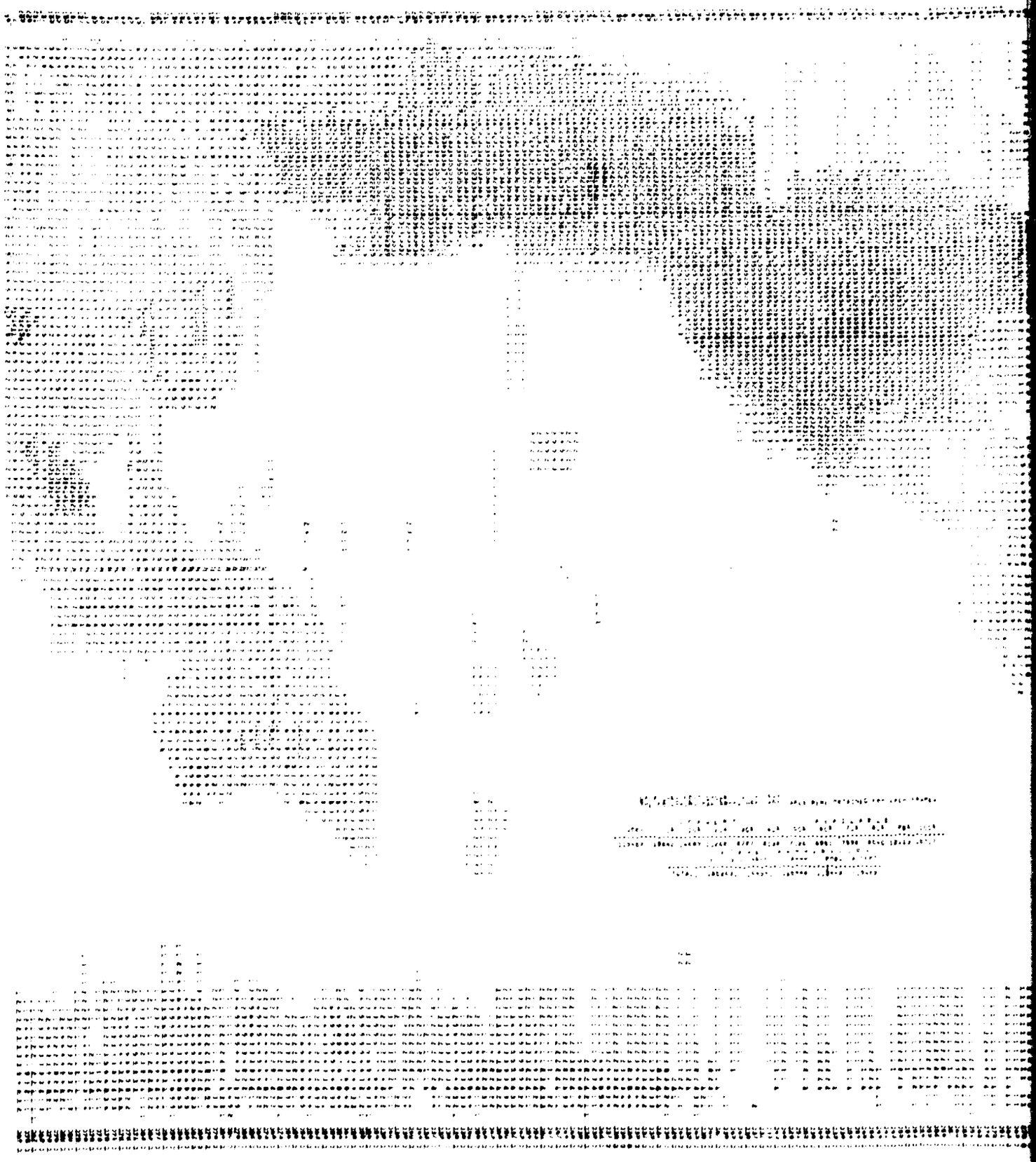


Figure 17-1. Computer Map of MSS Scenes
This Period - Landsat 1



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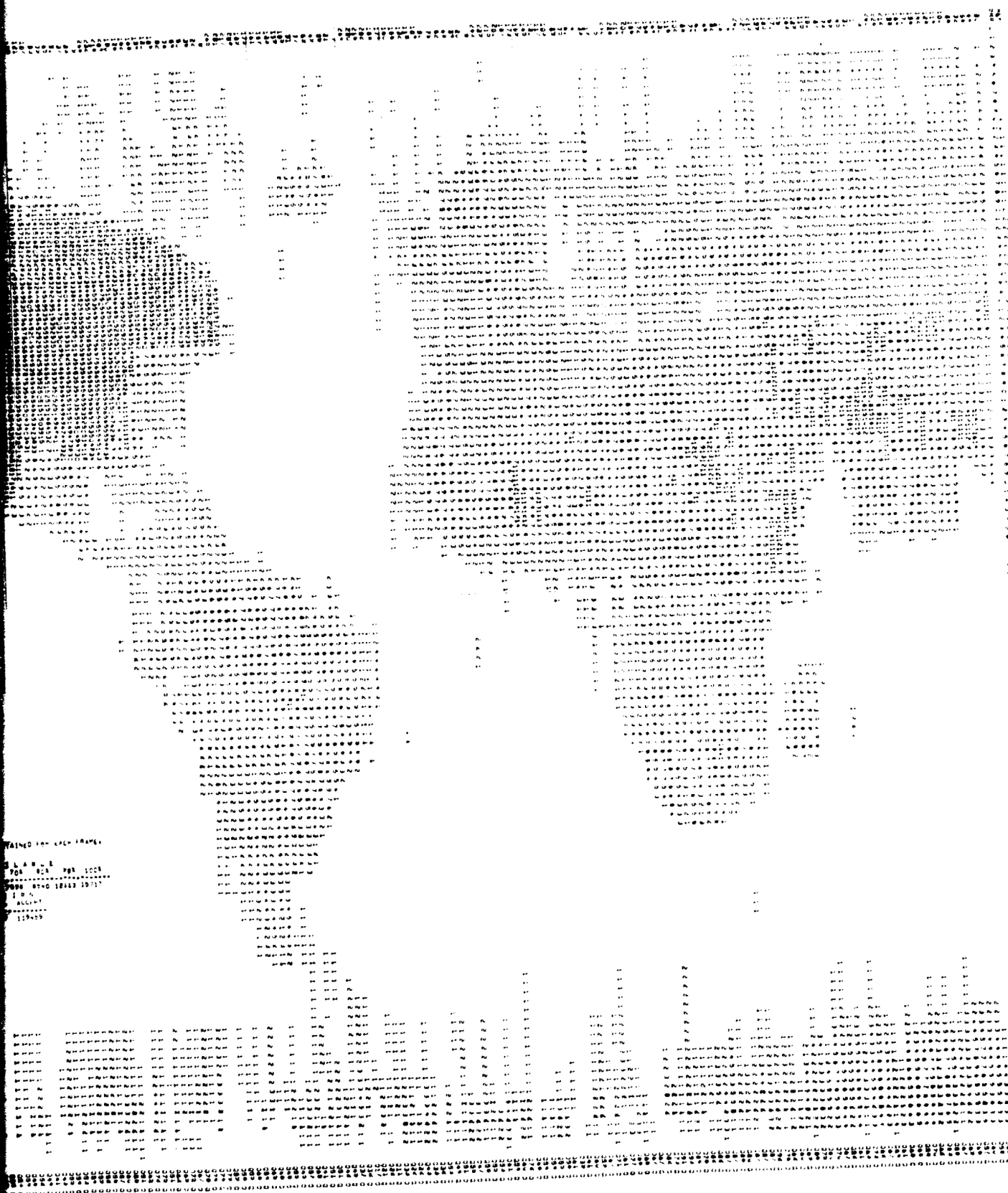


Figure 17-2. Computer Map of MSS Scenes Since Launch - Landsat-1

Table 17-1. MSS Telemetry Values

Function No.	Name		Telemetry Values in Orbits						
			20	5060	10587	12565	14158	14619	15233
15044	FOPT 2 T	(DGC)	17.46	19.84	19.75	21.45	18.69	17.98	18.15
15046	ELEC CVR T	(DGC)	19.37	21.83	21.96	24.01	20.48	20.02	20.20
15048	SCAN MIR REG T	(DGC)	16.35	19.77	20.48	22.86	21.13	20.50	20.94
15050	SCAN MIR DR. COIL T	(DGC)	15.94	19.30	19.78	22.31	19.70	18.84	19.21
15052	ROT SHUT HSG T	(DGC)	16.91	20.07	20.23	21.84	19.19	18.60	18.74
15043	FOPT 1 T	(DGC)	17.67	20.01	19.93	21.59	18.89	18.19	18.35
15045	MUX PWR CASE T	(DGC)	21.19	22.03	23.87	26.15	25.94	26.63	26.92
15047	PWR SUP T	(DGC)	17.41	20.00	20.21	22.05	20.19	19.51	19.83
15049	SCAN MIR DR. ELC T	(DGC)	16.12	19.41	20.23	22.66	21.24	20.64	21.16
15051	SCAN MIR HSG T	(DGC)	15.60	19.05	19.49	22.00	19.09	18.09	18.40
15040	MUX -6 VDC	(TMV)	4.03	4.03	3.98	4.03	3.96	4.03	4.03
15042	AVE DENS DATA	(TMV)	1.67	2.13	2.05	1.96	2.35	2.36	2.28
15054	CAL LAMP CUR A	(TMV)	1.12	1.12	1.12	1.11	1.12	1.12	1.12
15056	BAND 2 ± 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10
15058	BAND 4 ± 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.01	5.10	5.10
15060	+ 12 -6 VDC REG	(TMV)	4.82	5 02	4.97	4.97	4.94	5.02	5.02
15062	+ 19 VDC REC OUT	(TMV)	4.80	4.90	4.97	4.95	4.93	5.02	5.03
15064	BAND 1 HV A	(TMV)	5.10	5.16	5.12	5.13	5.12	5.12	5.12
15066	BAND 2 HV A	(TMV)	4.50	4.52	4.52	4.52	4.50	4.50	4.50
15068	BAND 3 HV A	(TMV)	4.60	4.62	4.62	4.62	4.62	4.62	4.62
15070	SHUT MOT CON OUT	(TMV)	2.43	2.44	2.47	2.47	2.46	2.51	2.51
15041	S/D CONV REF V	(TMV)	5.93	5.93	5.87	5.86	5.83	5.93	5.93
15053	SCAN MIR REG V	(TMV)	4.42	4.51	4.51	4.56	4.53	4.60	4.61
15055	BAND 1 ± 15 V	(TMV)	4.97	4.97	4.92	4.97	4.97	4.98	4.97
15057	BAND 3 ± 15 V	(TMV)	5.00	5.00	4.94	5.00	5.00	5.00	5.00
15059	-15 VDC TEL.	(TMV)	5.02	5.02	5.02	5.02	5.02	5.02	5.02
15061	± 5 VDC LOGIC REG	(TMV)	4.82	4.81	4.77	4.77	4.78	4.75	4.76
15063	-19 VDC REG OUT	(TMV)	3.43	3.39	3.50	3.53	3.51	3.57	3.58
15071	SCAN MIR DR. CLK	(TMV)	1.93	1.97	1.98	1.98	1.97	2.00	2.00

Table 17-2. MSS Response History
Landsat-1
Quantum Level for Selected Work
(0=Black: 63=White)

Sensor	Quantum Level					Band
	1st Year		2nd Yr.	3rd Yr.		
	Launch	2-4 Quar.	5-8 Quar.	9-11 Quar.	This Quar.	
1	43	39	39	38.5	37	
2	44	39	40	40	39	
3	43	38	40	40.5	39	
4	43	38	39	39	37	1
5	41	36	35	34	32	
6	43	39	41	41	39	
7	47	43	43	42	41	
8	46	41.5	41	41	40	
9	47	44	42.5	42	41	2
10	46	42	41.5	41	40	
11	47	42.5	42	42	41	
12	45	42	42.5	42.5	42	
13	46	46	49	51	51	
14	44	42	42	42.5	42	
15	45	42.5	42	41.5	41	3
16	40	37.5	37.5	37.5	37	
17	42	39	40	40.5	40	
18	44	40	40.5	41	40	
19	28	28	27	26	23	
20	25	26	25	23	21	
21	26	27	26.5	25	23	
22	23	23	22	21.5	19	4
23	22	22.5	23	22.5	20	
24	24	23.5	24	24	21	
Line Length	3221	3219	3217	3216	3216	

SECTION 18

DATA COLLECTION SUBSYSTEM (DCS)

The Data Collection Subsystem was turned off after Orbit 12690 on January 19, 1975.

Table 18-1 shows typical telemetry values since launch. All have been nominal.

Table 18-1. DCS Telemetry Values

Function No.	Name	Units	Orbit No.			
			16	4811	10592	12565
16001	REC-1 SIG. STNGT	DBM	-124	-123	-123	-124
16002	REC-1 TEMP.	DGC	22.72	23.74	23.65	24.67
16003	REC-1 INP. VOLTS	VDC	12.02	12.01	12.02	12.01
16004	REC-2 SIG. STNGT	DBM	*	*	*	*
16005	REC-2 TEMP.	DGC	*	*	*	*
16006	REC-2 INP. VOLTS	VDC	*	*	*	*

* Reads only when equipment is on

Table 18-2 shows the final qualitative performance of the DCS subsystem of Landsat-1 and Table 18-3 gives statistics of messages received.

Table 18-2. Final DCS Qualitative Performance Landsat-1

System Threshold	3500 km
Grazing Angle Effects	Not discernible
Adjacent DCP Interference	Not seen
Ground Transmission System	Satisfactory
Probability of Perfect Reception of any Messages During Window*	98.9%

* Window means "at times when the spacecraft is simultaneously within the horizon of the DCP and the ground receiving station."

Table 18-3. Final DCS Statistics Landsat-1

Through Orbit 12690	
DCS Platforms (DCP's) Shipped	224
Maximum DCP's Received per Day	114
Total Messages Received at OCC	1,152,045
Total Messages Rejected at OCC	906,910
Good Messages	92.1%
Number of Users	44

Figure 18-1 shows the total number of DCS messages received per 18-day cycle since launch. The number of active platforms and the USB power output are also plotted on the same time scale.

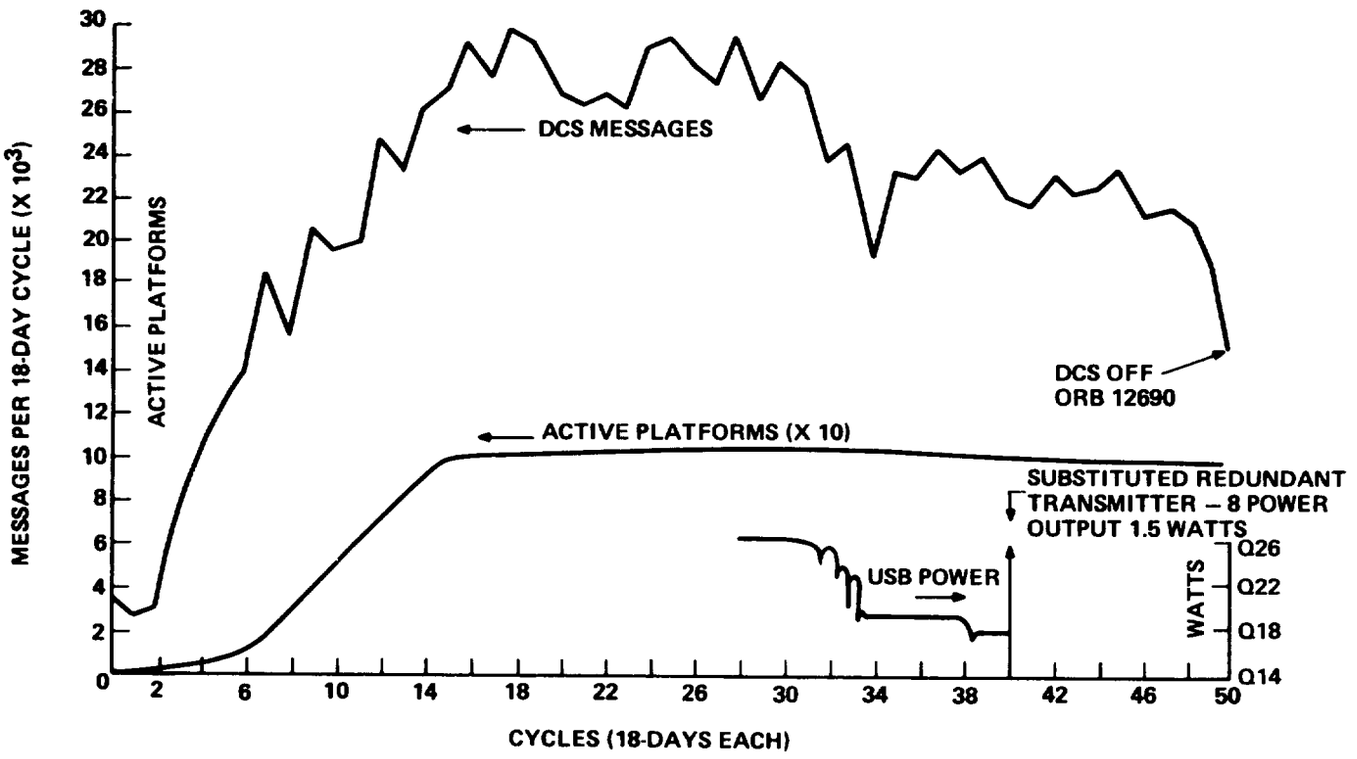


Figure 18-1. DCS Message Receipt History — Landsat-1

Landsat-1 Anomalies and Observations

Date	Anomaly/Observation	How Observed	Comments
7/24/72	Sun Sensor Temperature High	Off-Line	No Action Required for ERTS-1; ERTS-B Redesigned
7/24/72	Solar Paddle Temperature Excursions Greater Than Expected	Off-Line	No Action Required for ERTS-1; Math Model Corrected
7/25/72	USB Power Output Decreasing	Off-Line	Switched to Side B in Orbit 10068 on 7/15/74 after decline to 0.14 watts. USB Side B stable and holding at 1.5 watts
8/03/72	WBVTR No. 2 Power Converter Shorted	Real Time & Off-Line	Turned All P/L Off During Pass. Formed NASA/GE/RCA Evaluation Committee. Disconnected since Anomaly. Redesigned for ERTS-B
8/03/72	Decrease in Solar Array Current	Off-Line	Evaluate Degradation Effect Due to Solar Flare Activity
8/06/72	RBV Power Transient PSM Turn-Off Failure	Real Time	Turned off PRM. NASA/GE/RCA Evaluation Committee Formed; Disconnected since Anomaly; Redesign PSM for ERTS-B
8/10/72	DCS Reject Messages Rose to Over 40% of Total Messages for 15 Days	Off-Line	External Interference; Located Source; No Serious Interference Since
8/10/72	MSS Cal Wedge Levels Decreasing	Off-Line	Leveled Off After Orbit 1000; At Or About 5% Below Earlier Values
8/03/72	Incorrect Time Tags in Comstor "B" Cell 12	Real Time	Reload Comstors and Verify; (Discontinued Active Use of Cell 12)
12/04/72 12/06/72	Pitch Motor Drive Duty Cycles Roll Increased for Short Yaw Period	Off-Line	Evaluate - Prepared Contingency Plan
3/29/73	WBVTR No. 1; High BER	Real Time	Formed NASA/GE/RCA Committee; Lapped Heads; Now in Operational Use. Temporarily Restricted to Last 600 Feet (600 Seconds) of Tape
4/08/72	Slow Leak in Forward IR Scanner Pressure	Off-Line	Not Expected to Interfere with Normal Operations
5/20/72	Defect in Signal of Left Cosine Pot at S/C Midnight	Off-Line	Not Expected to Interfere with Normal Operations
6/03/73	Failure of Integrated Circuit Chip and TLM of Functions 6012, 1011, 12238 and 7010	Real Time & Off-Line	TLM Failure only. S/C Operations Normal
11/5/73	WBVTR-1 Tape Unit Pressure Drop	Real Time	Defect in Pressure Instrumentation which Causes Occasional Rapid Pressure Drop in TLM - Returns to Normal
11/13/73	Solar Array Drive	Real Time	Slight Peaks on Drive Voltage Ripple which Picked up Limit Flag - Returned to Normal
11/28/73	High Head Wheel Current, WBVTR-1, During Rewind	Real Time	Resumed Operat[illegible] WBVTR-1 Perfor[illegible] Manner
12/20/73	Pitch Motor Driver Duty Cycle Increased	Real Time	Similar to Entry 12/4/72 except more Sustained
12/22/73	RMP-1 and RMP-2 Showed Excessive	Real Time	Condition Lasted for Several Orbits and Returned to

FOLDOUT FRAME 2

	During Rewind		
12/20/73	Pitch Motor Driver Duty Cycle Increased	Real Time	Similar to Entry 12/4/72 except more Sustained
12/22/73	RMP-1 and RMP-2 Showed Excessive Noise/Output	Real Time	Condition Lasted for Several Orbits and Returned to Normal
2/20/74	Pitch Wheel Stopped During Sun Transient	Off-Line	During a sun transient in Orbit 8040 the pitch flywheel was changing directions. As it passed thru zero speed, the pitch flywheel stopped and did not resume operation until 2 minutes had elapsed in spite of application of 100% clockwise pitch motor driver duty cycle during that interval
3/5/74	WBVTR No. 1 High BER High HW-1	Real Time & Off Line	Limited Usage of Tape Footage
3/7/74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study
3/21/74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study
3/27/74	WBVTR-1 MSFE Count High	Off-Line	Suspended Operation Pending Study
4/02/74	WBVTR-1 MFSE Count High	Off-Line	Suspended Operation Pending Study
5/21/74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7/02/74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7/02/74	WBVTR-1 High HW-1 and MFSE	Real Time & Off Line	Suspended operation pending study
8/06/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
8/21/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
8/28/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
9/04/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/09/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/14/74	PSM Power Regulator Switchover from 1 to 2	Real Time	VHF interference signal present. Occurred at 02:46:21. Spacecraft was normal
9/23/74	PSM Power Regulator Switchover from 2 to 1	Real Time	VHF interference signal present. Occurred at 01:49:17. Spacecraft is normal
9/25/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/29/74	Pitch Flywheel Stopped	Real Time	The pitch CCW motor driver duty cycle began increasing in Orbit 11120. The pitch flywheel stopped (from 400 RPM) following a sun transient in Orbit 11125. After a period of approximately 8 hours, and attitude disturbances, the pitch flywheel restarted. Earth acquisition was obtained and operations returned to normal in Orbit 11136.
7/02/74	Pitch CCW Motor Driver Duty Cycle	Real Time &	Similar to 12/4/72 entry.

7/02/74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7/02/74	WBVTR-1 High HW-1 and MFSE	Real Time & Off Line	Suspended operation pending study
8/06/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
8/21/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
8/28/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
9/04/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry Returned to Normal
9/09/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/14/74	PSM Power Regulator Switchover from 1 to 2	Real Time	VHF interference signal present. Occurred at 02:46:21. Spacecraft was normal
9/23/74	PSM Power Regulator Switchover from 2 to 1	Real Time	VHF interference signal present. Occurred at 01:49:17. Spacecraft is normal
9/25/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/29/74	Pitch Flywheel Stopped	Real Time	The pitch CCW motor driver duty cycle began increasing in Orbit 11120. The pitch flywheel stopped (from 400 RPM) following a sun transient in Orbit 11125. After a period of approximately 8 hours, and attitude disturbances, the pitch flywheel restarted. Earth acquisition was obtained and operations returned to normal in Orbit 11133.
10/09/74	RMP B Motor Current Variations	Off-Line & Real Time	As a precautionary measure a switch was made to RMP A in Orbit 11257. RMP B is still functioning and can be used in the event of RMP A failure
1/30/75	Solar Array Current Notch	On-Line	Solar array current drops 500-600 ma for 1 to 14 minutes early in the day then return to normal. Solar panel temperature range at notch is -20 to +20°C. No effect on S/C Mission
1/30/75	Narrow Band Recorder 2 Bit Error Rise	Real Time & Off-Line	Bit Errors began build up in Orbit 12837 and unit was turned off in Orbit 13015 on 2/12/75. Limited operation was resumed in Orbit 14116 and continued until failure to move tape in Orbit 15253
3/07/75	Battery 6 Turned Off	Real Time & Off-Line	Battery 6 decrease in load share and rose slightly in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 13346. Battery was allowed to discharge to -26.5 volts when it was turned on in Orbit 14100. Normal operation resumed
6/18/75	Battery 6 Turned Off	Real Time & Off-Line	Battery 6 decreased in load share and rose in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 14780

FOLDOUT FRAME 5

LANDSAT-1

SPACECRAFT ORBIT REFERENCE TABLES

FROM APRIL 1975 THRU JULY 1976

ORBIT 13684 THRU 20488

FLIGHT DAY 982 THRU 1469

LANDSAT-1

APR, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	91	982	13684-13697	15- 28	2	55
2	92	983	13698-13711	29- 42	3	55
3	93	984	13712-13725	43- 56	4	55
4	94	985	13726-13739	57- 70	5	55
5	95	986	13740-13753	71- 84	6	55
6	96	987	13754-13767	85- 98	7	55
7	97	988	13768-13780	99-111	8	55
8	98	989	13781-13794	112-125	9	55
9	99	990	13795-13808	126-139	10	55
10	100	991	13809-13822	140-153	11	55
11	101	992	13823-13836	154-167	12	55
12	102	993	13837-13850	168-181	13	55
13	103	994	13851-13864	182-195	14	55
14	104	995	13865-13878	196-209	15	55
15	105	996	13879-13892	210-223	16	55
16	106	997	13893-13906	224-237	17	55
17	107	998	13907-13920	238-251	18	55
18	108	999	13921-13934	1- 14	1	56
19	109	1000	13935-13948	15- 28	2	56
20	110	1001	13949-13962	29- 42	3	56
21	111	1002	13963-13976	43- 56	4	56
22	112	1003	13977-13990	57- 70	5	56
23	113	1004	13991-14004	71- 84	6	56
24	114	1005	14005-14018	85- 98	7	56
25	115	1006	14019-14031	99-111	8	56
26	116	1007	14032-14045	112-125	9	56
27	117	1008	14046-14059	126-139	10	56
28	118	1009	14060-14073	140-153	11	56
29	119	1010	14074-14087	154-167	12	56
30	120	1011	14088-14101	168-181	13	56

LANDSAT-1

MAY, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	121	1012	14102-14115	182-195	14	56
2	122	1013	14116-14129	196-209	15	56
3	123	1014	14130-14143	210-223	16	56
4	124	1015	14144-14157	224-237	17	56
5	125	1016	14158-14171	238-251	18	56
6	126	1017	14172-14185	1-14	1	57
7	127	1018	14186-14199	15-28	2	57
8	128	1019	14200-14213	29-42	3	57
9	129	1020	14214-14227	43-56	4	57
10	130	1021	14228-14241	57-70	5	57
11	131	1022	14242-14255	71-84	6	57
12	132	1023	14256-14269	85-98	7	57
13	133	1024	14270-14282	99-111	8	57
14	134	1025	14283-14296	112-125	9	57
15	135	1026	14297-14310	126-139	10	57
16	136	1027	14311-14324	140-153	11	57
17	137	1028	14325-14338	154-167	12	57
18	138	1029	14339-14352	168-181	13	57
19	139	1030	14353-14366	182-195	14	57
20	140	1031	14367-14380	196-209	15	57
21	141	1032	14381-14394	210-223	16	57
22	142	1033	14395-14408	224-237	17	57
23	143	1034	14409-14422	238-251	18	57
24	144	1035	14423-14436	1-14	1	58
25	145	1036	14437-14450	15-28	2	58
26	146	1037	14451-14464	29-42	3	58
27	147	1038	14465-14478	43-56	4	58
28	148	1039	14479-14492	57-70	5	58
29	149	1040	14493-14506	71-84	6	58
30	150	1041	14507-14520	85-98	7	58
31	151	1042	14521-14533	99-111	8	58

LANDSAT-1

JUN, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	152	1043	14534-14547	112-125	9	58
2	153	1044	14548-14561	126-139	10	58
3	154	1045	14562-14575	140-153	11	58
4	155	1046	14576-14589	154-167	12	58
5	156	1047	14590-14603	168-181	13	58
6	157	1048	14604-14617	182-195	14	58
7	158	1049	14618-14631	196-209	15	58
8	159	1050	14632-14645	210-223	16	58
9	160	1051	14646-14659	224-237	17	58
10	161	1052	14660-14673	238-251	18	58
11	162	1053	14674-14687	1- 14	1	59
12	163	1054	14688-14701	15- 28	2	59
13	164	1055	14702-14715	29- 42	3	59
14	165	1056	14716-14729	43- 56	4	59
15	166	1057	14730-14743	57- 70	5	59
16	167	1058	14744-14757	71- 84	6	59
17	168	1059	14758-14771	85- 98	7	59
18	169	1060	14772-14784	99-111	8	59
19	170	1061	14785-14798	112-125	9	59
20	171	1062	14799-14812	126-139	10	59
21	172	1063	14813-14826	140-153	11	59
22	173	1064	14827-14840	154-167	12	59
23	174	1065	14841-14854	168-181	13	59
24	175	1066	14855-14868	182-195	14	59
25	176	1067	14869-14882	196-209	15	59
26	177	1068	14883-14896	210-223	16	59
27	178	1069	14897-14910	224-237	17	59
28	179	1070	14911-14924	238-251	18	59
29	180	1071	14925-14938	1- 14	1	60
30	181	1072	14939-14952	15- 28	2	60

LANDSAT-1

JULY 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	182	1073	14953-14966	29- 42	3	60
2	183	1074	14967-14980	43- 56	4	60
3	184	1075	14981-14994	57- 70	5	60
4	185	1076	14995-15008	71- 84	6	60
5	186	1077	15009-15022	85- 98	7	60
6	187	1078	15023-15035	99-111	8	60
7	188	1079	15036-15049	112-125	9	60
8	189	1080	15050-15063	126-139	10	60
9	190	1081	15064-15077	140-153	11	60
10	191	1082	15078-15091	154-167	12	60
11	192	1083	15092-15105	168-181	13	60
12	193	1084	15106-15119	182-195	14	60
13	194	1085	15120-15133	196-209	15	60
14	195	1086	15134-15147	210-223	16	60
15	196	1087	15148-15161	224-237	17	60
16	197	1088	15162-15175	238-251	18	60
17	198	1089	15176-15189	1- 14	1	61
18	199	1090	15190-15203	15- 28	2	61
19	200	1091	15204-15217	29- 42	3	61
20	201	1092	15218-15231	43- 56	4	61
21	202	1093	15232-15245	57- 70	5	61
22	203	1094	15246-15259	71- 84	6	61
23	204	1095	15260-15273	85- 98	7	61
24	205	1096	15274-15286	99-111	8	61
25	206	1097	15287-15300	112-125	9	61
26	207	1098	15301-15314	126-139	10	61
27	208	1099	15315-15328	140-153	11	61
28	209	1100	15329-15342	154-167	12	61
29	210	1101	15343-15356	168-181	13	61
30	211	1102	15357-15370	182-195	14	61
31	212	1103	15371-15384	196-209	15	61

LANDSAT-1

AUG, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	213	1104	15385-15398	210-223	16	61
2	214	1105	15399-15412	224-237	17	61
3	215	1106	15413-15426	238-251	18	61
4	216	1107	15427-15440	1- 14	1	62
5	217	1108	15441-15454	15- 28	2	62
6	218	1109	15455-15468	29- 42	3	62
7	219	1110	15469-15482	43- 56	4	62
8	220	1111	15483-15496	57- 70	5	62
9	221	1112	15497-15510	71- 84	6	62
10	222	1113	15511-15524	85- 98	7	62
11	223	1114	15525-15537	99-111	8	62
12	224	1115	15538-15551	112-125	9	62
13	225	1116	15552-15565	126-139	10	62
14	226	1117	15566-15579	140-153	11	62
15	227	1118	15580-15593	154-167	12	62
16	228	1119	15594-15607	168-181	13	62
17	229	1120	15608-15621	182-195	14	62
18	230	1121	15622-15635	196-209	15	62
19	231	1122	15636-15649	210-223	16	62
20	232	123	15650-15663	224-237	17	62
21	233	1124	15664-15677	238-251	18	62
22	234	1125	15678-15691	1- 14	1	63
23	235	1126	15692-15705	15- 28	2	63
24	236	1127	15706-15719	29- 42	3	63
25	237	1128	15720-15733	43- 56	4	63
26	238	1129	15734-15747	57- 70	5	63
27	239	1130	15748-15761	71- 84	6	63
28	240	1131	15762-15775	85- 98	7	63
29	241	1132	15776-15788	99-111	8	63
30	242	1133	15789-15802	112-125	9	63
31	243	1134	15803-15816	126-139	10	63

LANDSAT-1

SEP. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	244	1135	15817-15830	140-153	11	63
2	245	1136	15831-15844	154-167	12	63
3	246	1137	15845-15858	168-181	13	63
4	247	1138	15859-15872	182-195	14	63
5	248	1139	15873-15886	196-209	15	63
6	249	1140	15887-15900	210-223	16	63
7	250	1141	15901-15914	224-237	17	63
8	251	1142	15915-15928	238-251	18	63
9	252	1143	15929-15942	1- 14	1	64
10	253	1144	15943-15956	15- 28	2	64
11	254	1145	15957-15970	29- 42	3	64
12	255	1146	15971-15984	43- 56	4	64
13	256	1147	15985-15998	57- 70	5	64
14	257	1148	15999-16012	71- 84	6	64
15	258	1149	16013-16026	85- 98	7	64
16	259	1150	16027-16039	99-111	8	64
17	260	1151	16040-16053	112-125	9	64
18	261	1152	16054-16067	126-139	10	64
19	262	1153	16068-16081	140-153	11	64
20	263	1154	16082-16095	154-167	12	64
21	264	1155	16096-16109	168-181	13	64
22	265	1156	16110-16123	182-195	14	64
23	266	1157	16124-16137	196-209	15	64
24	267	1158	16138-16151	210-223	16	64
25	268	1159	16152-16165	224-237	17	64
26	269	1160	16166-16179	238-251	18	64
27	270	1161	16180-16193	1- 14	1	65
28	271	1162	16194-16207	15- 28	2	65
29	272	1163	16208-16221	29- 42	3	65
30	273	1164	16222-16235	43- 56	4	65

LANDSAT-1

OCT. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	274	1165	16236-16249	57- 70	5	45
2	275	1166	16250-16263	71- 84	6	45
3	276	1167	16264-16277	85- 98	7	45
4	277	1168	16278-16290	99-111	8	45
5	278	1169	16291-16304	112-125	9	45
6	279	1170	16305-16318	126-139	10	45
7	280	1171	16319-16332	140-153	11	45
8	281	1172	16333-16346	154-167	12	45
9	282	1173	16347-16360	168-181	13	45
10	283	1174	16361-16374	182-195	14	45
11	284	1175	16375-16388	196-209	15	45
12	285	1176	16389-16402	210-223	16	45
13	286	1177	16403-16416	224-237	17	45
14	287	1178	16417-16430	238-251	18	45
15	288	1179	16431-16444	1- 14	1	46
16	289	1180	16445-16458	15- 28	2	46
17	290	1181	16459-16472	29- 42	3	46
18	291	1182	16473-16486	43- 56	4	46
19	292	1183	16487-16500	57- 70	5	46
20	293	1184	16501-16514	71- 84	6	46
21	294	1185	16515-16528	85- 98	7	46
22	295	1186	16529-16541	99-111	8	46
23	296	1187	16542-16555	112-125	9	46
24	297	1188	16556-16569	126-139	10	46
25	298	1189	16570-16583	140-153	11	46
26	299	1190	16584-16597	154-167	12	46
27	300	1191	16598-16611	168-181	13	46
28	301	1192	16612-16625	182-195	14	46
29	302	1193	16626-16639	196-209	15	46
30	303	1194	16640-16653	210-223	16	46
31	304	1195	16654-16667	224-237	17	46

LANDSAT-1

NOV. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	305	1196	16668-16681	238-251	18	46
2	306	1197	16682-16695	1- 14	1	47
3	307	1198	16696-16709	15- 28	2	47
4	308	1199	16710-16723	29- 42	3	47
5	309	1200	16724-16737	43- 56	4	47
6	310	1201	16738-16751	57- 70	5	47
7	311	1202	16752-16765	71- 84	6	47
8	312	1203	16766-16779	85- 98	7	47
9	313	1204	16780-16792	99-111	8	47
10	314	1205	16793-16806	112-125	9	47
11	315	1206	16807-16820	126-139	10	47
12	316	1207	16821-16834	140-153	11	47
13	317	1208	16835-16848	154-167	12	47
14	318	1209	16849-16862	168-181	13	47
15	319	1210	16863-16876	182-195	14	47
16	320	1211	16877-16890	196-209	15	47
17	321	1212	16891-16904	210-223	16	47
18	322	1213	16905-16918	224-237	17	47
19	323	1214	16919-16932	238-251	18	47
20	324	1215	16933-16946	1- 14	1	48
21	325	1216	16947-16960	15- 28	2	48
22	326	1217	16961-16974	29- 42	3	48
23	327	1218	16975-16988	43- 56	4	48
24	328	1219	16989-17002	57- 70	5	48
25	329	1220	17003-17016	71- 84	6	48
26	330	1221	17017-17030	85- 98	7	48
27	331	1222	17031-17043	99-111	8	48
28	332	1223	17044-17057	112-125	9	48
29	333	1224	17058-17071	126-139	10	48
30	334	1225	17072-17085	140-153	11	48

LANDSAT-1

DEC. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	335	1226	17086-17099	154-167	12	68
2	336	1227	17100-17113	168-181	13	68
3	337	1228	17114-17127	182-195	14	68
4	338	1229	17128-17141	196-209	15	68
5	339	1230	17142-17155	210-223	16	68
6	340	1231	17156-17169	224-237	17	68
7	341	1232	17170-17183	238-251	18	68
8	342	1233	17184-17197	1- 14	1	69
9	343	1234	17198-17211	15- 28	2	69
10	344	1235	17212-17225	29- 42	3	69
11	345	1236	17226-17239	43- 56	4	69
12	346	1237	17240-17253	57- 70	5	69
13	347	1238	17254-17267	71- 84	6	69
14	348	1239	17268-17281	85- 98	7	69
15	349	1240	17282-17294	99-111	8	69
16	350	1241	17295-17308	112-125	9	69
17	351	1242	17309-17322	126-139	10	69
18	352	1243	17323-17336	140-153	11	69
19	353	1244	17337-17350	154-167	12	69
20	354	1245	17351-17364	168-181	13	69
21	355	1246	17365-17378	182-195	14	69
22	356	1247	17379-17392	196-209	15	69
23	357	1248	17393-17406	210-223	16	69
24	358	1249	17407-17420	224-237	17	69
25	359	1250	17421-17434	238-251	18	69
26	360	1251	17435-17448	1- 14	1	70
27	361	1252	17449-17462	15- 28	2	70
28	362	1253	17463-17476	29- 42	3	70
29	363	1254	17477-17490	43- 56	4	70
30	364	1255	17491-17504	57- 70	5	70
31	365	1256	17505-17518	71- 84	6	70

LANDSAT-1

JAN. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	1	1257	17519-17532	85- 98	7	70
2	2	1258	17533-17545	99-111	8	70
3	3	1259	17546-17559	112-125	9	70
4	4	1260	17560-17573	126-139	10	70
5	5	1261	17574-17587	140-153	11	70
6	6	1262	17588-17601	154-167	12	70
7	7	1263	17602-17615	168-181	13	70
8	8	126	17616-17629	182-195	14	70
9	9	1265	17630-17643	196-209	15	70
10	10	1266	17644-17657	210-223	16	70
11	11	1267	17658-17671	224-237	17	70
12	12	1268	17672-17685	238-251	18	70
13	13	1269	17686-17699	1- 14	1	71
14	14	1270	17700-17713	15- 28	2	71
15	15	1271	17714-17727	29- 42	3	71
16	16	1272	17728-17741	43- 56	4	71
17	17	1273	17742-17755	57- 70	5	71
18	18	1274	17756-17769	71- 84	6	71
19	19	1275	17770-17783	85- 98	7	71
20	20	1276	17784-17796	99-111	8	71
21	21	1277	17797-17810	112-125	9	71
22	22	1278	17811-17824	126-139	10	71
23	23	1279	17825-17838	140-153	11	71
24	24	1280	17839-17852	154-167	12	71
25	25	1281	17853-17866	168-181	13	71
26	26	1282	17867-17880	182-195	14	71
27	27	1283	17881-17894	196-209	15	71
28	28	1284	17895-17908	210-223	16	71
29	29	1285	17909-17922	224-237	17	71
30	30	1286	17923-17936	238-251	18	71
31	31	1287	17937-17950	1- 14	1	72

LANDSAT-1

FEB.1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	32	1288	17951-17964	15- 28	2	72
2	33	1289	17965-17978	29- 42	3	72
3	34	1290	17979-17992	43- 56	4	72
4	35	1291	17993-18006	57- 70	5	72
5	36	1292	18007-18020	71- 84	6	72
6	37	1293	18021-18034	85- 98	7	72
7	38	1294	18035-18047	99-111	8	72
8	39	1295	18048-18061	112-125	9	72
9	40	1296	18062-18075	126-139	10	72
10	41	1297	18076-18089	140-153	11	72
11	42	1298	18090-18103	154-167	12	72
12	43	1299	18104-18117	168-181	13	72
13	44	1300	18118-18131	182-195	14	72
14	45	1301	18132-18145	196-209	15	72
15	46	1302	18146-18159	210-223	16	72
16	47	1303	18160-18173	224-237	17	72
17	48	1304	18174-18187	238-251	18	72
18	49	1305	18188-18201	1- 14	1	73
19	50	1306	18202-18215	15- 28	2	73
20	51	1307	18216-18229	29- 42	3	73
21	52	1308	18230-18243	43- 56	4	73
22	53	1309	18244-18257	57- 70	5	73
23	54	1310	18258-18271	71- 84	6	73
24	55	1311	18272-18285	85- 98	7	73
25	56	1312	18286-18298	99-111	8	73
26	57	1313	18299-18312	112-125	9	73
27	58	1314	18313-18326	126-139	10	73
28	59	1315	18327-18340	140-153	11	73
29	60	1316	18341-18354	154-167	12	73

LANDSAT-1

MAR-1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	61	1317	18355-18368	168-181	13	73
2	62	1318	18369-18382	182-195	14	73
3	63	1319	18383-18396	196-209	15	73
4	64	1320	18397-18410	210-223	16	73
5	65	1321	18411-18424	224-237	17	73
6	66	1322	18425-18436	238-251	18	73
7	67	1323	18439-18452	1- 14	1	74
8	68	1324	18453-18466	15- 28	2	74
9	69	1325	18467-18480	29- 42	3	74
10	70	1326	18481-18494	43- 56	4	74
11	71	1327	18495-18508	57- 70	5	74
12	72	1328	18509-18522	71- 84	6	74
13	73	1329	18523-18536	85- 98	7	74
14	74	1330	18537-18549	99-111	8	74
15	75	1331	18550-18563	112-125	9	74
16	76	1332	18564-18577	126-139	10	74
17	77	1333	18578-18591	140-153	11	74
18	78	1334	18592-18605	154-167	12	74
19	79	1335	18606-18619	168-181	13	74
20	80	1336	18620-18633	182-195	14	74
21	81	1337	18634-18647	196-209	15	74
22	82	1338	18648-18661	210-223	16	74
23	83	1339	18662-18675	224-237	17	74
24	84	1340	18676-18689	238-251	18	74
25	85	1341	18690-18703	1- 14	1	75
26	86	1342	18704-18717	15- 28	2	75
27	87	1343	18718-18731	29- 42	3	75
28	88	1344	18732-18745	43- 56	4	75
29	89	1345	18746-18759	57- 70	5	75
30	90	1346	18760-18773	71- 84	6	75
31	91	1347	18774-18787	85- 98	7	75

LANDSAT-1

APR, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	92	1348	18786-18800	99-111	8	75
2	93	1349	18801-18814	112-125	9	75
3	94	1350	18815-18828	126-139	10	75
4	95	1351	18829-18842	140-153	11	75
5	96	1352	18843-18856	154-167	12	75
6	97	1353	18857-18870	168-181	13	75
7	98	1354	18871-18884	182-195	14	75
8	99	1355	18885-18898	196-209	15	75
9	100	1356	18899-18912	210-223	16	75
10	101	1357	18913-18926	224-237	17	75
11	102	1358	18927-18940	238-251	18	75
12	103	1359	18941-18954	1- 14	1	76
13	104	1360	18955-18968	15- 28	2	76
14	105	1361	18969-18982	29- 42	3	76
15	106	1362	18983-18996	43- 56	4	76
16	107	1363	18997-19010	57- 70	5	76
17	108	1364	19011-19024	71- 84	6	76
18	109	1365	19025-19038	85- 98	7	76
19	110	1366	19039-19051	99-111	8	76
20	111	1367	19052-19065	112-125	9	76
21	112	1368	19066-19079	126-139	10	76
22	113	1369	19080-19093	140-153	11	76
23	114	1370	19094-19107	154-167	12	76
24	115	1371	19108-19121	168-181	13	76
25	116	1372	19122-19135	182-195	14	76
26	117	1373	19136-19149	196-209	15	76
27	118	1374	19150-19163	210-223	16	76
28	119	1375	19164-19177	224-237	17	76
29	120	1376	19178-19191	238-251	18	76
30	121	1377	19192-19205	1- 14	1	77

LANDSAT-1

MAY, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	122	1378	19206-19219	15- 28	2	77
2	123	1379	19220-19233	29- 42	3	77
3	124	1380	19234-19247	43- 56	4	77
4	125	1381	19248-19261	57- 70	5	77
5	126	1382	19262-19275	71- 84	6	77
6	127	1383	19276-19289	85- 98	7	77
7	128	1384	19290-19302	99-111	8	77
8	129	1385	19303-19316	112-125	9	77
9	130	1386	19317-19330	126-139	10	77
10	131	1387	19331-19344	140-153	11	77
11	132	1388	19345-19358	154-167	12	77
12	133	1389	19359-19372	168-181	13	77
13	134	1390	19373-19386	182-195	14	77
14	135	1391	19387-19400	196-209	15	77
15	136	1392	19401-19414	210-223	16	77
16	137	1393	19415-19428	224-237	17	77
17	138	1394	19429-19442	238-251	18	77
18	139	1395	19443-19456	1- 14	1	78
19	140	1396	19457-19470	15- 28	2	78
20	141	1397	19471-19484	29- 42	3	78
21	142	1398	19485-19498	43- 56	4	78
22	143	1399	19499-19512	57- 70	5	78
23	144	1400	19513-19526	71- 84	6	78
24	145	1401	19527-19540	85- 98	7	78
25	146	1402	19541-19553	99-111	8	78
26	147	1403	19554-19567	112-125	9	78
27	148	1404	19568-19581	126-139	10	78
28	149	1405	19582-19595	140-153	11	78
29	150	1406	19596-19609	154-167	12	78
30	151	1407	19610-19623	168-181	13	78
31	152	1408	19624-19637	182-195	14	78

LANDSAT-1

JUN. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	153	1409	19638-19651	196-209	15	78
2	154	1410	19652-19665	210-223	16	78
3	155	1411	19666-19679	224-237	17	78
4	156	1412	19680-19693	238-251	18	78
5	157	1413	19694-19707	1- 14	1	79
6	158	1414	19708-19721	15- 28	2	79
7	159	1415	19722-19735	29- 42	3	79
8	160	1416	19736-19749	43- 56	4	79
9	161	1417	19750-19763	57- 70	5	79
10	162	1418	19764-19777	71- 84	6	79
11	163	1419	19778-19791	85- 98	7	79
12	164	1420	19792-19804	99-111	8	79
13	165	1421	19805-19818	112-125	9	79
14	166	1422	19819-19832	126-139	10	79
15	167	1423	19833-19846	140-153	11	79
16	168	1424	19847-19860	154-167	12	79
17	169	1425	19861-19874	168-181	13	79
18	170	1426	19875-19888	182-195	14	79
19	171	1427	19889-19902	196-209	15	79
20	172	1428	19903-19916	210-223	16	79
21	173	1429	19917-19930	224-237	17	79
22	174	1430	19931-19944	238-251	18	79
23	175	1431	19945-19958	1- 14	1	80
24	176	1432	19959-19972	15- 28	2	80
25	177	1433	19973-19986	29- 42	3	80
26	178	1434	19987-20000	43- 56	4	80
27	179	1435	20001-20014	57- 70	5	80
28	180	1436	20015-20028	71- 84	6	80
29	181	1437	20029-20042	85- 98	7	80
30	182	1438	20043-20055	99-111	8	80

LANDSAT-1

JUL 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	183	1439	20055-20069	112-125	9	#0
2	184	1440	20070-20083	126-139	10	#0
3	185	1441	20084-20097	140-153	11	#0
4	186	1442	20098-20111	154-167	12	#0
5	187	1443	20112-20125	168-181	13	#0
6	188	1444	20126-20139	182-195	14	#0
7	189	1445	20140-20153	196-209	15	#0
8	190	1446	20154-20167	210-223	16	#0
9	191	1447	20168-20181	224-237	17	#0
10	192	1448	20182-20195	238-251	18	#0
11	193	1449	20196-20209	1- 14	1	#1
12	194	1450	20210-20223	15- 28	2	#1
13	195	1451	20224-20237	29- 42	3	#1
14	196	1452	20238-20251	43- 56	4	#1
15	197	1453	20252-20265	57- 70	5	#1
16	198	1454	20266-20279	71- 84	6	#1
17	199	1455	20280-20293	85- 98	7	#1
18	200	1456	20294-20306	99-111	8	#1
19	201	1457	20307-20320	112-125	9	#1
20	202	1458	20321-20334	126-139	10	#1
21	203	1459	20335-20348	140-153	11	#1
22	204	1460	20349-20362	154-167	12	#1
23	205	1461	20363-20376	168-181	13	#1
24	206	1462	20377-20390	182-195	14	#1
25	207	1463	20391-20404	196-209	15	#1
26	208	1464	20405-20418	210-223	16	#1
27	209	1465	20419-20432	224-237	17	#1
28	210	1466	20433-20446	238-251	18	#1
29	211	1467	20447-20460	1- 14	1	#2
30	212	1468	20461-20474	15- 28	2	#2
31	213	1469	20475-20488	29- 42	3	#2

APPENDIX C

LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title and Date
1	PIR-1N23-ERTS-134	Landsat-1 and 2 Gating Pattern Comparison, dated 4/24/75
2	PIR-1N23-ERTS-142	Landsat Antenna Radiation Pattern, dated 6/11/75
3	PIR-1N23-ERTS-152	Landsat-1 Pitch Flywheel Anomaly, dated 7/23/75
4	PIR-1N23-ERTS-153	NBR-2 of Landsat-1: Recording Anomaly, dated 7/29/75

LANDSAT-2

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

LIST OF TABLES (Cont'd)

INTRODUCTION

This is the third report in a continuing series of documents issued at launch, and thereafter quarterly, to present flight performance analysis of the Landsat-2 spacecraft. Previously issued documents are:

75SDS4215	Landsat-2 Launch and Flight Activation Evaluation Report 22 to 26 January 1975 Launch through Orbit 50 and Orbit Adjust Operation	21 March 1975
75DFD4228	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1975 to 23 April 1975.	1975

This report contains analysis of performance for Orbits 1251 to 2525 for Landsat-2.

SECTION 1

SUMMARY LANDSAT-2 OPERATIONS

The Landsat-2 spacecraft was launched from the Western Test Range on 22 January 1975, at 022:17:55:51.604. The launch and orbital injection phase of the space flight were nominal and deployment of the spacecraft followed predictions. All systems continue normal except Forward Scanner Pressure, Forward Scanner Pressure Telemetry, and Wideband Video Tape Recorder No. 1 (WBVTR-1). The Forward Scanner Pressure had begun leaking before launch but will not effect scanner performance. The Forward Scanner Pressure (Function 1003) telemetry became erratic in Orbit 2244. WBVTR-1 failed to rewind in Orbit 1021 and had intermittent operational periods since. Spacecraft performance has not been degraded by these anomalies. Table 1-1 shows accumulative in-orbit payload systems performance.

Table 1-1. In-Orbit Payload Systems Performance Launch Thru Orbit 2540
Landsat-2

RBV	Total Scenes Imaged	787
	Avg. Scenes/Day	66
	Total Area Imaged (millions of sq. mi.)	6.85
	ON TIME (hr.)	6.7
	ON/OFF Cycles	46
	% Real Time Images	98
	% Recorded Images	2
MSS	Total Scenes Imaged	29,203
	Avg. Scenes/Day	164
	Total Area Imaged (millions of sq. n. mi.)	254.6
	ON TIME (hr.)	307.8
	ON/OFF Cycles	2,269
	% Real Time Images	59
	% Recorded Images	41
DCS	Messages at OCC	176,114
	Non-Perfect MSGS	13,471
	Max. DCP's ACTIVE/DAY	114
	Users	44
	Avg. MSG/Orbit	153
	ON TIME (hr.)	4,363.3
WPA-1	% Real Time Mode	1
	% Playback Mode	99
	ON TIME (hr.)	80.6
	ON/OFF Cycles	515
WPA-2	% Real Time Mode	65
	% P/B Mode	35
	ON TIME (hr.)	212.7
	ON/OFF Cycles	1,339
WBVTR-1	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	Mirror Frame Sync Error Count in P/B	<10
	Time Head-Tape Contact (hr.)	96.5
	Cycles Head-Tape Contact	1,548
	ON TIME (hr.)	122.2
WBVTR-2	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Stan lby Mode	1
	MFSE Count in P/B	<10
	Time Head-Tape Contact (hr.)	168.3
	Cycles Head-Tape Contact	2,053
	ON TIME (hr.)	213.8

SECTION 2

ORBITAL PARAMETERS

Landsat-2, together with Landsat-1, has continued to provide the ground track repeat pattern required for the nine-day image coverage of the earth. During this report period, the ground track of Landsat-2 has been maintained, as required, within 10 NM longitude error at the equator. The only orbit adjustment required for this was made in Orbit 1632 (19 May 1975) with a short firing of the -X thruster of the Orbit Adjust Subsystem. The error in longitude since launch as a function of time and orbit maintenance burns, is shown in Figure 2-1. Figure 2-2 shows the change in sun time at the descending equatorial crossings.

As of 23 July 1975, Landsat-2 has descending equatorial crossings at approximately 9:31 AM local time as opposed to 9:18 AM for Landsat-1.

The Brouwer Mean Orbital Parameters for Landsat-2 are given in Table 2-1.

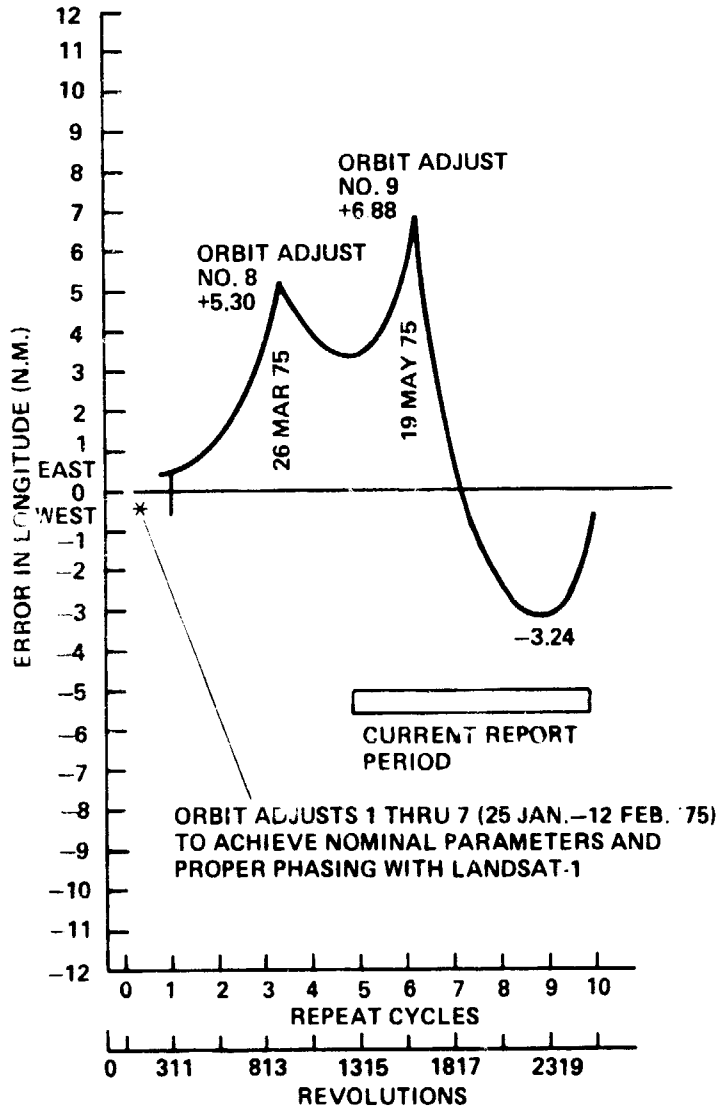


Figure 2-1. Effect of Orbit Adjusts on Landsat-2 Ground Track

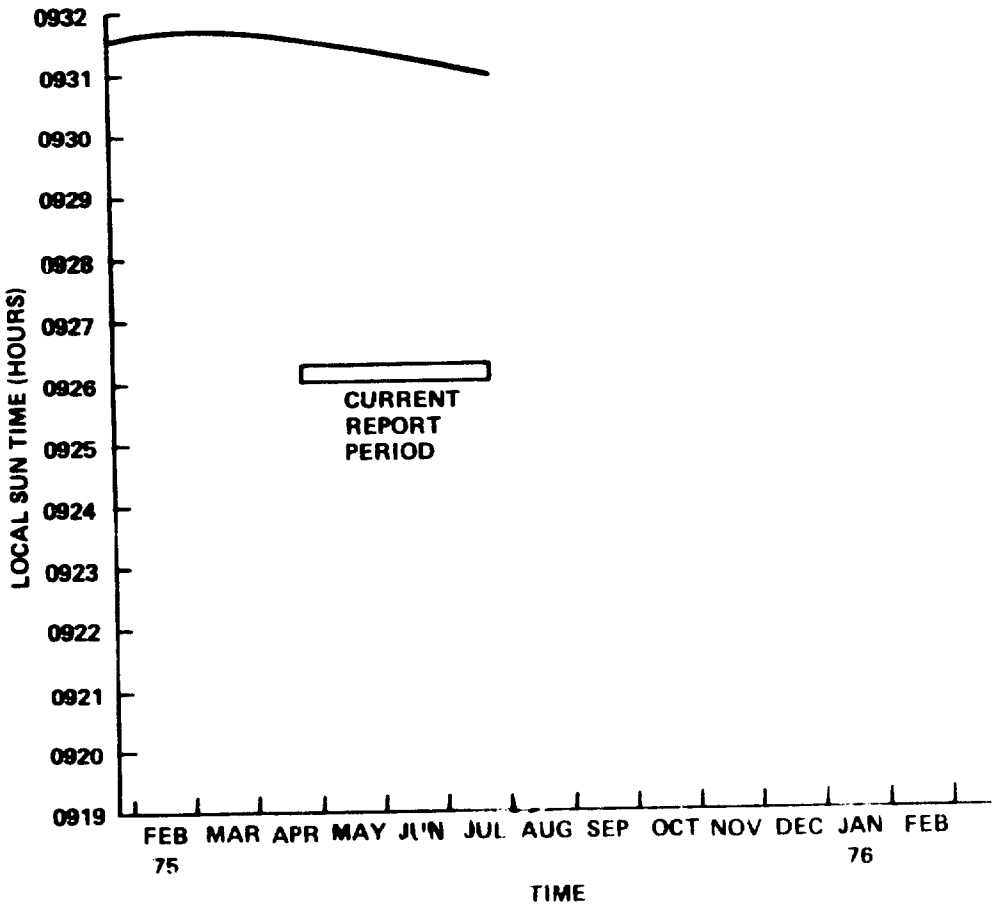


Figure 2-2. Local Sun Time Equator Crossing-Descending Node, Landsat-2

Table 2-1. Landsat-2 Brouwer Mean Orbital Parameters

Element / Date	Apogee (km)	Perigee (km)	Inclination (Deg)	Semi-major Axis (km)	Eccentricity	Two Body Period (min.)	Nodal Period (min.)	Argument of Perigee (Deg)	Right Ascension (Deg)	Mean Anomaly (Deg)
25 Jan 1975[1]	915.03	901.56	99.095	7286.462	0.000925	103.165	-	272.852	86.637	139.578
6 Feb 1975[2]	916.84	898.17	99.096	7285,820	0.001260	103.151	-	267.040	99.347	134.523
24 Apr 1975	917.85	897.40	99.079	7285.788	0.001403	103.151	103.266	62.55	174.339	117.183
25 Jul 1975	917.45	897.68	99.071	7285.733	0.001356	103.150	103.265	166.118	264.891	13.726

1 Post Launch

2 After the sequence of phasing maneuvers completed in Orbit 212

SECTION 3

POWER SUBSYSTEM (PWR)

The Power Subsystem on Landsat-2 has performed well throughout this report period. The solar arrays have continued to provide excess energy above spacecraft requirements and are expected to fully support the Landsat-2 mission beyond 1976. The batteries and the subsystem electronics have also shown very good performance during this report period.

The percentage degradation of the arrays is plotted as a function of days in orbit in Figure 3-1, along with the pre-launch predicted array degradation. The array degradation during this report period has been slightly lower than predicted. The projected values of midday array current are plotted in Figure 3-2. Here the array current is adjusted for sun intensity and array degradation, as well as sun angle. Along with the same curve is plotted the actual telemetry values observed during the current report period. The departures from the predicted array degradation is reflected here also.

Landsat 2 passed through the partial solar eclipse on May 11, 1975 during Orbit 1514. The loss in array energy was compensated by real time adjustment to the auxiliary loads.

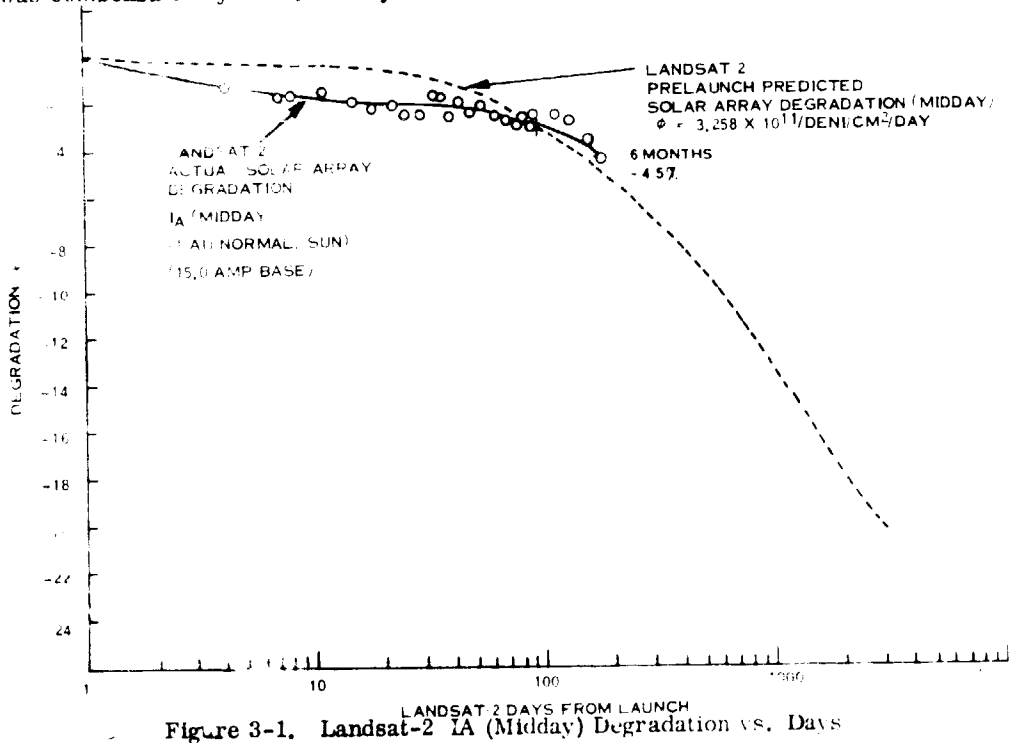


Figure 3-1. Landsat-2 IA (Midday) Degradation vs. Days

The battery packs averaged about 11% depth of discharge (DOD) during this report period. Battery temperature spread ranged from 3.5 to 5.5°C and is expected to be in the upper range during the on-coming period of higher sun intensity. Charge and load sharing of individual batteries have been satisfactory. Battery voltages have been maintained within suitable limits with Landsat-2 power management procedures, excess array energy being dissipated through auxiliary loads.

The power subsystem electronics have performed extremely well during this report period with all regulated voltages stable. Table 3-1 shows major subsystem parameters and table 3-2 shows power subsystem telemetry for selected orbits. Some parameters in Table 3-1 may be slightly different from those in Table 3-2 because Table 3-1 uses a power management time span (night followed by day), whereas the timespan used in Table 3-2 is the playback period from the NBN.

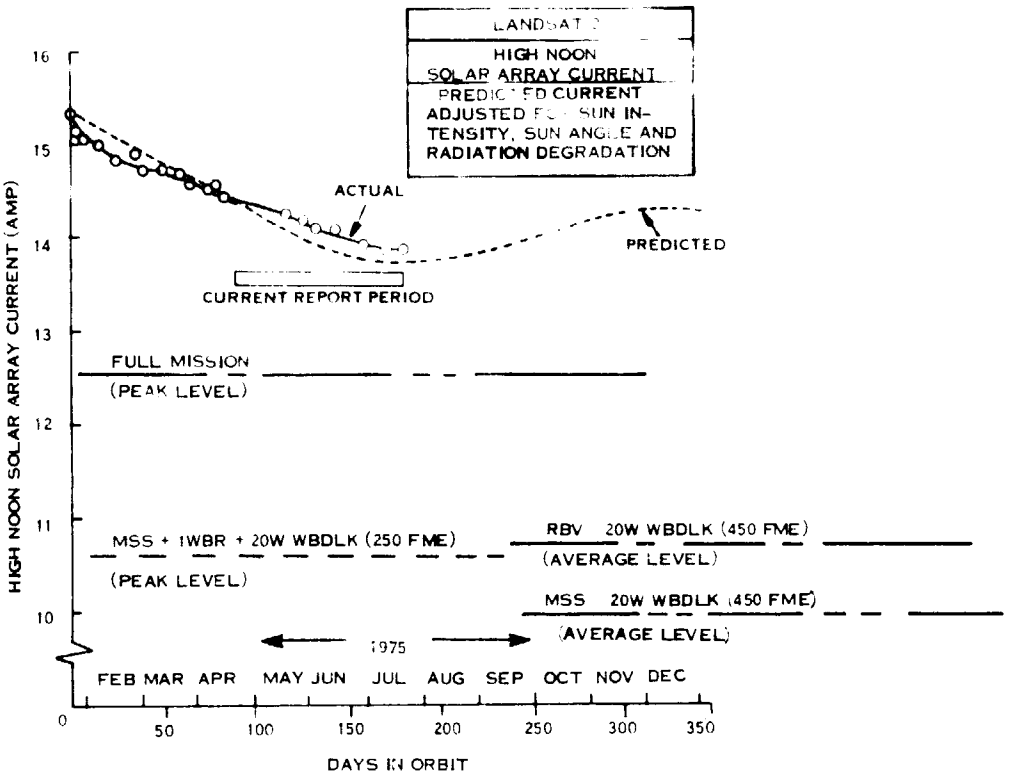


Figure 3-2. Landsat-2 Predicted Midday Solar Array Current

The shunt limiter on Landsat-2 has operated several times since launch and has held the solar array bus voltage at specified levels. The compensation loads have been switched a number of times during this period and a history of the same is given in Table 11-2.

Figure 3-3 shows the variation in sun angle to orbit plane and solar panels for Landsat-2.

Table 3-1. Landsat-2 Major Power Subsystem Parameters

Pwr. Mgmt. Orbit No.	50	400	847	1251	1691	2114	2540
Batt 1 Max	33.43	33.0	32.91	33.08	33.34	32.74	33.25
2 Chge	33.40	32.89	32.80	33.05	33.31	32.71	33.14
3 Volt	33.35	32.92	32.75	33.00	33.26	32.66	33.09
4	33.45	32.94	32.85	33.02	33.28	32.68	33.20
5	33.42	32.91	32.91	33.08	33.33	32.73	33.25
6	33.41	32.99	32.90	33.07	33.33	32.73	33.24
7	33.45	32.93	32.85	33.11	33.36	32.76	33.28
8	33.45	32.93	32.85	33.10	33.36	32.76	33.27
Average	33.42	32.94	32.85	33.07	33.32	32.72	33.21
Batt 1 End-of-Night	29.32	29.32	28.89	28.98	29.06	28.63	29.06
2 Volt	29.38	29.29	28.87	28.95	29.12	28.70	29.12
3	29.32	29.32	28.89	28.98	29.07	28.64	29.07
4	29.34	29.34	28.91	29.00	29.09	28.57	29.09
5	29.40	29.31	28.89	28.97	29.06	28.63	29.06
6	29.31	29.31	28.88	28.96	29.05	28.62	28.96
7	29.34	29.34	28.91	29.00	29.08	28.65	29.08
8	29.34	29.34	28.91	29.00	29.00	28.65	29.00
Average	29.34	29.32	28.89	28.98	29.06	28.64	29.05
Batt 1 Chge	12.76	12.42	12.37	12.36	12.23	12.34	12.13
2 Share	11.68	11.60	12.15	12.24	12.49	12.24	12.45
3 (%)	12.24	12.31	12.98	13.21	13.60	13.38	13.67
4	11.99	12.18	12.49	12.62	12.79	12.55	12.50
5	12.84	12.67	12.20	12.01	11.66	11.91	11.52
6	13.35	13.70	12.69	12.71	12.27	12.65	13.20
7	12.90	13.03	12.94	12.86	12.79	12.86	12.81
8	12.24	12.09	12.17	11.99	12.18	12.07	11.72
Batt 1 Load	12.60	12.25	12.15	11.97	11.73	11.38	11.35
2 Share	12.70	13.16	13.54	14.12	13.71	13.52	13.99
3 (%)	12.67	13.11	12.97	13.14	13.85	13.41	14.38
4	12.44	12.53	12.36	12.57	12.85	12.68	12.99
5	12.34	12.17	11.87	11.59	11.38	11.63	11.58
6	12.70	12.01	12.35	12.10	11.91	12.22	11.30
7	12.47	12.39	12.48	12.42	12.36	12.55	12.35
8	12.04	12.37	12.29	12.08	12.20	12.12	12.06
Batt 1 Temp	21.46	20.35	20.04	20.20	20.76	20.86	21.34
2 in	20.25	19.46	19.67	19.98	21.11	20.89	21.44
3 (°C)	18.60	17.67	17.81	18.22	19.12	18.88	19.18
4	20.83	20.44	20.32	20.73	21.11	20.86	20.91
5	24.98	24.64	22.62	22.11	21.77	21.89	22.31
6	24.26	24.18	22.02	21.78	21.49	21.58	23.01
7	24.71	24.10	22.81	22.59	22.77	22.72	23.62
8	23.63	22.69	22.09	22.04	22.30	22.40	22.71
Average	22.34	21.69	20.92	20.95	21.30	21.26	21.81
S/C Reg Bus Pwr. (W)	*	156.21	161.13	161.38	183.5	175.6	185.0
Comp Load Pwr. (W)	*	28.67	34.06	34.06	41.2	41.2	41.2
P/L Reg Bus Pwr. (W)	*	9.59	9.59	9.59	9.6	22.1	9.6
C/D Ratio	1.15	1.05	1.08	1.08	1.09	1.08	1.10
Total Charge (A-M)	271.9	213.26	237.80	250.98	268.03	264.48	267.55
Total Discharge (A-M)	237.2	203.85	219.63	229.67	245.50	245.72	244.33
Solar Array (A-M)	1106	1086	1063	1032	1008	995	981
S.A. Peak I (Amp)	16.05	15.65	15.55	15.37	15.06	14.82	14.67
Midday Array I (Amp)	*	14.	14.67	14.51	14.20	14.04	13.88
Sun Angle (Deg)	*	8.	3.91	0.08	-3.46	-3.57	-1.22
Max R Pad Temp (°C)	*	59.60	59.60	60.80	60.80	58.40	59.60
Min R Pad Temp (°C)	*	-35.0	-35.60	-38.67	-38.67	-39.34	-38.00
Max L Pad Temp (°C)	*	59.23	58.46	57.69	56.92	56.15	56.92
Min L Pad Temp (°C)	*	-40.0	-41.43	-45.71	-45.71	-46.43	-45.00

*Data not processed and unavailable

Table 3-2. Landsat-2 Power Subsystem Analog Telemetry (Average Value for Data Received in NDPF R Playback)

Function	Description	Unit	Orbits						
			50	434	825	1253	1682	2125	2532
6001	Batt 1 Disc I	Amp	1.01	1.18	0.82	0.89	0.89	0.94	0.85
6002	2		1.01	1.25	0.89	0.97	1.01	1.07	0.97
6003	3		1.00	1.28	0.91	0.97	1.00	1.07	0.99
6004	4		1.00	1.26	0.89	0.93	0.95	1.02	0.93
6005	5		0.99	1.16	0.82	0.88	0.86	0.92	0.85
6006	6		1.02	1.19	0.88	0.96	0.91	0.96	0.86
6007	7		1.00	1.21	0.89	0.91	0.93	0.98	0.91
6008	8		0.97	1.16	0.86	0.89	0.91	0.97	0.87
6011	Batt 1 Chg I	Amp	0.47	0.56	0.40	0.43	0.44	0.60	0.57
6012	2		0.43	0.55	0.39	0.46	0.45	0.61	0.57
6013	3		0.45	0.58	0.40	0.45	0.48	0.65	0.61
6014	4		0.44	0.56	0.41	0.43	0.46	0.62	0.57
6015	5		0.47	0.56	0.39	0.41	0.43	0.59	0.54
6016	6		0.49	0.59	0.41	0.44	0.45	0.61	0.60
6017	7		0.47	0.58	0.42	0.44	0.46	0.63	0.60
6018	8		0.45	0.54	0.39	0.41	0.43	0.58	0.55
6021	Batt 1 Volt	VDC	31.50	31.21	31.33	31.18	30.94	30.94	30.92
6022	2		31.48	31.18	31.30	31.15	30.92	30.92	30.90
6023	3		31.49	31.19	31.31	31.16	30.93	30.92	30.91
6024	4		31.49	31.19	31.31	31.16	30.93	30.92	30.91
6025	5		31.50	31.20	31.32	31.18	30.94	30.94	30.92
6026	6		31.49	31.19	31.32	31.16	30.93	30.93	30.90
6027	7		31.52	31.22	31.35	31.20	30.96	30.96	30.94
6028	8		31.49	31.20	31.32	31.17	30.93	30.93	30.92
6031	Batt 1 Temp	DGC	21.59	20.40	19.74	20.23	20.87	20.93	20.93
6032	2		20.53	19.87	19.45	20.05	20.97	20.98	20.75
6033	3		18.80	17.94	17.72	18.30	19.09	19.14	18.66
6034	4		20.90	20.08	20.52	20.75	20.95	21.12	20.88
6035	5		25.16	24.40	22.77	22.15	22.00	21.85	22.22
6036	6		24.37	23.78	22.11	21.79	21.71	21.73	22.55
6037	7		24.83	24.05	22.71	22.52	22.92	22.90	23.26
6038	8		23.75	22.55	21.87	22.05	22.48	22.44	22.52
6040	Rt. Pad Temp	DGC	28.96	29.61	28.91	26.72	26.31	25.88	26.16
6041	Rt. Pad VM	VDC	33.72	33.38	33.69	33.74	33.58	33.50	33.56
6042	Rt. Pad VN	VDC	33.46	33.15	33.12	33.00	33.41	33.42	33.18
6044	Lt. Pad Temp	DGC	25.56	26.46	25.12	21.86	21.22	20.45	21.16
6045	Lt. Pad VF	VDC	34.40	34.15	34.17	33.99	33.82	33.77	33.87
6046	Lt. Pad VG	VDC	34.48	34.24	34.25	34.08	33.89	33.87	33.91
6050	S/C UR Bus V	VDC	31.73	31.46	31.55	31.41	31.15	31.12	31.14
6051	S/C RG Bus V	VDC	24.57	24.51	24.58	24.58	24.57	24.57	24.57
6052	Aux Reg AV	VDC	23.36	23.36	23.38	23.39	23.37	23.37	23.40
6053	Aux Reg BV	VDC	23.37	23.38	23.38	23.40	23.36	23.36	23.39
6054	Solar I	Amp	14.68	14.49	14.40	14.24	14.12	13.98	13.76
6056	S/C RG Bus I	Amp	7.28	7.05	6.58	6.62	6.97	7.62	7.17
6058	PC Mod T1	DGC	21.67	21.26	20.78	21.42	22.01	22.74	21.98
6059	PC Mod T2	DGC	20.44	19.40	19.02	20.06	20.85	20.94	20.53
6070	P/L RG Bus V	VDC	24.61	24.61	24.61	24.60	24.60	24.60	24.60
6071	P/L UR Bus V	VDC	31.65	31.56	31.48	31.49	31.22	31.02	31.21
6073	P Aux AV	VDC	23.47	23.49	23.50	23.50	23.49	23.49	23.51
6074	P Aux BV	VDC	23.46	23.49	23.50	23.50	23.49	23.49	23.51
6075	PR Mod T1	DGC	20.86	20.67	20.09	20.99	21.56	21.65	21.39
6076	PR Mod T2	DGC	22.13	21.71	21.48	22.01	22.78	22.69	22.38
6079	Fuse Blow V	VDC	24.48	24.49	24.47	24.47	24.47	24.49	24.48
6080	Shunt 1 I	Amp	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6081	2		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6082	3		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6083	4		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6084	5		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6085	6		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6086	7		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6087	8		0.0	0.0	0.0	0.0	0.0	0.0	0.0
6100	P/L RG Bus I	Amp	0.38	1.04	0.39	0.42	0.89	0.91	0.80
Total No.	Major Frames	Frm	396	392	386	385	387	387	387

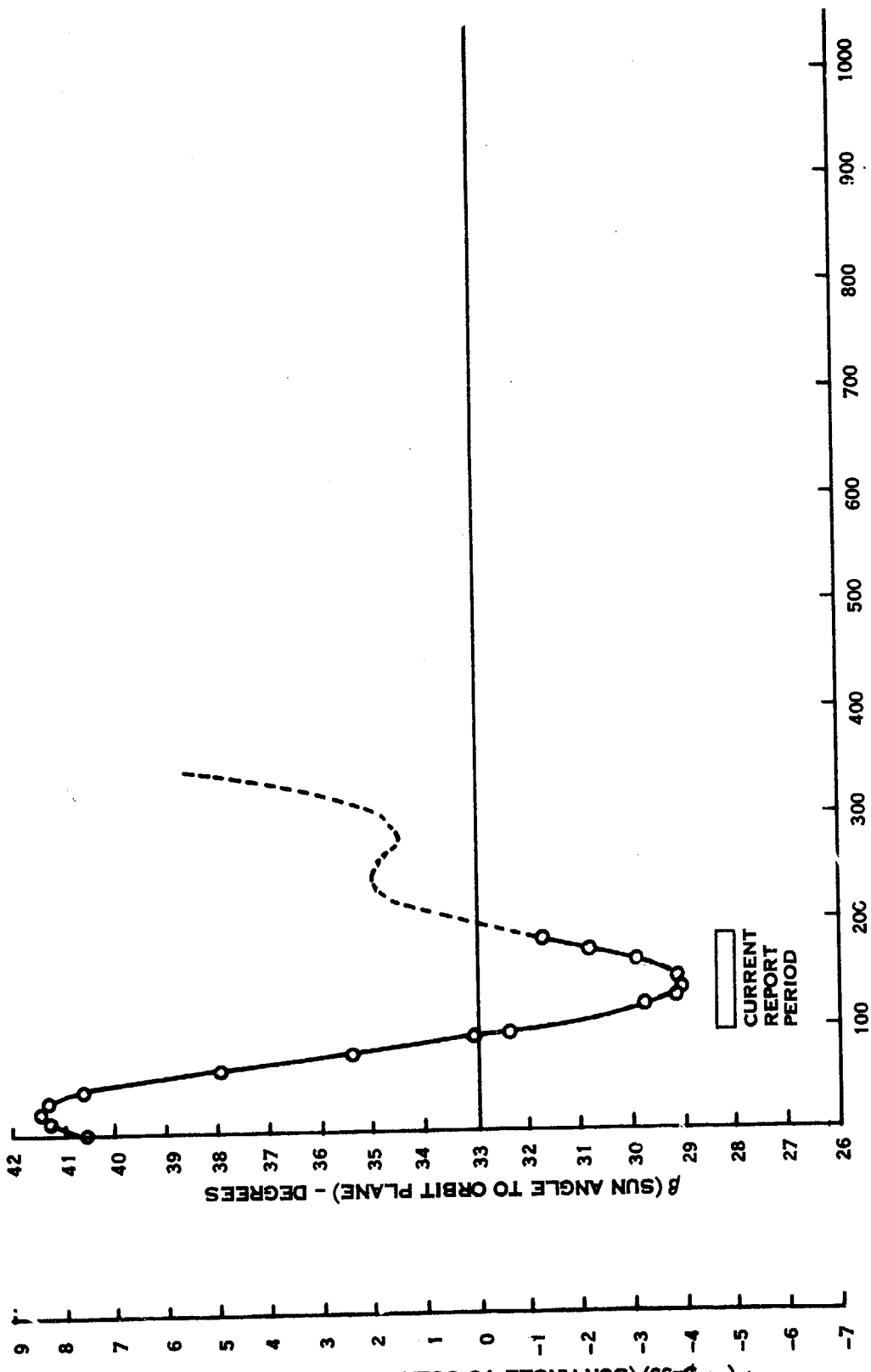


Figure 3-3. Actual β and α (Paddle) Sun Angles

LS-2

C.2

SECTION 4

ATTITUDE CONTROL SYSTEM (ACS)

Landsat-2's Attitude Control System has been operating properly in the ACS Normal Mode since launch and has consistently maintained correct spacecraft attitude.

The pressure leak in the Forward Scanner has had no affect on the ACS System's performance.

During Orbit 2272, (4 July 1975), telemetry point 1003 — which monitors the Forward Scanner pressure — failed. However, constant monitoring of this telemetry point prior to failure provided sufficient data to derive a pressure decay vs. time curve that can be used to predict Forward Scanner pressure in the future. According to this curve, the pressure within the scanner's housing will equal the vapor pressure of the scanner's lubricant (10^{-4} torr) in September of 1977. However, no problems are anticipated when this event occurs. Figure 4-1 shows a plot of the Forward Scanner pressure with the revised equation for pressure loss.

Both Solar Array Drives (SAD) performed normally and maintained proper solar panel alignment with the sun line during satellite day. Motor voltages and temperatures were within specifications. The LSAD rate has slowly increased and since Orbit 1636 (20 May 1975) rotates faster than orbit rate when the sun sensor is in the albedo shield, and one normal phase switch per orbit has been required to realign the LSAD perpendicular to the sun line when the sun sensor is clear of the albedo shield.

The LSAD's actual rate is 3.61 D/M which is 3.57% faster than orbit rate (3.48 D/M). Correspondingly, the LSAD motor winding voltage has decreased 7.2% from -5.09 volts in Orbit 26 (24 January 1975) to -4.72 volts in Orbit 2103 (23 June 1975). Figure 4-2 demonstrates typical LSAD performance since phase switching began. The data is superimposed over the LSAD's calibration curve.

Referring to Figure 4-2, the LSAD is normal to the sun at satellite noon, but approximately 80 minutes later, the included angle between the solar paddle and the sun line has increased from 90° to 100°. The LSAD sun sensor responds to this 10° position error and phase switching occurs for nearly 2 minutes.

The RSAD's typical performance is shown in Figure 4-3. Its motor winding voltage has decreased 11.97% from -5.51 volts in Orbit 26 (24 January 1974) to -4.86 volts in Orbit 2103 (23 June 1975). The RSAD's rate is close to orbit rate and no phase switching has been required to maintain RSAD sun alignment.

Figures 4-4 and 4-5 demonstrate the pneumatics gating activities through Orbit 2525 (22 July 1975). Neither graph indicates the development of a seasonal gating pattern. In fact, segments of the curves in Figure 4-4 covering this report period are almost linear.

+Pitch gating was affected, however, for approximately 48 hours after the conduction of RBV tests in Orbits 2366 to 2372 (11 July 1975). +Pitch gating decreased from 15 gates per day to 10 gates per day during this interval but resumed its former frequency immediately thereafter. The strength of the RBV's magnetic field appears adequate to affect the spacecraft's attitude control system.

Remaining total impulse declined predictably from 493.25 LB-SEC in Orbit 1250 (22 April 1975) to 462.29 LB-SECS in Orbit 2532 (23 July 1975). Discounting a change in the ACS mode of operation, the remaining freon will support the spacecraft until October 1978.

Typically, flywheel duty cycles have averaged seven percent or less. Pitch and Yaw flywheel speed have averaged approximately -150 RPM while the ROLL flywheels have averaged +720 RPM. Sun transient response due to dual scanner mode has been similar to Landsat-1 and is normal. RMP2, commanded into operation shortly after ACS acquisition as the primary control of the Yaw subsystem, has functioned normally.

Tables 4-1, 4-2 and 4-3 show typical telemetry for temperature and pressures; voltages and currents; and attitude errors and driver duty cycles as obtained from SCEST program averages.

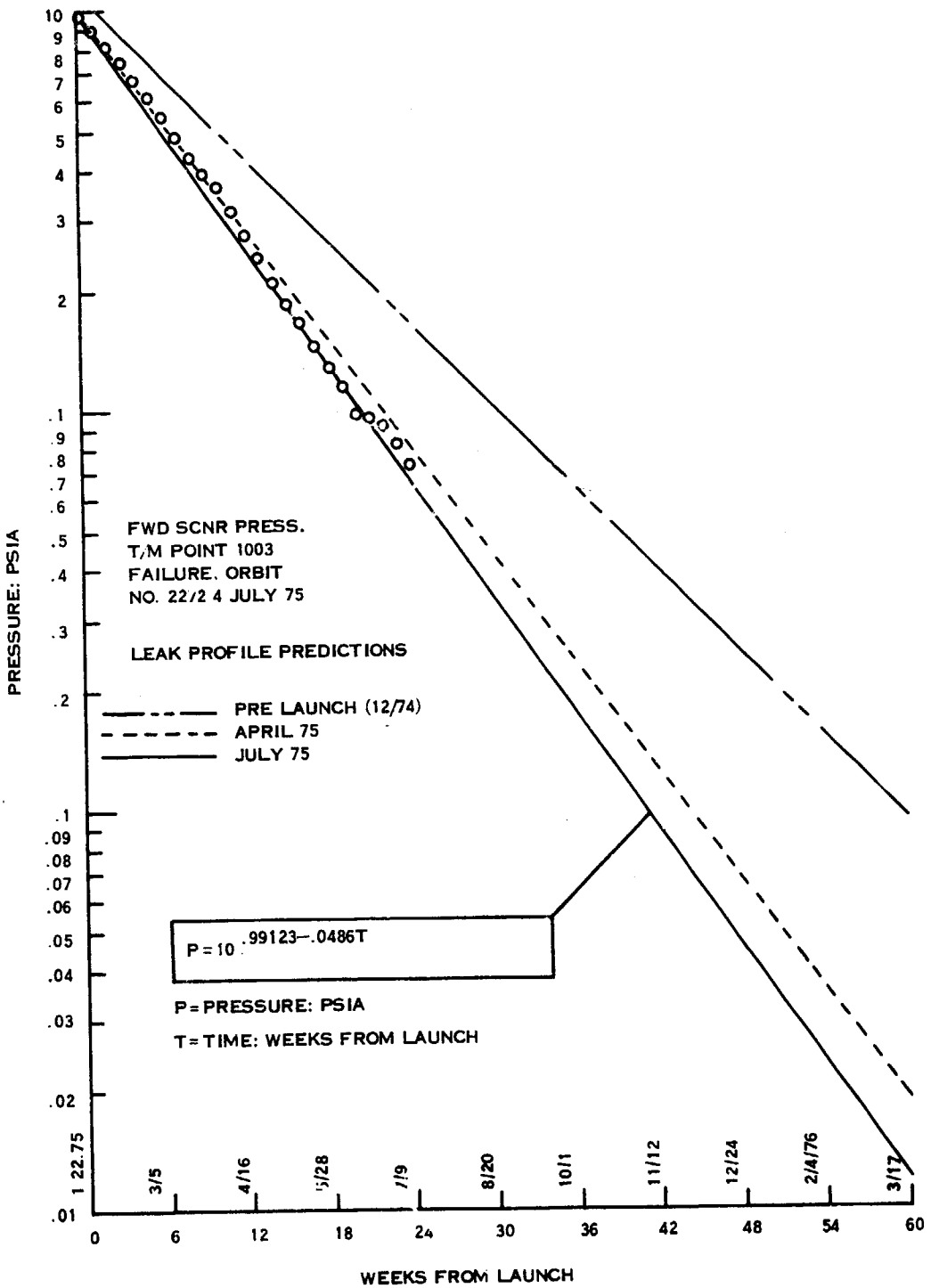


Figure 4-1. Landsat-2 Forward Scanner Pressure History

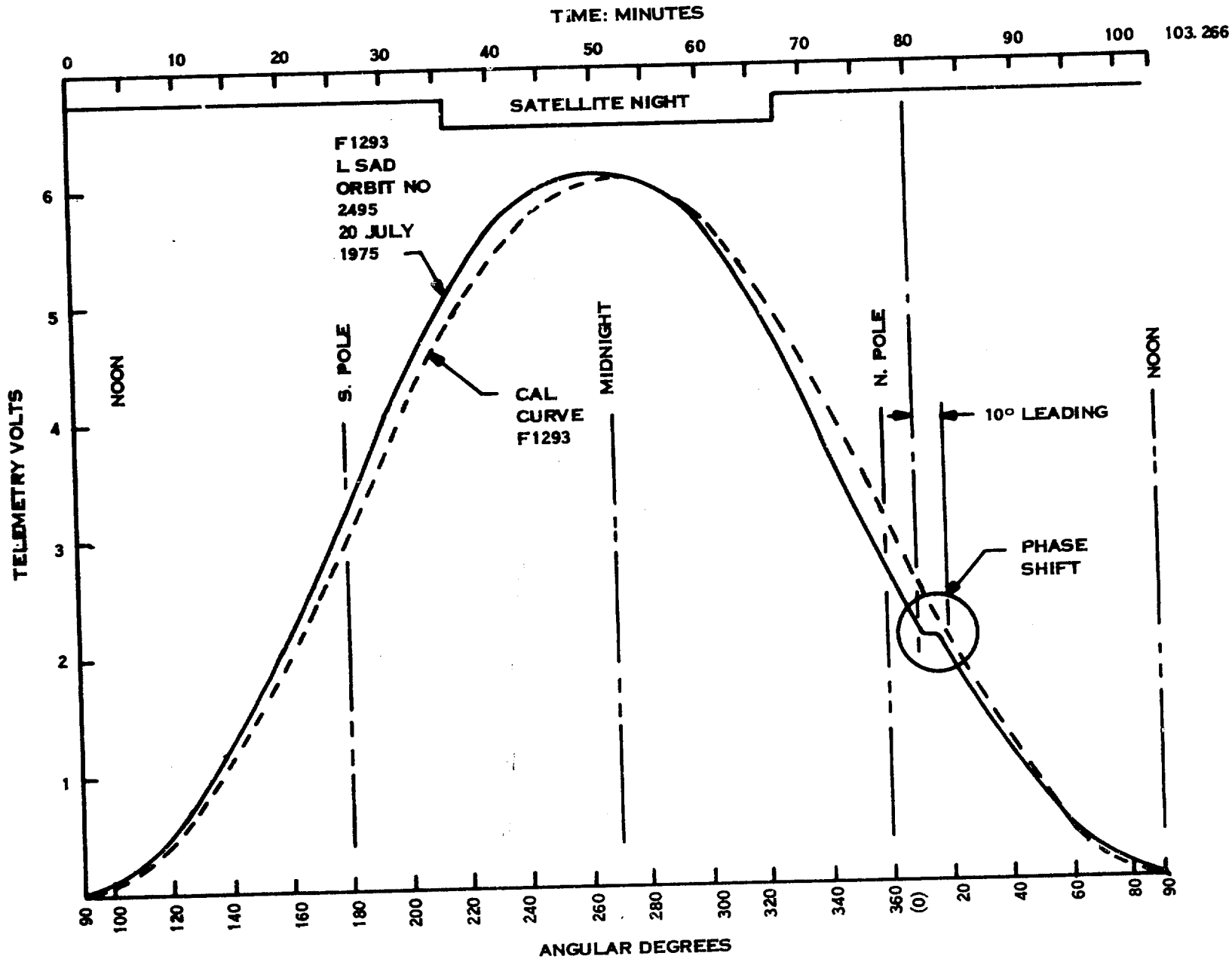


Figure 4-2. Landsat-2 LSAD Performance

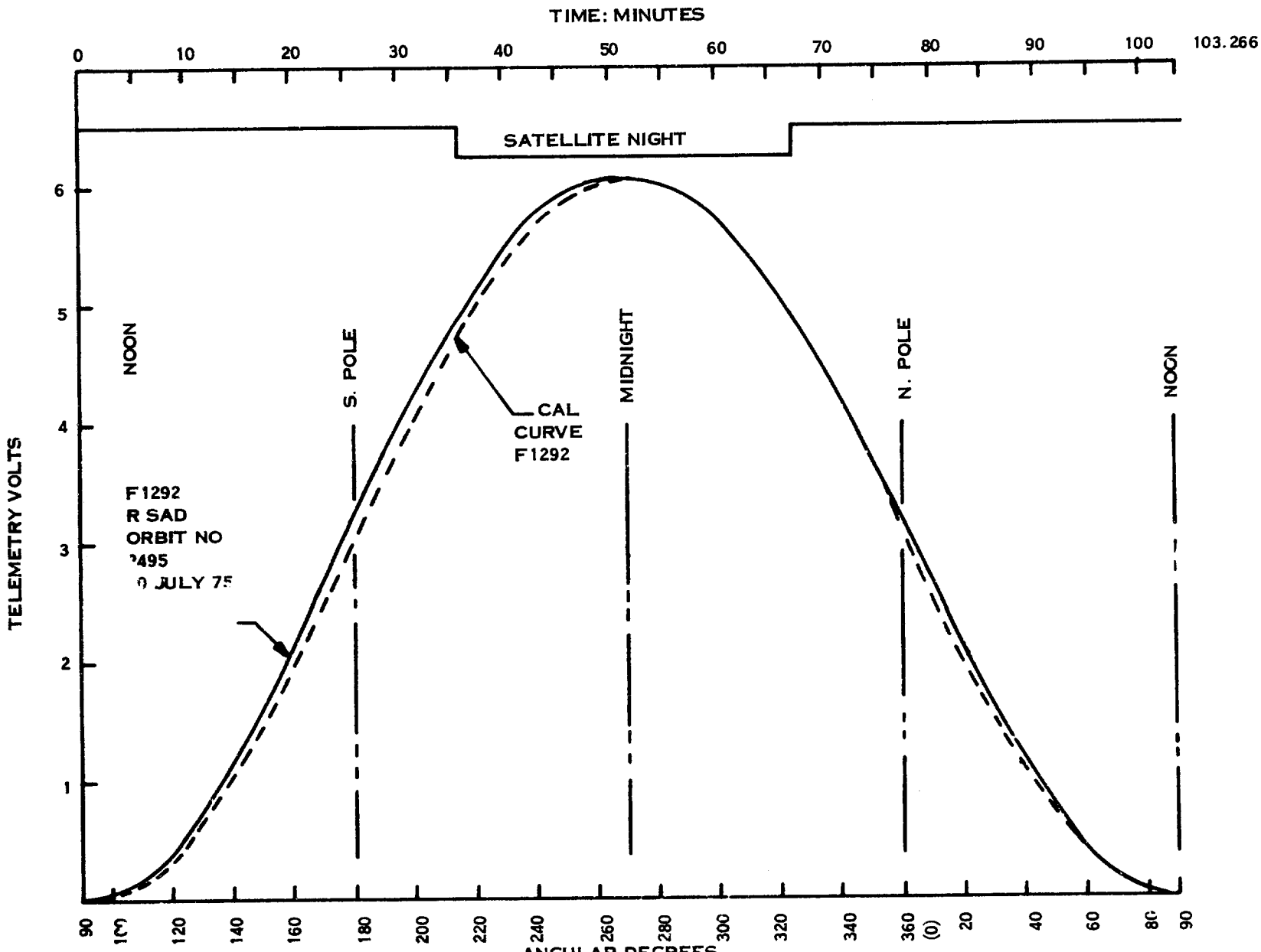


Figure 4-3. Landsat-2 RSAD Performance

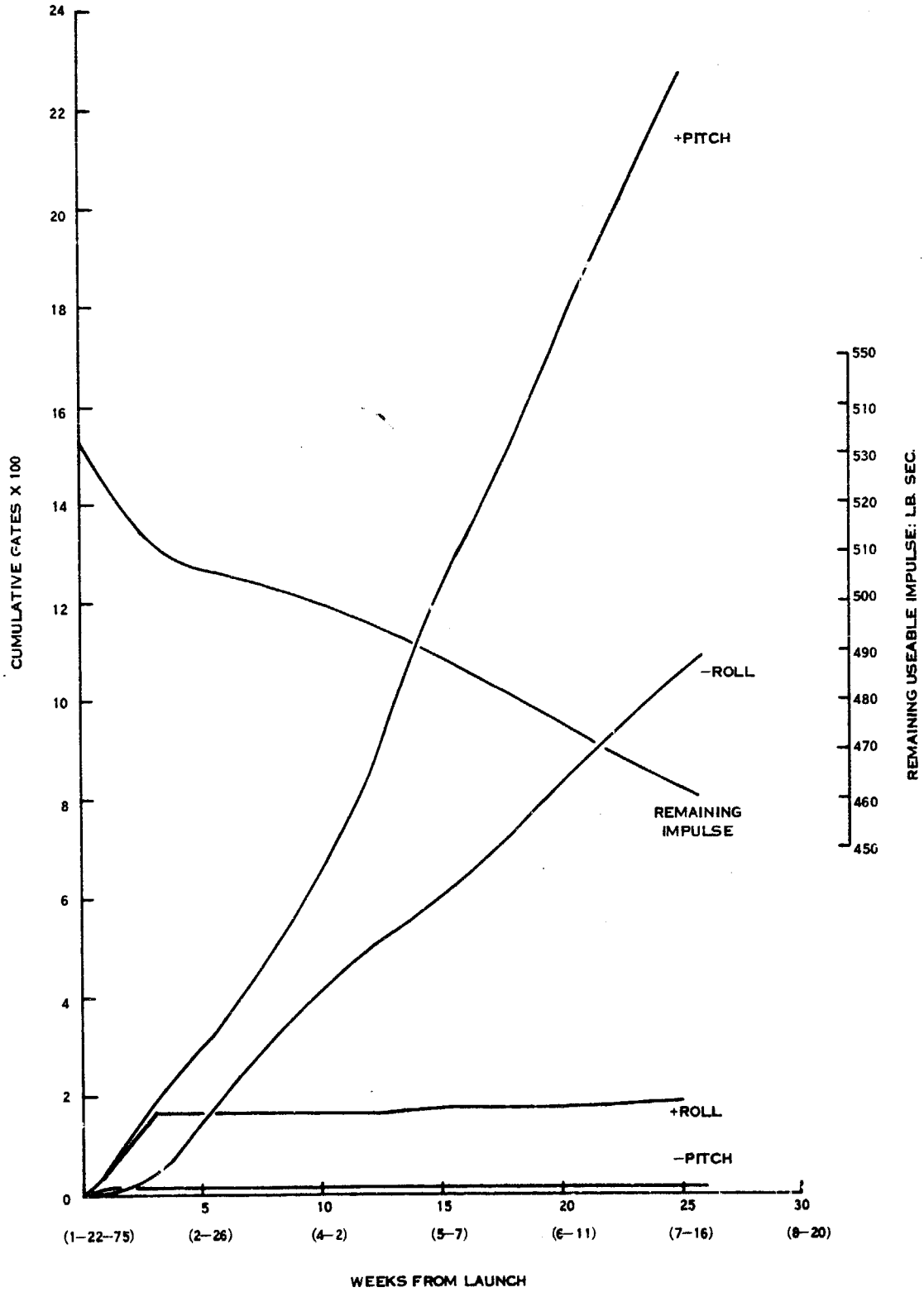


Figure 4-4. Landsat-2 Gating History

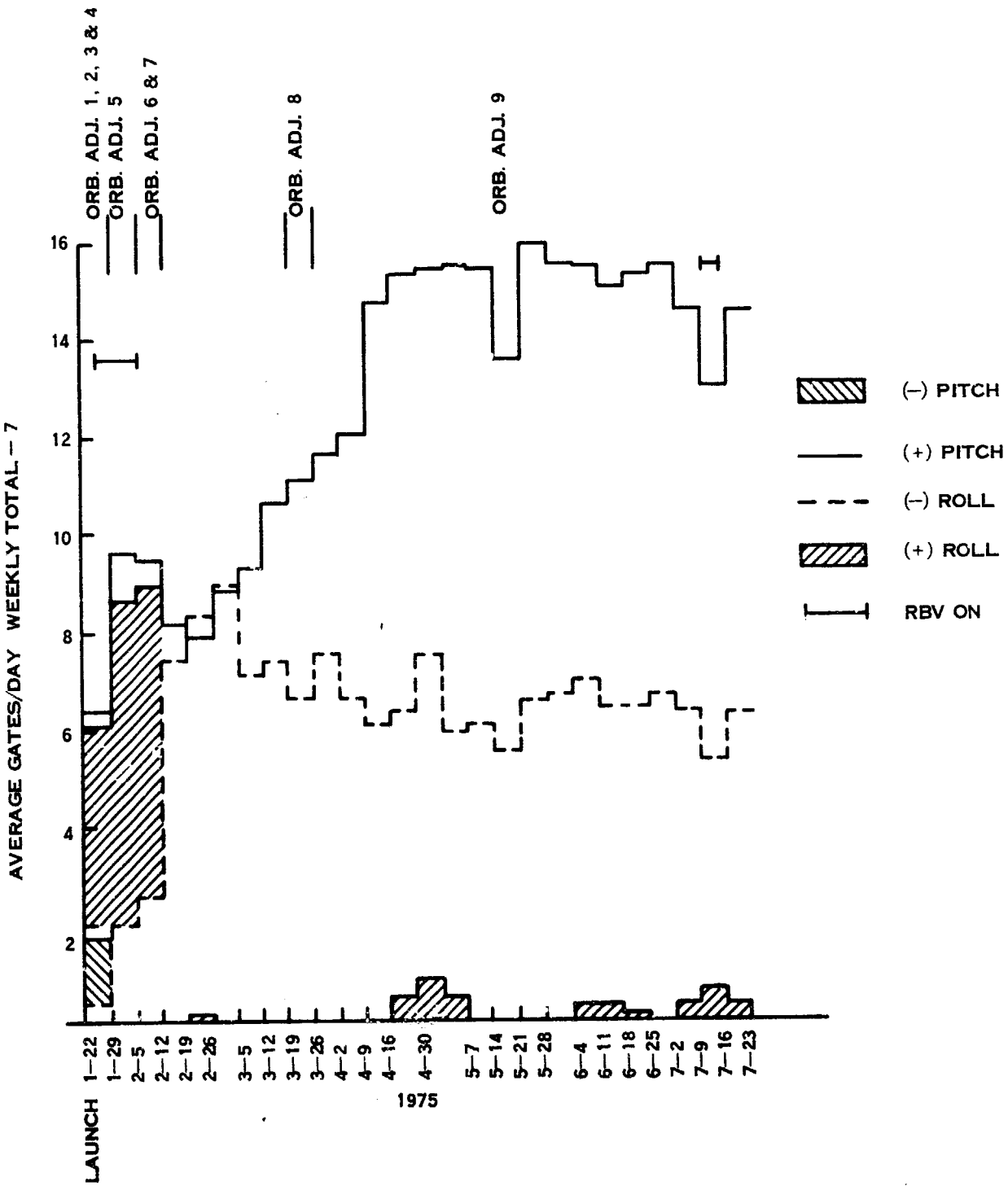


Figure 4-5. Landsat-2 Gating Frequency vs Time

Table 4-1. Landsat-2 Subsystem Temperature and Pressure Averages

Function	Units	Orbits						
		29	424	825	1253	1682	2125	2532
1084 RMP 1 Gyro Temperature	DGC	19.33(1)	20.13	21.02	21.15	21.02	21.13	21.02
1094 RMP 2 Gyro Temperature	DGC	74.00	73.94	74.00	74.00	73.98	73.99	74.00
1222 SAD RT MTR HSNG Temp.	DGC	19.50	20.29	21.46	22.24	22.35	22.50	22.23
1242 SAD LT MTR HSNG Temp.	DGC	26.87	27.43	27.95	27.94	27.54	27.54	27.54
1223 SAD RT MTR WNDNG Temp.	DGC	21.76	22.07	23.30	24.31	24.52	24.74	24.23
1243 SAD LT MTR WNDNG Temp.	DGC	30.23	30.28	30.77	30.85	30.40	30.31	30.32
1228 SAD RT HSG Pressure	PSI	7.26	7.25	7.25	7.25	7.25	7.25	7.25
1248 SAD LT HSG Pressure	PSI	7.28	7.33	7.33	7.28	7.27	7.27	7.27
1007 FWD Scanner MTR Temp.	DGC	22.07	22.00	22.73	22.72	22.26	22.16	22.25
1016 Rear Scanner MTR Temp.	DGC	24.19	23.66	24.26	24.18	23.65	23.63	23.62
1003 FWD Scanner Pressure	PSI	9.59(2)	6.59	4.17	2.58	1.42	.91	D
1012 Rear Scanner Pressure	PSI	6.21	6.31	6.29	6.19	6.10	6.01	6.00
1212 Gas Tank Pressure	PSI	1948.0	1857.64	1837.15	1800.29	1751.25	1714.06	1677.12
1210 Gas Tank Temperature	DGC	20.66	21.67	22.34	22.66	22.40	22.35	22.33
1213 Manifold Pressure	PSI	53.98	54.28	54.01	54.55	54.36	54.11	54.83
1211 Manifold Temperature	DGC	19.18	19.88	20.57	20.78	20.56	20.54	20.50
1059 CLG Power Supply Card Temp.	DGC	39.00	39.50	40.01	40.00	39.50	39.47	39.52
1260 THO1 EBP	DGC	24.29	24.74	25.29	25.31	24.92	25.02	25.01
1261 THO2 EBP	DGC	20.29	20.78	21.50	21.63	21.34	21.39	21.36
1262 THO3 EBP	DGC	18.29	19.03	19.94	20.31	20.11	20.27	20.05
1263 THO1 STS	DGC	6.54	- 3.96	- 2.14	- 3.03	-5.27	-5.85	-6.22
1264 THO2 STS	DGC	D	D	D	D	D	D	D
1265 THO3 STS	DGC	8.46	0.67	2.07	0.79	-1.14	-.99	-.48
1266 THO4 STS	DGC	-2.78	-10.78	- 9.02	- 9.13	-10.05	-9.70	-9.65
1267 THO5 STS	DGC	9.62	0.04	2.44	1.28	-1.64	-2.39	-2.64
1224 SAD R FSST	DGC	35.00	25.68	30.16	34.56	37.20	37.41	36.57
1244 SAD L FSST	DGC	50.00	46.19	46.38	46.17	46.01	46.06	46.29

(1) RMP-1 Left off after initial test in Orbit 1
(2) Prelaunch leak - refer to text
D = Defective telemetry point

Table 4-2. Landsat-2 ACS Voltages and Currents

Functions	Units	Orbits 29	424	825	1253	1682	2125	2532
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1091 RMP 2 MTR Volts	VDC	29.99	29.98	29.98	29.97	29.96	29.97	29.94
1092 RMP 2 MTR Current	Amps	0.10	0.10	0.10	0.10	.10	.10	.10
1090 RMP 2 Supply Volts	VDC	-23.63	-23.62	-23.62	-23.62	-23.62	-23.61	-23.61
1220 SAD RT MTR WNDNG Volts	VDC	-5.47	-4.81	-4.80	-4.71	-4.60	-4.73	-4.51
1240 SAD LT MTR WNDNG Volts	VDC	-5.08	-4.87	-4.89	-4.91	-4.78	-4.76	-4.70
1227 SAD RT -15 VDC Conv.	VDC	15.14	15.14	15.12	15.14	15.13	15.14	15.15
1247 SAD LT -15 VDC Conv.	VDC	15.23	15.22	15.22	15.21	15.22	15.23	15.22
1056 CLB ±6 VDC	TMV	2.35	2.35	2.35	2.35	2.35	2.35	2.35
1055 CLB ±10 VDC	TMV	2.88	2.89	2.89	2.90	2.90	2.90	2.90
1057 CLB Power Supply Volts	TMV	2.97	2.95	2.95	2.94	2.94	2.95	2.94

Table 4-3. Landsat-2 ACS Attitude Errors and Driver Duty Cycles

Function	Units	Orbits 26	405	800	1202	1682	2125	2532
1041 Pitch Fine Error	DEG	-0.15	-0.14	-0.13	-0.14	-.14	-.14	-.14
1043 Pitch Flywheel Speed	RPM	-156.12	-181.29	-200.51	-221.22	-192.23	-176.80	-198.41
1038 Pitch Mtr Drvr CCW	PCT	6.64	6.61	8.13	8.61	6.20	5.84	7.35
1039 Pitch Mtr Drvr CW	PCT	2.03	1.62	3.07	3.64	1.52	1.58	2.60
1030 Roll Fine Error	DEG	-0.13	-0.13	-0.15	-0.11	-.12	-.11	-.09
1027 Roll Rear Flywheel Spd	RPM	729.30	744.61	778.70	731.98	752.14	732.64	739.75
1026 Roll Fwd Flywheel Spd	RPM	703.02	712.83	741.20	710.22	712.34	718.13	725.23
1022 Roll Rear Mtr Drvr CCW	PCT	0.67	0.56	0.71	0.86	.09	.21	.39
1025 Roll Rear Mtr Drvr CW	PCT	7.54	[illegible]34	7.72	7.11	4.89	4.95	5.47
1023 Roll Fwd Mtr Drvr CCW	PCT	0.70	0[illegible]	0.93	0.79	.20	.20	.37
1024 Roll Fwd Mtr Drvr CW	PCT	5.46	[illegible]	5.43	4.47	4.65	3.78	4.74
1035 Yaw Tach	RPM	-95.73	-77.3[illegible]	-32.34	-77.38	5.15	-51.21	-41.57
1033 Yaw Mtr Drvr CW	PCT	1.98	1.91	2.60	2.10	1.69	[illegible].46	1.77
1034 Yaw Mtr Drvr CCW	PCT	2.10	2.03	2.12	2.15	1.35	1.46	1.72
1221 SAD Right Tach	D/M		3.43	3.42	3.39	3.39	3.37	3.38
1241 SAD Left Tach	D/M	3.68	3.65	3.64	3.64	3.63	3.64	3.63

SECTION 5

COMMAND/CLOCK SUBSYSTEM (CMD)

The CMD Subsystem operated nominally in this report period.

Table 5-1 shows typical telemetry values since launch. All are nominal.

The clock of Landsat-2 drifts in an opposite direction to the clock of Landsat-1. To show this more clearly, the drift histories of both are shown in Figure 5-1.

Table 5-1. Command/Clock Telemetry Summary, LANDSAT-2

Function No.	Name	Mode	Units	Orbit						
				35	402	825	1253	1479	1972	2462
8005	Pri. Power Supply Temp.	-	°C	38.82	38.38	38.99	39.86	40.02	40.51	40.43
8006	Red. Power Supply Temp.	-	°C	36.93	36.40	37.13	38.03	38.24	38.49	38.70
8007	Pri. Osc. Temp.	-	°C	28.70	27.80	28.25	28.70	28.80	29.11	29.35
8008	Red Osc. Temp.	-	°C	27.82	26.95	27.01	27.93	28.21	28.49	28.68
8009	Pri. Osc. Output	-	TMV	1.06	1.05	1.05	1.05	1.06	1.06	1.06
8010	Red. Osc. Output	-	TMV	1.17	1.17	1.18	1.19	1.19	1.20	1.20
8011	100 KHz	Pri. - Red.	TMV	3.17	3.16	3.15	3.16	3.16	3.16	3.16
8012	10 KHz	Pri. - Red.	TMV	3.08	3.05	3.05	3.05	3.05	3.05	3.05
8013	2.5 KHz	Pri. - Red.	TMV	3.01	2.95	2.95	2.95	2.96	2.95	2.95
8014	400 Hz	Pri. - Red.	TMV	4.17	4.45	4.45	4.45	4.45	4.45	4.45
8015	Pri. + 4V Power Supply	Pri. Clk ON	VDC	NA	2.05	2.05	2.05	2.05	2.05	2.05
8016	Red. + 4V Power Supply	Red. Clk ON	VDC	NA	2.00	2.01	2.01	2.01	2.01	2.01
8017	Pri. + 6V Power Supply	Pri. Clk ON	VDC	NA	2.30	2.30	2.30	2.31	2.31	2.30
8018	Red. + 6V Power Supply	Red. Clk ON	VDC	NA	2.30	2.30	2.31	2.31	2.31	2.31
8019	Pri. - 6V Power Supply	Pri. Clk ON	VDC	NA	5.22	5.22	5.22	5.23	5.23	5.23
8020	Red. - 6V Power Supply	Red. Clk ON	VDC	NA	5.22	5.23	5.23	5.23	5.23	5.23
8021	Pri. - 23V Power Supply	Pri. Clk ON	VDC	NA	5.70	5.70	5.70	5.70	5.70	5.70
8022	Red. - 23V Power Supply	Red. Clk ON	VDC	NA	5.65	5.65	5.65	5.65	5.65	5.65
8023	Pri. - 29V Power Supply	Pri. Clk ON	VDC	NA	5.29	5.29	5.29	5.29	5.29	5.30
8024	Red. - 29V Power Supply	Red. Clk ON	VDC	NA	5.28	5.29	5.29	5.28	5.29	5.29
8101	CIU A - 12V	CIU A ON	VDC	3.79	3.97	3.97	3.97	3.97	3.97	3.97
8102	CIU B - 12V	CIU B ON	VDC	3.78	3.95	3.95	3.95	3.95	3.95	3.95
8103	CIU A - 5V	CIU A ON	VDC	3.93	4.15	4.15	4.15	4.15	4.15	4.15
8104	CIU B - 5V	CIU B ON	VDC	3.90	4.10	4.10	4.10	4.10	4.10	4.10
8105	CIU A Temp.	CIU A ON	°C	26.01	21.51	21.68	22.09	22.09	22.25	22.50
8106	CIU B Temp.	CIU B ON	°C	23.35	19.54	19.68	19.96	19.96	20.18	20.38
8201	Receiver RF-A Temp.	-	°C	NA	28.82	29.03	29.58	29.78	29.82	30.02
8202	Receiver RF-B Temp.	-	°C	29.09	OFF	OFF	OFF	OFF	OFF	OFF
8203	D MOD A Temp.	-	°C	28.95	38.10	38.26	38.80	38.97	38.99	39.20
8204	D MOD B Temp.	-	°C	37.73	26.29	26.47	27.10	27.36	27.39	27.56
8205	Receiver A AGC	Receiver A ON	DBM	OFF	-90.57	-94.06	-91.00	-91.31	-91.12	-92.18
8206	Receiver B AGC	Receiver B ON	DBM	-87.83	OFF	OFF	OFF	OFF	OFF	OFF
8207	Amp. A Output	Receiver A ON	TMV	OFF	2.71	2.42	2.70	2.66	2.71	2.51
8208	Amp. B Output	Receiver B ON	TMV	2.10	OFF	OFF	OFF	OFF	OFF	OFF
8209	Freq. Shift Key A Out	Receiver A ON	TMV	OFF	1.09	1.09	1.09	1.08	1.09	1.08
8210	Freq. Shift Key B Out	Receiver B ON	TMV	1.11	OFF	OFF	OFF	OFF	OFF	OFF
8211	Amp. A Output	Receiver A ON	TMV	OFF	1.14	1.13	1.13	1.12	1.15	1.12
8212	Amp. B Output	Receiver B ON	TMV	1.13	OFF	OFF	OFF	OFF	OFF	OFF
8215	D MOD A - 15V	Receiver A ON	TMV	OFF	4.86	4.87	4.87	4.87	4.87	4.87
8216	D MOD B - 15V	Receiver B ON	TMV	4.77	OFF	OFF	OFF	OFF	OFF	OFF
8217	Regulator A - 10V	Receiver A ON	TMV	OFF	5.40	5.40	5.40	5.40	5.40	5.40
8218	Regulator B - 10V	Receiver B ON	TMV	5.32	OFF	OFF	OFF	OFF	OFF	OFF
8311	ECAM Mem. Tmp	ECAM ON	DGC	NA	17.18	17.46	17.96	18.13	18.41	18.03
8312	ECAM Pwr Spply Temp	ECAM ON	DGC	NA	21.63	21.62	22.43	22.78	23.00	23.13

NA - Not available due to processing problem - MT 710

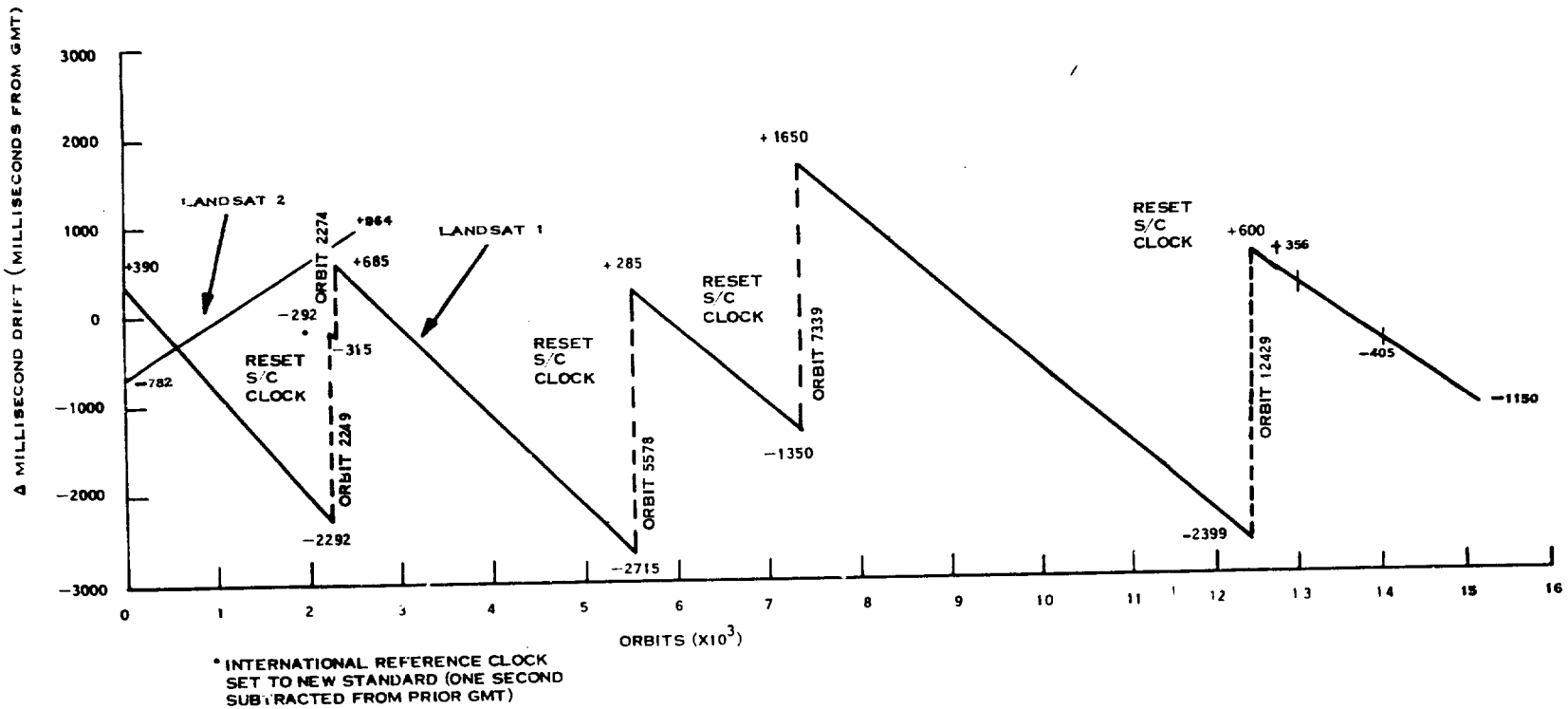


Figure 5-1. Comparison of Landsat-1 and Landsat-2 Drift Histories

SECTION 6

TELEMETRY SUBSYSTEM (TMP)

The TLM has operated nominally in this report period.

Table 6-1 shows typical telemetry values since launch. All are nominal. The VHF transmitter at 26.16 dBm has a power output of 400 milliwatts, up from the 325 milliwatts, to which Landsat-1 VHF transmitter had declined. Ground stations are reporting proportionately increased signal strengths in the order of 2 dB as shown in Figure 6-1.

Table 6-1. Landsat-2 TMP Telemetry Values

Funct. No.	Function Name	Unit	Orbit						
			35	424	825	1253	1479	1972	2467
9001	Memory Sequencer A Converter	VDC	4.45	4.45	4.45	4.45	4.45	4.45	4.45
9002	Memory Sequencer B Converter	VDC	**	**	**	**	**	**	**
9003	Memory Sequencer Temp	°C	20.00	18.88	18.63	19.19	19.24	19.41	20.77
9004	Formatter A Converter	VDC	4.52	4.52	4.51	4.51	4.51	4.50	4.51
9005	Formatter B Converter	VDC	**	**	**	**	**	**	**
9006	Dig. Mux A Converter	VDC	4.22	4.22	4.22	4.22	4.22	4.22	4.22
9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**
9008	Formatter/Dig Mux Temp	°C	25.00	24.76	23.85	23.23	22.49	22.50	23.98
9009	Analog Mux A Converter	VDC	4.02	4.05	4.05	4.05	4.05	4.05	4.05
9010	Analog Mux B Converter	VDC	**	**	**	**	**	**	**
9011	A/D Converter A Voltage	VDC	4.02	4.02	4.02	4.02	4.02	4.02	4.02
9012	A/D Converter B Voltage	VDC	**	**	**	**	**	**	**
9013	Analog Mux, A/D Conv. Temp	°C	25.00	24.61	24.63	25.00	24.55	24.85	24.91
9014	Preregulator A Voltage	VDC	4.00	4.00	4.00	4.00	4.00	4.00	4.00
9015	Preregulator B Voltage	VDC	**	**	**	**	**	**	**
9016	Reprogrammer Temp	°C	22.50	22.12	21.53	22.24	21.62	21.60	22.27
9017	Memory A Converter	VDC	4.45	4.45	4.45	4.45	4.45	4.45	4.45
9018	Memory A Temp	°C	17.50	14.78	15.00	16.46	17.06	16.97	17.33
9019	Memory B Converter	VDC	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.50	16.19	15.32	16.78	16.91	16.79	17.28
9100	Reflected Power (Xmtr A)	dBm	18.29	14.11	14.02	13.84	13.70	13.66	13.69
9101	Xmtr A-20 VDC	VDC	3.80	3.97	3.97	3.97	3.98	3.97	3.98
9103	Xmtr A Temp	°C	27.73	23.94	22.19	21.02	20.71	20.41	20.97
9104	Xmtr B Temp	°C	*	25.14	23.27	22.08	21.76	21.45	22.07
9105	Xmtr A Power Output	dBm	27.73	26.16	26.14	26.14	26.16	26.19	26.19
9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**

*Not available due software.

**Not turned on since Prelaunch.

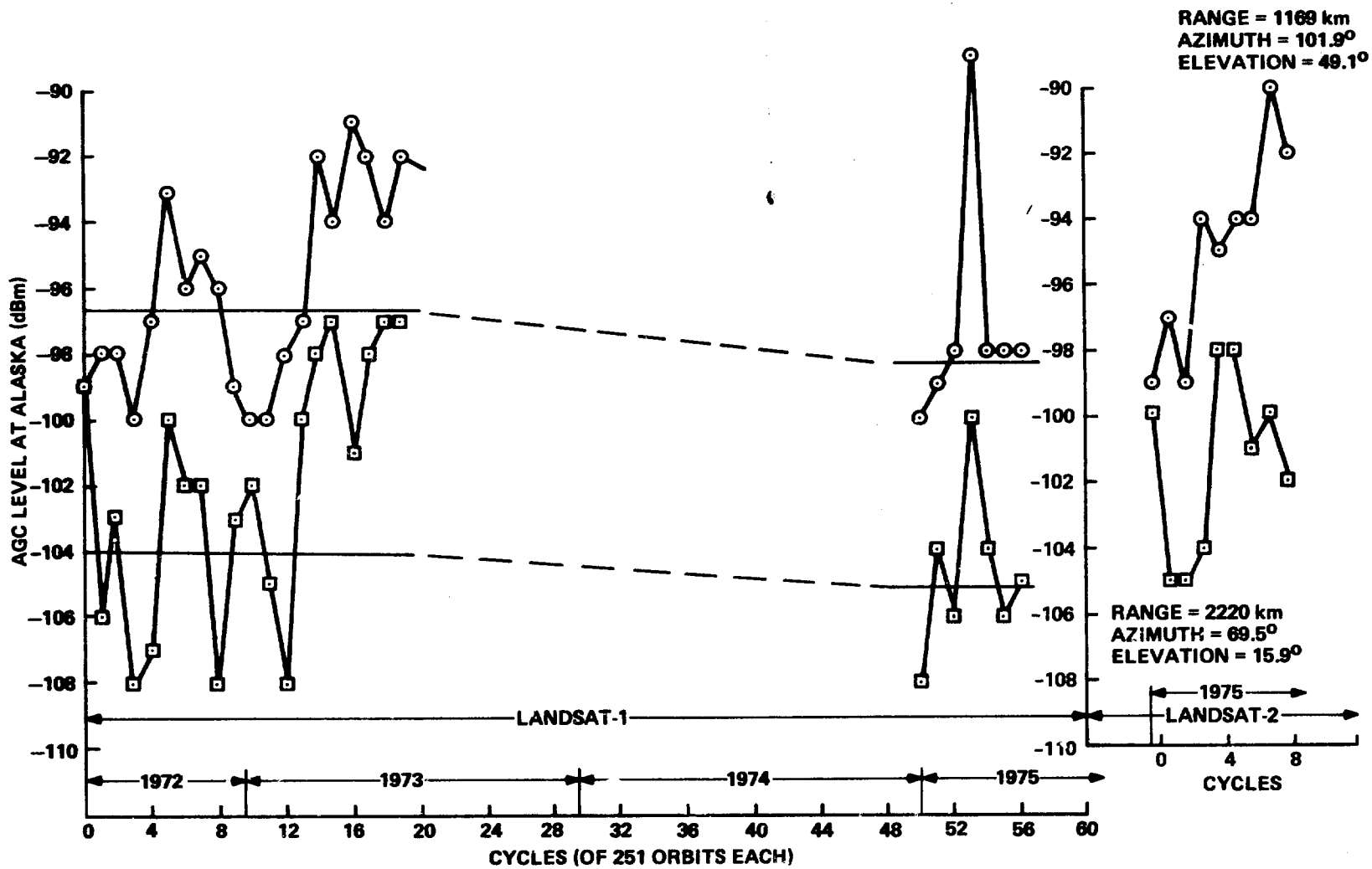


Figure 6-1. Power Received at Alaska (85-foot Antenna) From VHF Transmitter (0.35 Watts) Landsat-1/2

SECTION 7

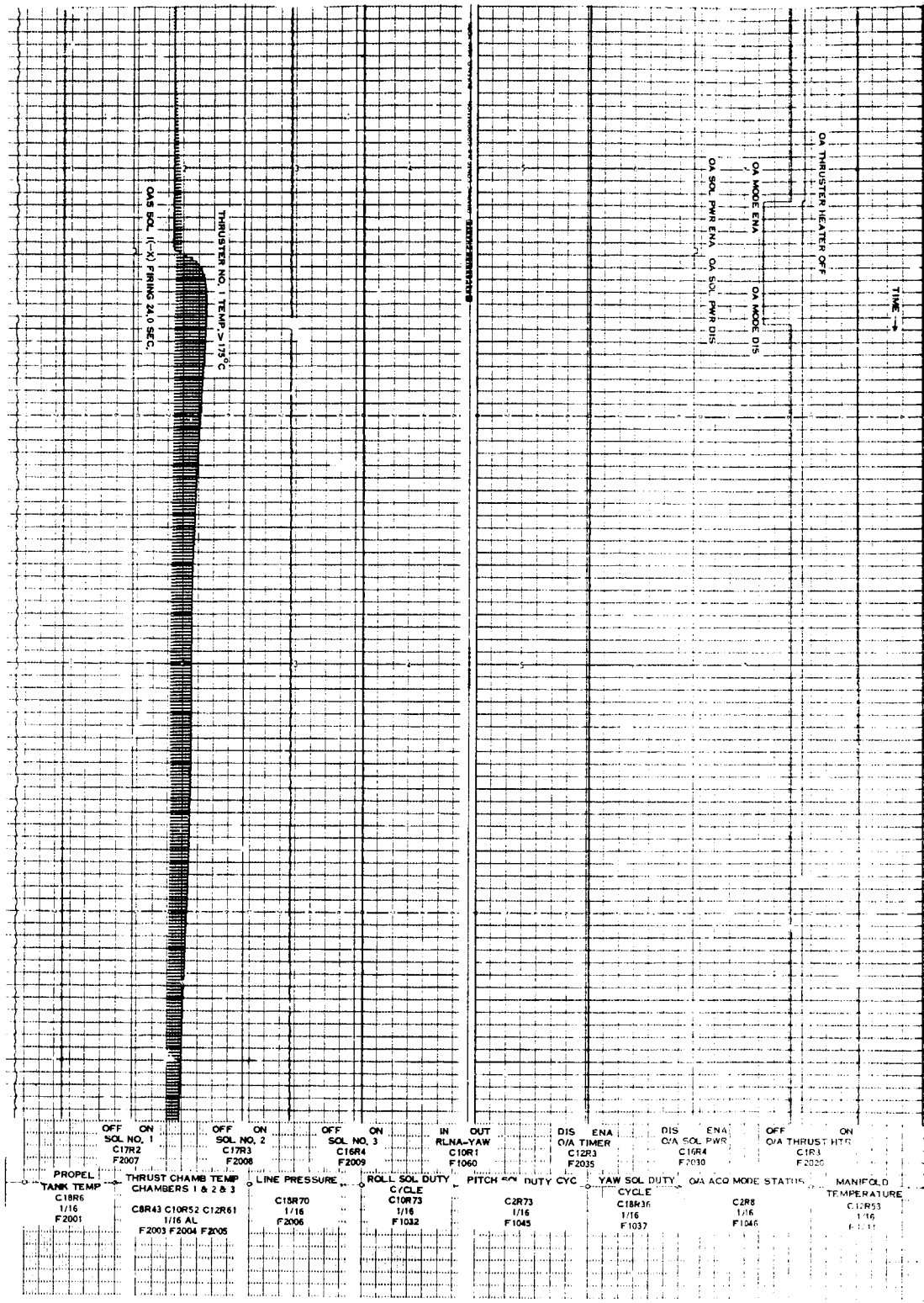
ORBIT ADJUST SUBSYSTEM (OAS)
LANDSAT-2

The Orbit Adjust Subsystem on Landsat-2 has been fired nine times since launch, 5 times using the -X thruster and 4 times using the +X thruster. One firing of the -X and +X thruster each was for alignment tests. Three +X firings and two -X firings were made to phase the satellite with Landsat-1 to obtain a combined nine day ground track repeat pattern. Two -X firings were for orbit maintenance.

The only orbit maintenance burn required during this report period was made in Orbit 1632 (19 May 1975). During this maneuver, the -X thruster was fired for a duration of 24 seconds expending 0.07 lbs. of hydrazine. Performance was normal as seen from characteristics of the burn shown in Figure 7-1.

The subsystem activity through the end of this report period is summarized in Table 7-1. A total of 6.80 lbs of hydrazine has been expended so far from the prelaunch load of 67 lbs.

The OAS telemetry has consistently shown normal pressure temperature parameters. A sampling of the same is given in Table 7-2.



FOLDOUT FRAME 1

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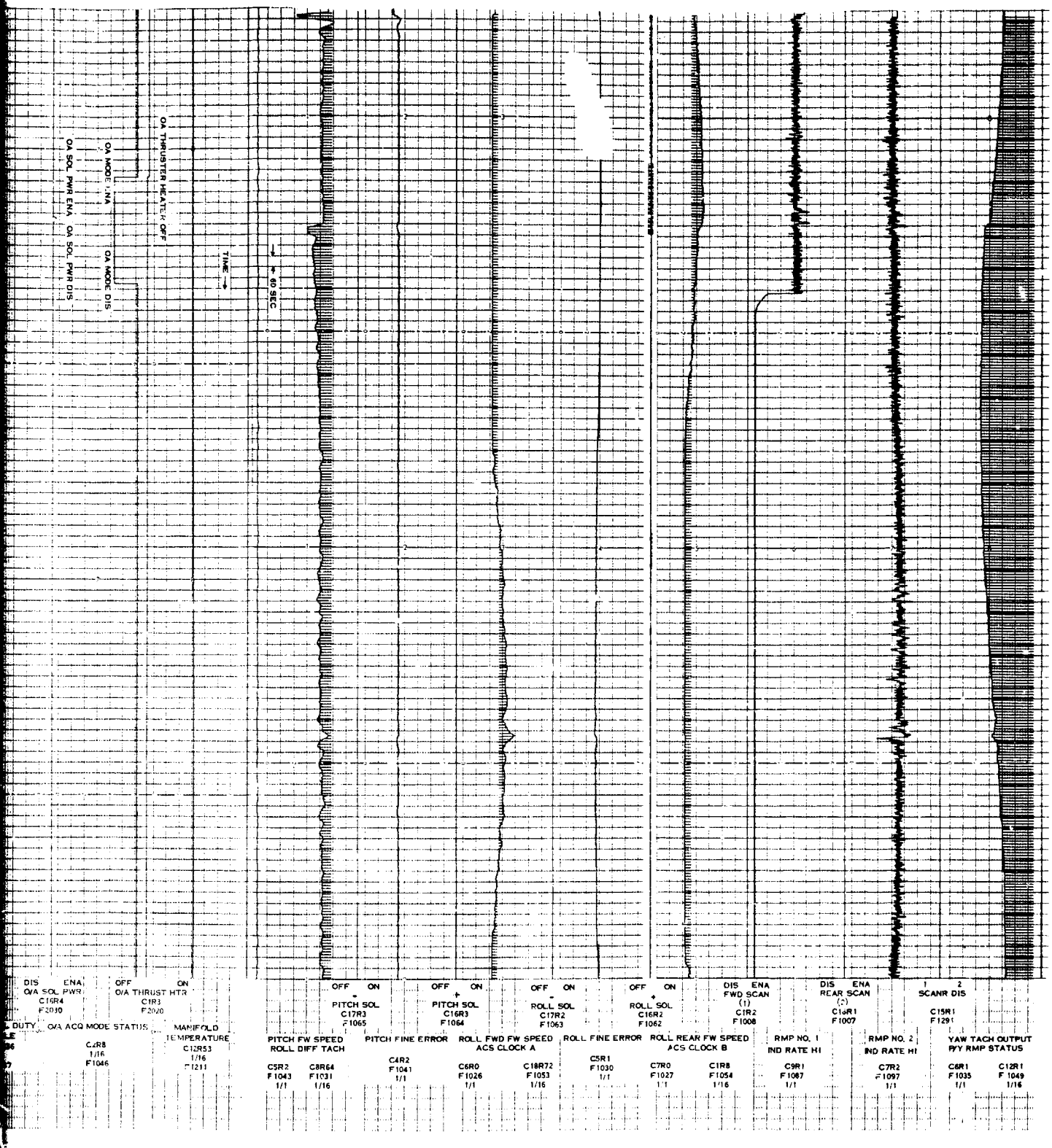

Figure 7-1. Performance Characteristics, Landsat-2 -X Thruster Orbit Adjust, Orbit 1632 (19 May 1975)

FOLDOUT FRAME 2 7-3/7-4

Table 7-1. Landsat-2 Orbit Adjust Summary

Orbit	Orbit Adjust No.	Ignition Epoch	Burn Duration (Seconds)	+Δa (Meters)	Engine Performance Efficiency %	Fuel[1] Used (Lbs)	Tank Pressure (PSIA)	Tank Temperature (° F)	Thruster Axis
32	1	25 Jan 75 00 34 00.8	4.8	39	104.3	0.02	539.96	72.0	-X
71	2	27 Jan 75 19 57 00.8	4.8	-36	90.1	0.02	547.46	73.5	+X
79	3	28 Jan 75 09 49 00.8	420.0	3455	107.0	1.62	547.46	73.5	-X
86	4	28 Jan 75 21 13 00.8	420.0	3233	107.0	1.51	502.46	73.5	-X
163	5	3 Feb 75 10 36 00.8	420.0	-2974	97.0	1.42	458.75	75.0	+X
191	6	5 Feb 75 10 51 00.8	360.0	-2421	97.5	1.15	438.71	75.0	+X
212	7	6 Feb 75 22 31 00.8	308.8	-2009	98.6	0.95	416.21	75.0	+X
880	8	26 Mar 75 21 44 00.8	12.8	82	107.6	0.04	397.47	70.5	-X
1632	9	19 May 75 18 54 00.8	24.0	+154	107.6	0.07	401.21	73.5	-X

[1] Initial Fuel Capacity - 67 lbs.

Table 7-2. Landsat-2 OAS Telemetry Values

Function No.	Name	Units	Orbit						
			50	424	825	1253	1682	2125	2532
2001	Prop. Tank Temp.	°C	23.03	21.39	21.39	21.97	23.05	23.05	23.05
2003	Thrust Chamber No. 1 (-X) Temp.*	°C	24.84	24.92	26.87	30.28	32.22	32.13	30.14
2004	Thrust Chamber No. 2 (+X) Temp.*	°C	37.34	35.29	35.78	37.63	40.13	39.04	38.41
2005	Thrust Chamber No. 3 (-Y) Temp.*	°C	47.22	46.35	41.54	36.23	33.39	33.12	34.20
2006	Line Pressure	psia	545.60	396.57	397.44	399.69	402.87	404.94	404.97

*Widespread of temperature is due to nozzle locations and satellite day/night transitions relative to data averaged. Typical orbital range is from 19 to 59 DGC.

SECTION 8

MAGNETIC MOMENT COMPENSATING ASSEMBLY (MMCA)

The spacecraft was corrected for unbalanced magnetic moments in Orbits 293 and 321 as reported earlier. These adjustments were made on the pitch magnetic rod of the MMCA.

No adjustment to the MMCA dipoles was made during this report period.

Orbital averages of MMCA telemetry functions for selected orbits are given in Table 8-1.

A drift in the telemetry value of the pitch flux density (FCN 4005), reported earlier, came to a stop around Orbit 1700 (24 May 1975) and since, has held steady at the current value of 2.90 TMV.

Table 8-1. Landsat-2 MMCA Telemetry Values

Function	Name	Units	Orbit						
			50	424	825	1253	1682	2125	2532
4001	A1 Board Temp	°C	20.56	19.28	19.41	19.84	20.45	20.23	19.82
4002	A2 Board Temp	°C	*	*	*	*	*	*	*
4003	Hall Current	TMV	3.40	3.40	3.40	3.40	3.40	3.40	3.40
4004	Yaw Flux Density	TMV	3.05	3.06	3.06	3.06	3.07	3.07	3.07
4005	Pitch Flux Density	TMV	3.15	3.02	3.00	2.92	2.90	2.90	2.90
4006	Roll Flux Density	TMV	2.99	2.98	2.97	2.98	2.98	2.98	2.98

*Defective Telemetry Function (Pre-launch)

SECTION 9

UNIFIED S-BAND/PREMODULATION PROCESSER (USB/PMP)

The USB Subsystem has operated nominally in this report period.

Table 9-1 shows telemetry values since launch. All are nominal. Unlike the experience of Landsat-1, the transmitter has maintained a steady power output of about 1.4 watts since launch. Figure 9-1 shows AGC readings of Goldstone for a constant position in space.

Table 9-1. Landsat-2 USB/PMP Telemetry Values

No.	Function Name	Units	T/V (20°C)	15	50	424	825	1253	1479	1972	2462
11001	USB Rcvr AGC	DBM	NA	-112.72	-120.24	-123.27	-131.50	-121.65	-121.7	-124.27	-128.8
11002	USB Xmtr Pwr	WTS	1.40	1.36	1.36	1.41	1.37	1.38	1.42	1.41	1.43
11003	USB Rcvr Error	KHz	NA	-2.15	-4.87	-4.14	-4.28	-4.14	-3.31	-5.98	-4.64
11004	USB Xpndr Temp	DGC	22.93	25.88	29.12	26.26	24.89	24.38	24.66	23.95	24.37
11005	USB Xpndr Press	PSI	16.99	17.08	17.09	17.07	17.06	16.94	16.90	16.82	16.74
11007	USB Xmtr A -15V	VDC	2.35	2.36	**	**	**	**	**	**	**
11008	USB Xmtr B -15V	VDC	2.39	**	2.40	2.37	2.33	2.40	2.40	2.40	2.40
11009	USB Range -15V	VDC	2.07	2.07	2.05	2.05	2.05	2.05	2.07	2.05	2.07
11101	PMP Pwr A Volt	VDC	-15.22	-15.10	**	**	**	**	**	**	**
11102	PMP Pwr B Volt	VDC	-15.07	**	-14.96	14.97	-15.03	-14.98	-14.77	-15.01	-15.02
11103	PMP Temp A	DGC	NA	37.30	32.37	31.37	29.72	28.64	30.12	27.43	29.12
11104	PMP Temp B	DGC	NA	28.34	35.16	32.99	31.07	30.03	34.01	29.64	30.57

**Unit OFF in this period.

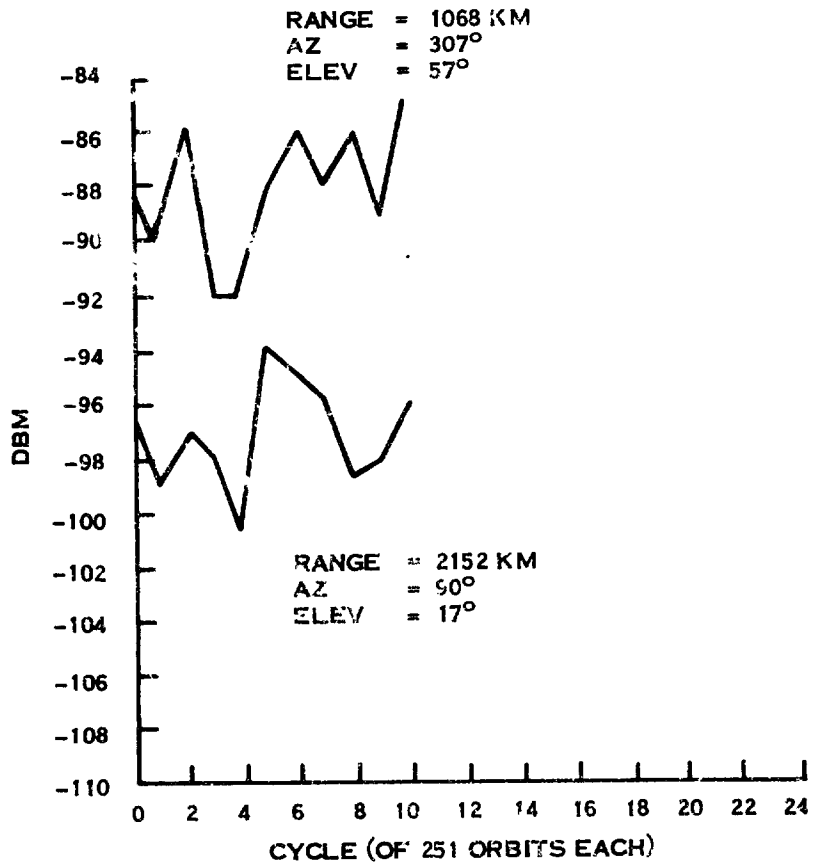

Figure 9-1. USB Link 4 AGC Readings at Goldstone with 30-Foot Antenna, Landsat-2

SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM (EIS)
LANDSAT-2

The Auxiliary Processing Unit (APU) consisting of Search Track Data, Time Code Data, and Back-up Timers operated satisfactorily throughout this report period. Telemetry for the APU is shown in Table 10-1.

The Power Switching Module (PSM) containing the switching relays for power to the OAS, MSS, WBVTR #1 and #2, RBV and PRM, functioned normally. During this report period, the Orbit Adjust power circuit was powered for the duration of the orbit adjust maneuver in Orbit 1632 (19 May 1975). The MSS, as well as WBVTR #1 and #2 power circuits, have been operated on a regular basis.

The Interface Switching Module performed all switchings of the Orbit Adjust Heater and Compensation loads normally during this report period.

Table 10-1. Landsat-2 APU Telemetry Functions

Function	Description	Unit	Orbit							
			21	54	424	825	1253	1682	2125	2532
13200	APU, -24.5 VDC	TMV	*	*	*	*	*	*	*	*
13201	APU, -12 Volts	TMV	2.42	2.44	2.44	2.44	2.44	2.45	2.44	2.45
13202	APU Temp	DGC	27.44	27.70	27.12	26.87	26.65	26.59	26.54	26.60

*Defective Telemetry (Prelaunch)

SECTION 11

THERMAL SUBSYSTEM (THM)

The thermal control subsystem on Landsat-2 has provided excellent temperature control of all spacecraft equipments since launch.

Table 11-1 gives average subsystem telemetry values for several representative orbits during the first six months of operation of Landsat-2. Temperatures during this report period have generally been slightly higher than in the preceding months, in spite of decreasing sun intensity. This is attributed to the increased power dissipation in the spacecraft during the present report period (see S/C Reg. Bus Pwr in Table 3-1). Average temperatures of the sensory ring bays are plotted in Figure 11-1.

The average temperature of the right forward sun sensor on Landsat-2 has ranged between 30 - 35°C during this report period, as opposed to 60 - 65°C for Landsat-1. Other temperatures on Landsat-2 have typically ranged within limits established by Landsat-1 during the three years of its operation.

Compensation load 3 associated with the Wideband Electronics Unit 1 was turned on in Orbit 1367 (30 April 1975). It was again switched in Orbits 1645 (20 May 1975) and 1657 (21 May 1975). All these switchings in this report period were made in connection with the tests conducted on the Wideband Tape Recorder 1.

A history of all compensation load switchings since launch is given in Table 11-2.

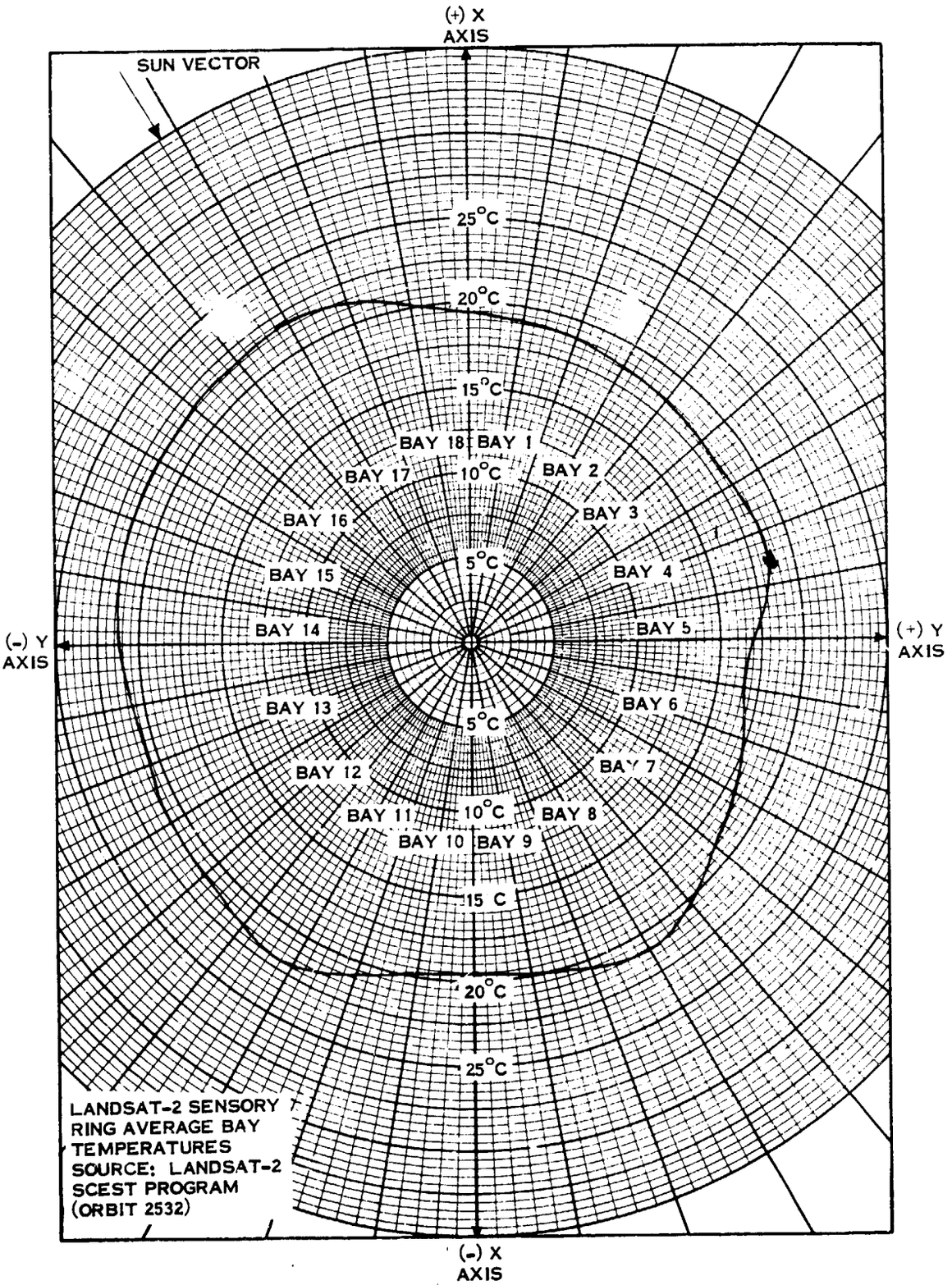

Figure 11-1. Landsat-2 Sensory Ring Thermal Profile

Table 11-1. Landsat-2 Thermal Subsystem Analog Telemetry (Average Value for Frames of Data Received in NBTR Playback)

Function No.	Function / Description	Unit	Orbits						
			21	424	825	1253	1682	2125	2532
7001	THM TH01 STI	DGC	19.40	18.25	17.98	18.71	19.88	19.54	19.59
7002	THM TH02 SBO	DGC	17.18	17.15	16.72	17.48	18.19	18.42	18.05
7003	THM TH03 STI	DGC	18.73	18.10	17.97	18.38	19.58	19.54	19.49
7004	THM TH10 TCB	DGC	19.38	19.13	19.09	19.08	19.15	19.12	19.01
7005	THM TH04 STI	DGC	17.19	16.98	16.38	17.06	17.99	18.17	17.92
7006	THM TH05 SBO	DGC	17.42	16.90	16.62	17.13	17.78	17.79	17.46
7007	OA -X Thruster	DGC	19.66	19.21	19.74	20.52	21.04	21.03	20.58
7008	THM TH06-STO	DGC	14.78	13.93	13.92	14.50	15.16	15.13	14.77
7009	THM TH06 SBI	DGC	19.18	18.24	18.34	18.82	19.63	19.57	19.18
7010	THM TH07 STI	DGC	18.08	17.11	17.33	18.00	18.69	18.57	18.26
7011	THM TH08 STO	DGC	19.34	18.74	19.28	20.07	20.69	20.61	20 22
7012	THM TH09 SBI	DGC	21.44	20.91	21.22	21.75	22.13	22.14	21.80
7013	THM TH10 SBO	DGC	18.58	18.23	18.37	18.58	18.79	18.88	18.56
7014	THM TH11 STI	DGC	21.65	21.30	21.18	21.11	21.23	21.19	21.13
7015	THM TH12 SBO	DGC	23.93	23.69	22.98	22.38	22.02	22.06	22.13
7016	THM TH13 STI	DGC	22.21	21.98	21.04	20.49	20.44	20.34	20.51
7017	RBV Beam Ctr Ln	DGC	20.38	19.88	20.04	20.32	20.54	20.52	20.33
7018	THM TH14 STO	DGC	24.12	23.59	22.31	21.34	21.06	20.93	21.29
7019	NBR Rad Outbd B4	DGC	2.72	2.08	2.33	3.05	3.78	3.49	3.26
7020	THM TH15 SBI	DGC	23.07	22.72	21.36	20.96	21.08	20.77	21.13
7021	THM TH16 STI	DGC	23.26	22.70	21.88	21.92	22.59	21.93	22.29
7022	THM TH17 SBI	DGC	21.77	21.36	20.57	20.72	21.28	21.02	21.42
7023	THM TH18 SBO	DGC	21.67	21.57	20.88	21.06	21.55	21.44	21.49
7030	THM TH03 Bar	DGC	15.56	15.37	14.83	15.48	16.31	16.52	16.28
7033	THM TH12 Bar	DGC	23.06	23.42	22.44	21.71	21.42	21.66	21.70
7035	THM TH18 Bar	DGC	19.53	18.52	18.18	18.73	19.69	19.17	19.32
7040	THM TH01 TCB	DGC	19.42	18.84	18.52	19.08	19.91	20.12	19.78
7041	THM TH02 TCB	DGC	17.55	16.80	16.61	17.33	18.24	18.23	18.02
7042	THM TH03 TCB	DGC	16.98	17.52	16.12	16.83	17.77	18.39	18.23
7043	THM TH04 TCB	DGC	19.90	19.45	19.11	19.69	20.39	20.40	20.05
7044	THM TH05 TCB	DGC	16 42	15.64	15.59	16.08	16.67	16.60	16.21
7045	THM TH07 TCB	DGC	17.76	16.97	17.33	17.96	18.58	18.55	18.12
7046	THM TH09 TCB	DGC	19.30	18.82	18.92	19.24	19.49	19.62	19.31
7048	THM TH11 TCB	DGC	23.17	23.03	22.79	22.50	22.47	22.44	22.45
7049	THM TH12 TCB	DGC	23.36	22.65	21.46	20.62	20.29	20.50	20.62
7050	THM TH13 TCB	DGC	22.89	22.73	21.37	20.45	20.15	20.10	20.34
7051	THM TH14 TCB	DGC	25.07	24.67	22.94	22.09	21.93	21.80	22.11
7052	THM TH16 TCB	DGC	22.22	22.12	20.72	20.83	21.59	21.41	21.59
7053	THM TH17 TCB	DGC	23.52	22.84	22.13	22.32	22.89	22.67	22.79
7054	THM TH18 TCB	DGC	20.01	15.52	19.03	19.46	20.08	20.04	20.05
7060	THM Shutter By 1	DEG	22.54	16.70	13.36	18.26	26.41	28.44	24.43
7061	THM Shutter By 2	DEG	19.34	12.27	14.29	19.00	30.87	26.69	24.75
7062	THM Shutter By 3	DEG	22.75	25.87	11.43	19.46	30.49	32.48	31.67
7063	THM Shutter By 4	DEG	33.99	30.04	32.37	35.12	40.06	37.87	36.32
7064	THM Shutter By 5	DEG	7.50	3.44	3.46	6.35	9.81	9.54	8.67
7065	THM Shutter By 7	DEG	17.06	10.30	12.95	19.77	25.23	25.09	22.52
7067	THM Shutter By 9	DEG	33.75	34.80	34.11	35.25	37.50	38.23	38.22
7068	THM Shutter by 10	DEG	37.46	35.85	3.71	35.65	35.77	35.58	34.96
7069	THM Shutter by 11	DEG	52.25	23.64	16	17.10	14.43	10.85	10.16
7070	THM Shutter by 12	DEG	61.38	58.87	.99	46.16	44.71	45.54	46.30
7071	THM Shutter by 13	DEG	63.60	63.16	54.58	47.54	45.51	44.58	45.76
7072	THM Shutter by 14	DEG	59.44	57.07	46.12	40.54	39.18	38.22	40.40
7073	THM Shutter by 15	DEG	67.79	66.98	56.73	52.64	52.32	50.66	53.78
7074	THM Shutter by 16	DEG	45.20	46.02	36.32	37.85	44.15	42.35	43.68
7075	THM Shutter by 17	DEG	57.88	53.10	48.53	49.22	52.65	50.70	52.10
7076	THM Shutter by 18	DEG	40.49	37.44	34.37	36.36	39.59	39.02	39.32
7080	THM Q1 T Zener V	VDC	4.85	4.85	4.85	4.85	4.86	4.86	4.85
7081	THM Q2 T Zener V	VDC	4.90	4.90	4.90	4.90	4.90	4.90	4.90
7082	THM Q3 T Zener V	VDC	5.05	5.03	5.03	5.03	5.04	5.04	5.04
7083	THM Q1 S Zener V	VDC	4.97	4.96	4.95	4.96	4.97	4.97	4.96
7084	THM Q2 S Zener V	VDC	4.98	4.98	4.98	4.98	4.98	4.98	4.98
7085	THM Q3 S Zener V	VDC	5.15	5.15	5.15	5.15	5.15	5.15	5.15
7090	THM PSM Mount	DGC	21.02	20.18	20.19	20.76	21.34	21.01	21.05
7091	THM Ind Attitude	DGC	17.79	16.76	17.17	17.73	18.37	18.36	17.86
7092	THM RBV Radiator	DGC	18.01	17.72	17.90	18.07	18.22	18.13	18.06
7093	THM RBVC Ctr Bm	DGC	20.74	20.17	20.48	20.82	21.06	20.99	20.82
7094	THM WBVTR Root	DGC	13.77	13.15	13.43	14.24	15.20	14.55	14.71
7095	THM WBVTR Rad C:	DGC	3.64	3.21	3.74	4.52	5.36	4.86	4.99
7096	THM WBVTR Strap	DGC	15.90	15.31	15.43	16.24	17.21	16.75	16.95
7097	THM WB Mt Bay 1	DGC	22.91	14.78	14.75	16.90	23.33	21.35	22.60
7098	THM WB Mat Bay 1	DGC	22.07	14.69	13.98	16.61	21.44	18.01	19.25
7099	THM WBVTR Sep 3	DGC	18.03	17.41	17.01	17.81	18.89	18.83	18.76
7100	THM WBVTR Sep 17	DGC	21.83	21.08	20.44	20.87	21.68	21.25	21.55
7101	THM WBVTR 1 Cent	DGC	22.45	21.56	21.43	22.20	23.24	22.89	23.13
7102	THM WBVTR 2 Bay	DGC	17.34	16.63	16.52	17.27	18.20	17.89	17.69
7103	THM WBVTR 2 BY 15	DGC	21.77	21.26	20.32	20.72	21.52	20.57	20.99
7104	THM WBVTR 2 Ctr	DGC	20.74	19.91	19.65	20.65	21.99	20.77	21.08
7105	THM NBTR B Sep 6	DGC	17.82	16.91	17.12	17.73	18.56	18.34	17.96
7106	THM NBTR B Sep 1	DGC	22.11	21.64	20.73	20.64	21.01	20.39	20.70
7107	THM NBTR Bm Ctr	DGC	20.32	19.58	19.55	20.30	21.08	20.30	20.44
7108	THM MSS Mount 14	DGC	20.59	20.07	19.44	19.33	19.63	19.21	19.40
7109	THM OA -Y Thruster	DGC	25.64	25.17	23.42	22.25	21.87	21.51	21.99
7110	THM MSS WBVTR Bm	DGC	16.75	15.85	16.27	17.15	18.13	17.50	17.54
7111	THM OA +X Thruster	DGC	20.33	15.83	15.71	17.55	20.98	19.02	19.72
7130	THM Aux P1 T	DGC	34.18	22.47	37.68	31.52	10.41	8.83	6.21
7131	THM Aux P2 T	DGC	2.90	0.48	2.96	0.84	-2.08	0.28	2.22

Table 11-2. Landsat-2 Compensation Load History

Orbits	Compensation Load Status*							
	1	2	3	4	5	6	7	8
Launch	0	0	0	0	0	0	0	0
2	X	X	X	X	X	0	X	X
237	X	X	X	X	X	0	0	0
272	X	X	X	X	X	0	X	X
306	X	X	0	X	X	0	0	0
572	X	X	0	X	X	0	0	X
1367	X	X	X	X	X	0	0	X
1645	X	X	0	X	X	0	0	X
1657	X	X	X	X	X	0	0	X

*Note
X = ON
0 = OFF

SECTION 12

NARROWBAND TAPE RECORDERS (NBR)

The Narrowband Recorder Subsystem operated satisfactorily throughout the entire period, both Recorders alternating in Record and Playback modes with a nominal one minute overlap.

Since launch, each Recorder has operated for a period of 2269 hours.

Table 12-1 identifies cumulative operating hours for both Recorders by mode, and Table 12-2 gives typical telemetry values.

Table 12-1. NBR Operating Hours by Modes

NBR	On	Off	Playback	Record
A	2269	2075	91	2178
B	2269	2075	91	2178

Table 12-2. Narrowband Tape Recorder Telemetry Values, Landsat-2

Function		Typical Telemetry Values - Orbits		
No.	Name	36/37	437/719	2111/2112
10001	A - Motor Cur. (ma)			
	Record	132.0	140.5	133.3
	P/B	108.0	107.8	95.2
10101	B - Motor Cur. (ma)			
	Record	148.5	146.33	141.7
	P/B	143.6	141.71	138.7
1002	A - Pwr Sup. Cur. (ma)			
	Record	170.5	172.4	167.5
	P/B	410.0	409.2	399.3
10102	B - Pwr Sup. Cur. (ma)			
	Record	260.0	259.8	261.3
	P/B	481.0	479.7	479.7
10003	A - Rec. Temp (DGC)	26.1	25.0	26.1
10103	B - Rec. Temp. (DGC)	27.0	25.4	27.0
10004	A - Supply (VDC)	-24.87	-25.10	-25.1
10104	B - Supply (VDC)	-24.55	-24.68	-24.6

SECTION 13

WIDEBAND TELEMETRY SUBSYSTEM (WBTS)
LANDSAT 2

The WBTS has operated nominally in this report period.

Table 13-1 shows typical telemetry values. All are nominal.

Figure 13-1 is the AGC history recorded at Goldstone with the spacecraft successively at the same points in space. WBPA-2 has been used more consistantly and is presented in this Figure. Values from WBPA-1 are nearly identical when this power amplifier is used.

Table 13-1. Wideband Telemetry Subsystem

(1)	Name	T/V (2)		Orbits				
		10W	20W	424	753	1479	1972	2462
12001	Temp, TWT Coll. (DGC)	30.1	33.6	OFF	35.00	35.63	31.25	35.00
12101		27.9	31.2	31.43	29.38	35.71	32.81	37.14
12002	Cur, Helix (MA)	3.30	3.85	OFF	4.37	4.30	4.49	4.51
12102		4.03	4.56	4.53	4.56	4.43	4.45	4.48
12003	Cur, TWT Cath. (MA)	33.20	46.10	OFF	44.07	43.60	42.50	45.12
12103		34.09	46.78	45.37	46.30	45.26	45.51	45.24
12004	Fwd Power (DBM) (3)	40.61	42.38	OFF	42.51	42.60	42.37	42.77
12104		40.93	43.71	43.65	43.68	43.66	43.61	43.69
12005	Refl Power (DBM) (3)	22.34	27.0	OFF	25.57	25.61	25.58	26.10
12105		34.55	36.45	36.36	37.37	37.15	37.20	37.14
12227	Con. Volt, Loop Stress (MHz)(4)	1.54		OFF	1.66	1.42	1.76	1.12
12228		2.53		0.32	0.47	0.24	0.49	-0.01
12229	Temp. Mod (DGC)	19.5		17.16	17.25	19.93	17.06	20.88
12232	+15 VDC Pwr	2.65		2.65	2.60	2.65	2.65	2.65
12234	-15 VDC Pwr Sup (TMV) (5)	4.07		4.08	4.02	4.01	4.03	3.94
12236	+5 VDC Pwr Sup (TMV) (5)	3.55		3.50	3.50	3.53	3.47	3.54
12238	-5 VDC Pwr Sup (TMV) (5)	4.08		4.07	4.02	4.03	3.95	4.01
12240	-24 VDC Unreg. Pwr (TMV) (5)	5.86		5.90	5.89	5.80	5.97	5.66
12242	Temp, Inv. (DGC)	23.7		21.68	21.93	23.21	22.35	23.79

NOTES:

(1) Function numbers for WPA-1=120XX; for WPA-2=121XX

(2) Thermo-Vacuum Test data for comparison

(3) Pwr outputs of 10 or 20 watts can be selected

(4) Any reading other than zero or -7.5 is acceptable

(5) Only power supply A operated during these orbits

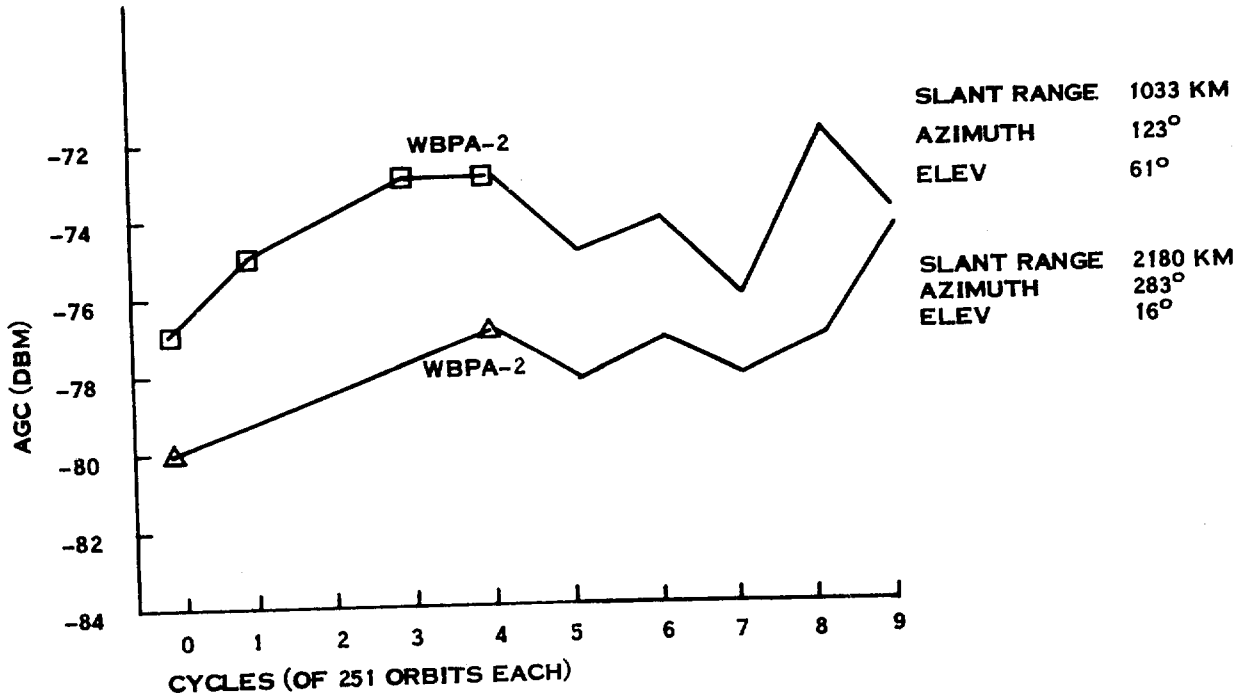

Figure 13-1. Landsat-2 AGC Readings Goldstone 30-Foot Antenna WBPA 2 - Link 3

SECTION 14

ATTITUDE MEASUREMENT SENSOR (AMS)

The AMS is a passive radiometric balance sensor which operates in the 14-16 micron IR band. AMS Telemetry Values are shown in Table 14-1.

The AMS was launched in the OFF mode (CMD 774), turned ON during Oribt 6, and has been performing normally since then.

Table 14-1. Landsat-2 AMS Temperature Telemetry

Function		Units	50	424	825	1253	1682	2125	2532
3004	Case - Temp 1	DGC	19.00	17.90	18.48	19.05	19.50	19.49	19.02
3005	Assembly-Temp 2	DGC	18.70	17.47	18.08	18.69	18.93	19.00	18.71

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

In Orbit 1021 (5 April 1975) of the previous reporting period, WBVTR-1 failed to execute a commanded rewind operation and was turned off pending further study.

On 30 April and 1 May 1975, rewind tests were performed in Orbits 1367 and 1379, and WBVTR-1 responded satisfactorily to all commands, showing no anomalous behavior. Additional confirming rewind tests were successfully executed in Orbits 1477 - 1478 (8 May 1975), and WBVTR-1 was put back into operational service in Orbit 1490 (9 May 1975).

In Orbit 1532 (12 May 1975) WBVTR-1 again failed to execute a rewind command. Test rewinds were all successfully executed in Orbit 1535 and WBVTR-1 was restored to service in Orbit 1539 (13 May 1975).

On 15 May 1975, in Orbit 1568, a third occurence of WBVTR-1 rewind failure took place. However, after this failure, repeated rewind attempts involving 64 transmitted rewind commands in various test sequences over the period 15 May - 21 May, 1975 all met with failure.

On 21 May 1975 a test designed specially to circumvent suspect functional aspects of the WBVTR-1 relay control logic was successfully performed, restoring WBVTR-1 to normal operation in Orbit 1659.

Operation of WBVTR-1 was now restricted to tape footages between 300-1000 feet, but was extended in controlled increments until tape usage to 1700 feet was permitted on 10 July 1975 (Orbit 2347).

In Orbit 2237 (2 July 1975) an isolated incident occurred in which WBVTR-1 dropped out of rewind prematurely. This incident has not been repeated.

At the end of this reporting period, WBVTR-1 has successfully executed 278 commanded rewinds since the failure in Orbit 1568 and the operation appears normal.

A summary of WBVTR-1 operational history, extracted from PIR-U-1N23-ERTS-156 (21 August 1975) prepared by K. S. Rizk, is presented in Table 15-1.

For further details of the WBVTR-1 rewind anomalies see Appendix C, references 1, 3-7, 9, 17 and 18.

WBVTR-2 has exhibited two brief anomalistic episodes, but otherwise has operated normally throughout the reporting period, and has been called upon to provide the entire spacecraft video record and playback requirements during the "down" periods of WBVTR-1.

During Orbit 1919 (9 June 1975), after responding normally to a rewind command, WBVTR-2 dropped out of rewind mode after a movement of 8 feet. All commands since the Orbit 1919 dropout have executed normally, as did all commands prior to the dropout. Study to date has not identified the cause of the anomaly.

For further details of the WBVTR-2 anomalies, see Appendix C, References 11 and 14. WBVTR-1 has operated for a cumulative on-time of 122.1 hours. Of this time, the video head was in contact with the moving tape for 96.5 hours.

WBVTR-2 has operated for a cumulative on-time of 213.8 hours. Video head-to-tape contact time is 168.9 hours.

Table 15-1. WBVTR-1 Operational History

1975 Date	Orbit	Events	Action Taken	Results	Footage
Jan 22 to Apr 5	0-1020	Normal	-	-	0-1830
Apr 5	1021	Fail to R/W	- 4 R/W Trys	- All Failed	1331 1534
Apr 30	1367	R/W Try	4 Succ. CMDS	Normal	1602.5 to 1022
May 1	1379	R/W Try	5° Higher Temp.	Normal	1022 to 445
May 8	1476	Pre-Opn. Test	FF & P/B	Normal	445 to 977
	1477	Pre-Opn. Test	R/W & P/B	Normal	977 to 961 to 1347
	1478	Pre-Opn. Test	R/W Rec. & R/W	Normal	1347 to 407 to 527 to 307
May 8-12	1478-1531	Operational with restrictions	6 Successful R/W CMDS	-	300 to 1530
May 12	1532 1535	Fail to R/W R/W Try	Opns Suspnd Operational	- Normal	1492.5 300 - 1530
May 15	1566 1574	Fail to R/W Fail to R/W	Opns Suspnd -	2 Attempts Fail 6 Attempts Fail	1466 1490.5
May 15-21	1575 to 1656	60 R/W Attempts	-	All Fail	1490.5
May 21	1657 1659 1660	6 R/W Attempts R/W Attempts Special R/W Test R/W Attempt R/W Attempt	- - - - Operational	All Fail Fail Normal Normal Normal	1598.5 1598.5 1598.5 to 650 650 to 575 575 to 312
May 21 to July 2	1660 to 2236	Operational	-	Normal	300 to 1700
July 2	2237	Abort R/W	-	-	165.5
July 2 to July 22	2238 to 2527	Operational	-	Normal	300 to 1700

Table 15-2 gives typical telemetry for WBVTR-1 and WBVTR-2. Tables 15-3 and 15-4 show the telemetry values for Record, Playback, Rewind, and Standby operational modes.

Figures 15-1 and 15-2 show tape usage for both recorders.

Table 15-2. WBVTR Telemetry Values

WBVTR-1 Functions		Telemetry Value in Orbits						
Number	Name	45/46	493	815	996	1665	2097	2473
13022	Pressure Trans.	16.52	16.51	16.51	16.51	16.51	16.50	16.50
13023	Temp. Trans.	20.74	19.80	20.56	20.05	19.09	20.02	19.65
13024	Temp. Elec.	25.00	17.50	19.23	18.59	21.33	22.45	21.47
13032	Limiter Voltage	1.48	1.49	1.50	1.49	1.49	1.50	1.49
13034	+5.6 VDC Conv.	5.70	5.54	5.53	5.48	5.42	5.54	5.58
13201	-12 VDC APU	2.44	2.45	2.44	2.45	2.44	2.45	2.45
13202	Temp. APU	29.06	27.11	26.83	26.76	26.44	26.57	26.52

WBVTR-2 Functions		Telemetry Values in Orbits						
Number	Name	45/46	455	815	966	1665	2097	2473
13122	Pressure Trans.	16.12	16.14	16.12	16.12	15.86	15.87	15.82
13123	Temp. Trans.	21.50	20.75	18.40	18.48	20.88	20.49	19.73
13124	Temp. Elec.	23.50	17.61	14.08	14.49	19.43	19.02	18.10
13132	Limiter Voltage	1.30	1.30	NA	NA	1.28	1.30	1.27
13134	+5.6 VDC Conv.	5.71	5.62	5.85	6.32	5.66	5.67	5.74
13201	-12 VDC APU	2.44	2.44	2.44	2.45	2.44	2.45	2.45
13202	Temp. APU	29.06	27.25	26.83	26.76	26.44	26.57	26.52

NA - Data not available

Table 15-3. Landsat-2 WBVTR-1 Telemetry Function Values by Mode

WBVTR-1 Function/Description		Orbit T/V	Orbit 718	Orbit 1734
13029 -	Input P/B Voltage			
	Record	0.0	0.0	0.0
	Playback	0.33	0.30	0.32
	Rewind	0.0	0.0	0.0
	Standby	0.0	0.0	0.0
13028 -	Capstan Motor Current			
	Record	0.32	0.27	0.36
	Playback	0.29	0.30	0.30
	Rewind	0.23	0.21	0.27
	Standby	0.0	0.0	0.0
13030 -	Headwheel Motor Current			
	Record	0.50	0.51	0.50
	Playback	0.495	0.49	0.49
	Rewind	0.41	0.44	0.44
	Standby	0.41	0.44	0.43
13031 -	Recorder Input Current			
	Record	3.58	3.61	3.62
	Playback	3.92	3.86	3.93
	Rewind	2.18	2.16	2.30
	Standby	1.79	1.90	1.80
13033 -	Servo Voltage			
	Record	0.0	0.0	0.0
	Playback	49.99	50.04	50.37
	Rewind	0.0	0.0	0.0
	Standby	0.0	0.0	0.0
13026 -	Capstan Motor Speed			
	Record	89.77	88.03	88.03
	Playback	89.37	87.45	86.29
	Rewind	100.12	99.06	97.32
	Standby	0.0	0.0	0.0
13027 -	Headwheel Motor Speed			
	Record	97.5	96.18	95.07
	Playback	96.96	96.07	94.52
	Rewind	98.96	97.28	96.62
	Standby	99.12	97.28	93.96

Table 15-4. Landsat-2 WBVTR-2 Telemetry Function Values by Mode

WBVTR-2 Function/Description		Orbit T/V	Orbit 437	Orbit 1734
13129 -	Input P/B Voltage			
	Record	0.0	0.0	0.0
	Playback	0.37	0.36	0.34
	Rewind	0.0	0.0	0.0
	Standby	0.0	0.0	0.0
13128 -	Capstan Motor Current			
	Record	0.33	0.33	0.32
	Playback	0.34	0.35	0.35
	Rewind	0.16	0.20	0.19
	Standby	0.0	0.0	0.0
13130 -	Headwheel Motor Curren.			
	Record	0.47	0.47	0.47
	Playback	0.46	0.46	0.47
	Rewind	0.43	0.42	0.43
	Standby	0.45	0.42	0.43
13131 -	Recorder Input Current			
	Record	2.88	2.90	2.90
	Playback	3.11	3.02	3.08
	Rewind	1.79	1.79	1.80
	Standby	1.18	1.58	1.60
13133 -	Servo Voltage			
	Record	0.0	0.0	0.0
	Playback	48.92	49.04	49.33
	Rewind	0.0	0.0	0.0
	Standby	0.0	0.0	0.0
13126 -	Capstan Motor Speed			
	Record	108.66	106.70	106.02
	Playback	108.38	106.70	106.02
	Rewind	130.04	117.68	117.0
	Standby	0.0	0.0	0.0
13127 -	Headwheel Motor Speed			
	Record	98.41	96.52	96.00
	Playback	98.11	96.00	95.48
	Rewind	99.96	97.04	96.00
	Standby	101.72	97.04	96.52

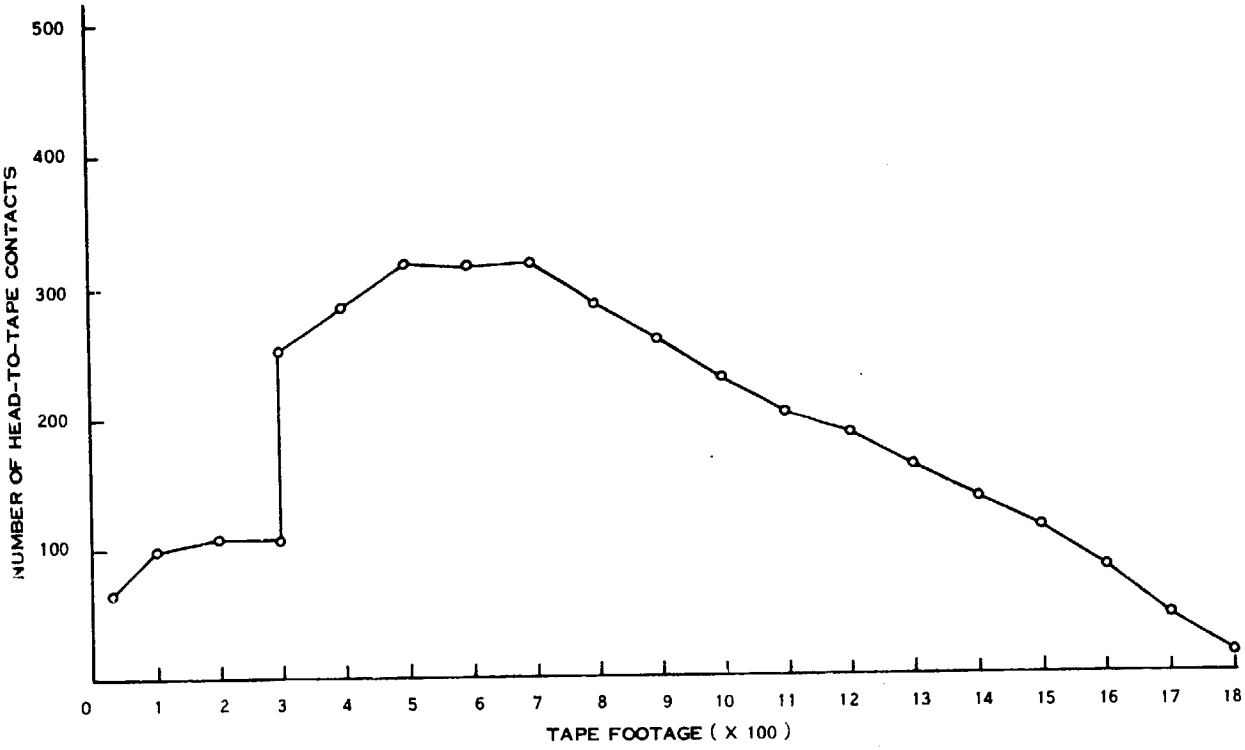

Figure 15-1. Landsat-2 WBR-1 Tape Usage thru Orbit 2531

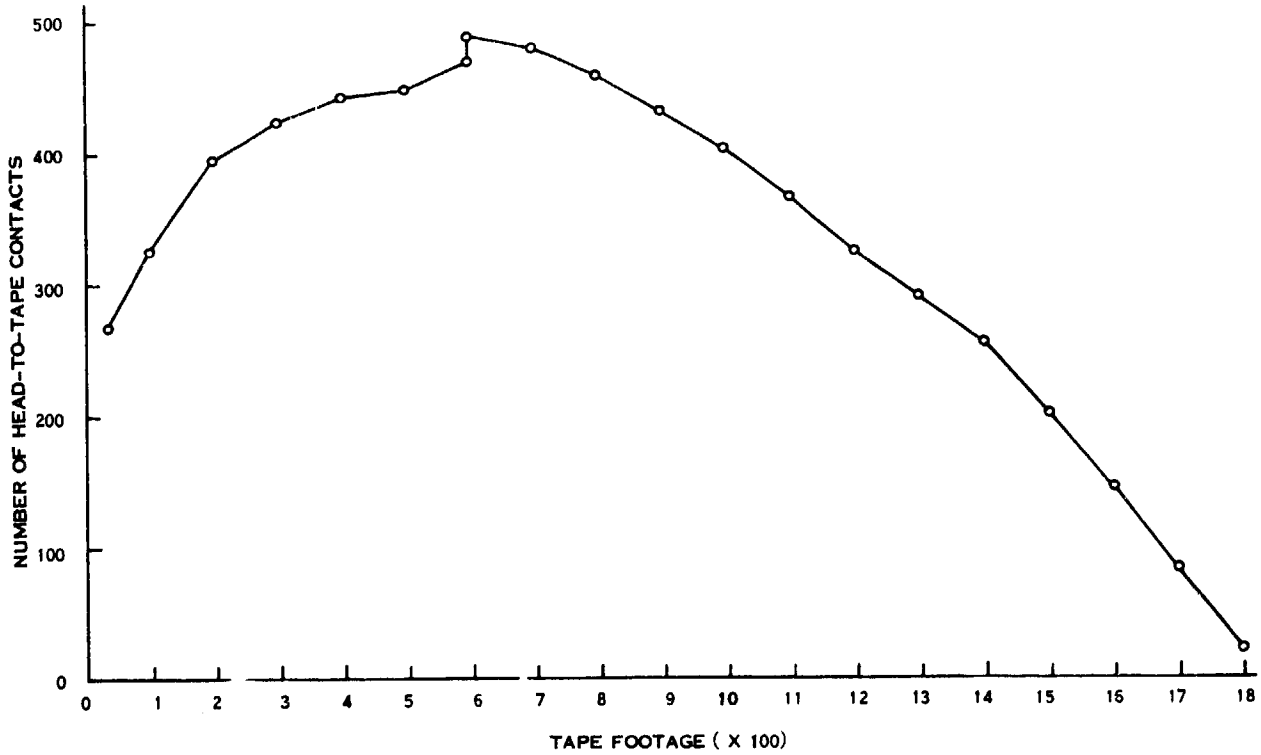

Figure 15-2. Landsat-2 WBR-2 Tape Usage thru Orbit 2530

SECTION 16

RETURN BEAM VIDICON (RBV)

Periodic tests of the RBV Subsystem will be performed to assure that it can contribute useful data if returned to service. The program currently adopted will, on a quarterly basis: activate all components frequently enough to avoid deterioration; verify continued capability to execute all commands; provide activities to exercise, check, and maintain ground station equipment in readiness.

The first periodic test was successfully performed on 11 July 1975, during Orbits 2367-2372. The RBV was turned ON and exercised in all of its operating modes; MSS data was concurrently transmitted for video comparison purpose.

RBV telemetry data was observed in real-time, quick-look pictures were made, and the RBV video data was observed in real-time on the A-Scope and was recorded on the TR-70 tape recorder.

Throughout the test, all RBV modes and all Spacecraft subsystems functioned normally. No unexpected gating was experienced.

Table 16-1 shows telemetry values for Orbit 2371, in addition to data for earlier operational Orbits.

Tables 16-2, 16-3, and 16-4 give telemetry values for Prepare, Hold, and Read modes of the three RBV cameras.

Figures 16-1, 16-2, and 16-3 are representative imagery of a single scene in the three RBV spectral bands as transmitted by the RBV Subsystem. The scene shown was taken over Anchorage, Alaska, visible in the southwest quadrant of the picture.

Table 16-1. RBV Telemetry Value

Function		Orbits					
No.	Name	T/V Value	41	54	151	209	2371
14001	CCC Board Temp. (DgC)	N/A	19.939	19.65	19.72	20.58	20.27
14002	CCC Pwr. Sup. Temp (DgC)	N/A	21.047	20.52	20.65	21.90	21.46
14003	15 VDC Sup. (TMV)	N/A	3.950	3.92	3.75	3.89	3.92
14004	+6V, -5.25 VDC Sup. (TMV)	N/A	3.075	2.92	2.92	3.00	3.07
14100	VID Output V (TMV)	0.98	NA	NA	NA	NA	0.70
14200 *		0.93	NA	1.05	1.16	1.30	1.23
14300		1.06	NA	1.03	1.10	1.24	1.27
14102	Comb. Align Cur. (TMV)	3.75-4.02	3.950	3.85	3.85	3.86	3.81
14202 *		3.87-4.10	3.875	3.91	3.91	3.92	3.92
14302		3.80-4.05	3.850	3.90	3.72	3.85	3.80
14103	Elec Temp. (DgC)	N/A	24.363	24.24	24.10	26.08	24.49
14203 *		N/A	20.387	19.84	19.97	22.16	22.40
14303		N/A	25.383	25.05	25.35	28.20	24.15
14104	LV Pwr Sup T. (DgC)	N/A	23.363	23.44	23.55	25.68	24.13
14204 *		N/A	18.834	18.14	18.29	20.61	20.87
14304		N/A	26.023	25.36	25.66	28.28	24.12
14105	Defl. Pwr. Sup. +10 VDC (TMV)	3.92-4.07	3.950	4.00	3.82	3.95	3.94
14205 *		3.95-4.10	3.950	3.97	3.80	3.93	3.92
14305		3.95-4.07	4.000	4.00	4.00	4.00	3.95
14106	L.V.P.S. +6V, -6.3 VDC (TMV)	3.65-3.80	3.700	3.67	3.52	3.64	3.59
14206 *		3.67-3.80	3.650	3.65	3.49	3.61	3.61
14306		3.65-3.77	3.725	3.70	3.70	3.71	3.66
14107	Ther. Elec. Cur. (TMV)	2.53	2.650	2.61	2.49	2.54	2.54
14207 *		2.43	2.500	2.49	2.37	2.42	2.44
14307		2.52	2.575	2.57	2.46	2.49	2.52
14108	Vid. Fil. Cur. (TMV)	1.80-3.50	2.550	2.43	2.44	2.49	2.48
14208 *		2.55-2.75	2.400	2.40	2.30	2.37	2.34
14308		2.50-2.80	2.575	2.58	2.46	2.54	2.54
14110	Vid. Tgt. Volt (TMV)	2.95-3.20	3.025	2.98	2.98	2.98	2.95
14210 *		3.15-3.45	3.050	2.86	2.86	2.93	2.93
14310		2.55-2.80	3.225	2.62	2.51	2.60	2.56
14113	Vert Def V (TMV)	2.86	4.050	2.92	2.87	2.84	2.79
14213 *		3.09	4.275	3.15	3.12	3.08	2.99
14313		3.91	4.275	3.59	3.45	3.51	3.48
14114	Vid FPT (DgC)	21.99	21.997	19.87	20.18	21.18	20.67
14214 *		21.00	21.059	20.55	20.64	21.56	21.14
14314		22.66	22.398	20.65	20.85	21.89	21.12
14115	Foc Coil T (DgC)	24.17	20.940	21.04	21.47	23.23	22.41
14215 *		23.82	20.387	20.67	21.00	22.83	22.22
14315		24.47	21.940	22.25	22.66	24.53	23.08

* 141XX refers to Camera 1
142XX refers to Camera 2
143XX refers to Camera 3
NA - Data not Available

Table 16-2. Camera #1 (Blue) Telemetry (Values in TMV)

Function No.	Function Name	Mode	Telemetry Values				
			T/V Value	Orbit 054	Orbit 151	Orbit 209	Orbit 2371
14101	Focus I	Hold	0.66	0.65	0.65	0.67	0.70
		Prep	1.71	1.68	1.68	1.74	1.75
		Read	2.83	2.80	2.85	2.85	2.90
14109	Grid V	Prep	0.79	0.80	0.75	0.75	0.80
		Read	2.43	2.42	2.43	2.42	2.44
		Hold	4.00	3.95	3.95	3.95	4.00
14111	Cath I	Hold	0.38	0.38	0.38	0.38	0.40
		Read	0.84	0.83	0.83	0.83	0.85
		Prep	3.03	3.05	3.00	3.04	3.10
14112	Hor Def	Hold	0.01	0.00	0.00	0.00	0.00
		Prep	1.79	1.75	1.75	1.75	1.80
		Read	3.23	3.25	3.25	3.25	3.30
14120	+500 V	Prep	0.92	0.85	0.85	0.88	0.90
		Read	4.05	4.05	4.05	4.05	4.10

Table 16-3. Camera #2 (Yellow) Telemetry (Values in TMV)

Function No.	Function Name	Mode	Telemetry Values				
			T/V Value	Orbit 054	Orbit 151	Orbit 209	Orbit 2371
14201	Focus I	Hold	0.58	0.54	0.49	0.54	0.60
		Prep	1.60	1.56	1.57	1.54	1.60
		Read	2.71	2.65	2.65	2.65	2.70
14209	Grid V	Prep	0.83	0.75	0.82	0.81	0.85
		Read	2.25	2.25	2.25	2.25	2.30
		Hold	4.13	4.05	4.05	4.09	4.10
14211	Cath I	Hold	0.37	0.37	0.33	0.34	0.35
		Read	0.95	0.95	0.95	0.95	1.00
		Prep	3.05	3.05	3.05	3.05	3.10
14212	Hor Def	Hold	0.01	0.00	0.00	0.00	0.00
		Prep	1.87	1.85	1.88	1.85	1.90
		Read	3.32	3.25	3.25	3.25	3.30
14220	+500 V	Prep	1.14	1.15	1.15	1.15	1.20
		Read	4.29	4.25	4.25	4.25	4.30

Table 16-4. Camera #3 (Red) Telemetry (Values in TMV)

Function No.	Function Name	Mode	Telemetry Values				
			T/V Value	Orbit 054	Orbit 151	Orbit 209	Orbit 2371
		Hold	0.68	0.65	0.65	0.71	0.70
14301	Focus I	Prep	1.80	1.79	1.85	1.84	1.83
		Read	2.89	2.85	2.85	2.92	2.90
		Prep	0.77	0.75	0.75	0.75	0.80
14309	Grid V	Read	2.64	2.65	2.65	2.65	2.70
		Hold	4.13	4.08	4.10	4.13	4.18
		Hold	0.40	0.39	0.39	0.39	0.40
14311	Cath I	Read	0.56	0.54	0.54	0.54	0.55
		Prep	3.23	3.25	3.25	3.25	3.30
		Hold	0.01	0.00	0.00	0.00	0.00
14312	Hor Def	Pref	2.09	2.05	2.05	2.05	2.10
		Read	3.41	3.35	3.35	3.41	3.45
14320	+500 V	Prep	1.16	1.15	1.15	1.15	1.20
		Read	4.28	4.25	4.25	4.25	4.30

Figure 16-1. Landsat-2 RBV, Band 1

Figure 16-2. Landsat-2 RBV, Band 2

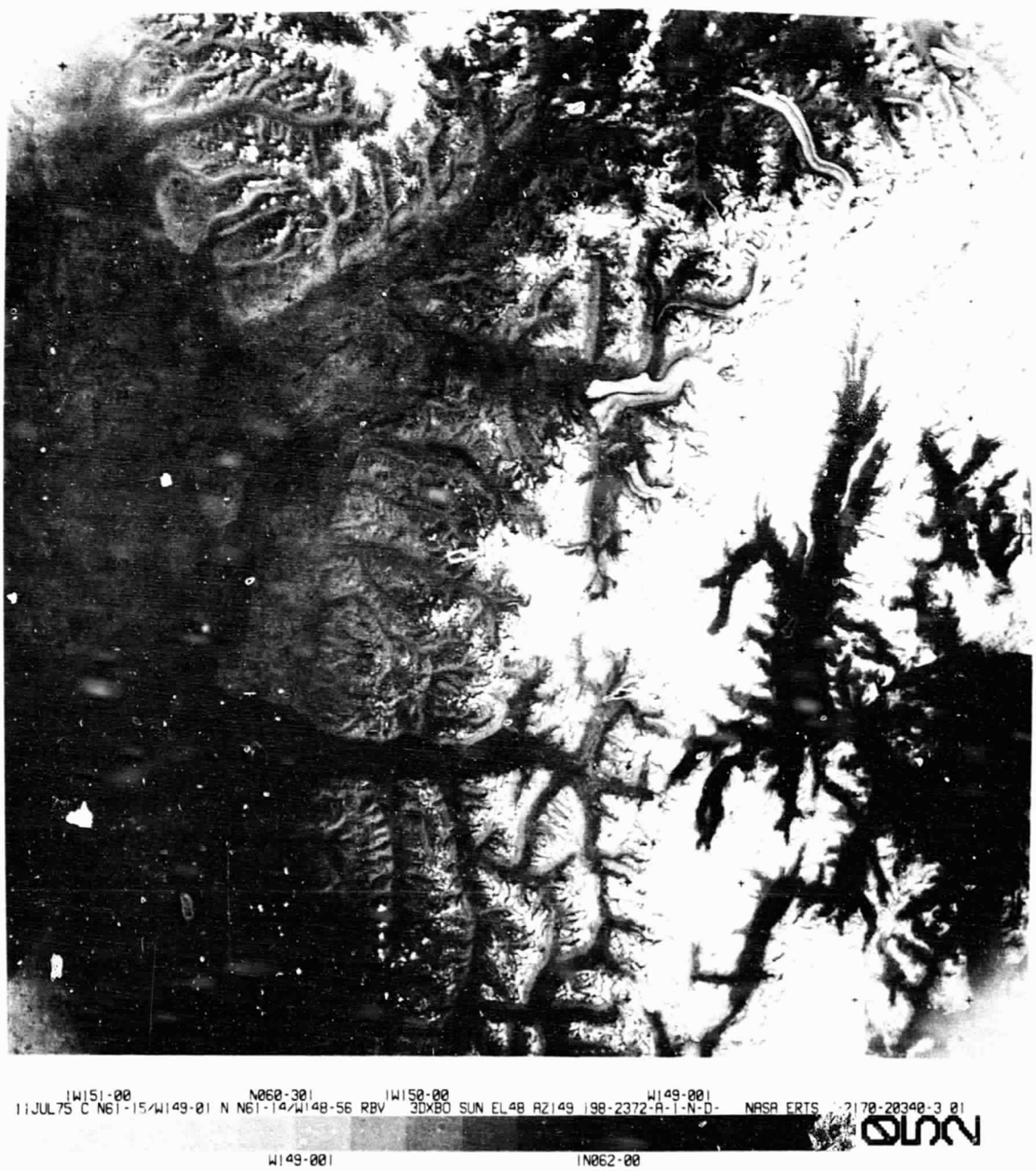

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Figure 16-3. Landsat-2 RBV, Band 3

SECTION 17

MULTISPECTRAL SCANNER SUBSYSTEM (MSS)

The MSS Subsystem has operated nominally in this period without incident. Figure 17-1 shows the number of scenes imaged at each geographic location this quarter, and Figure 17-2 shows images since launch.

Table 17-1 shows typical telemetry values since launch. All are nominal.

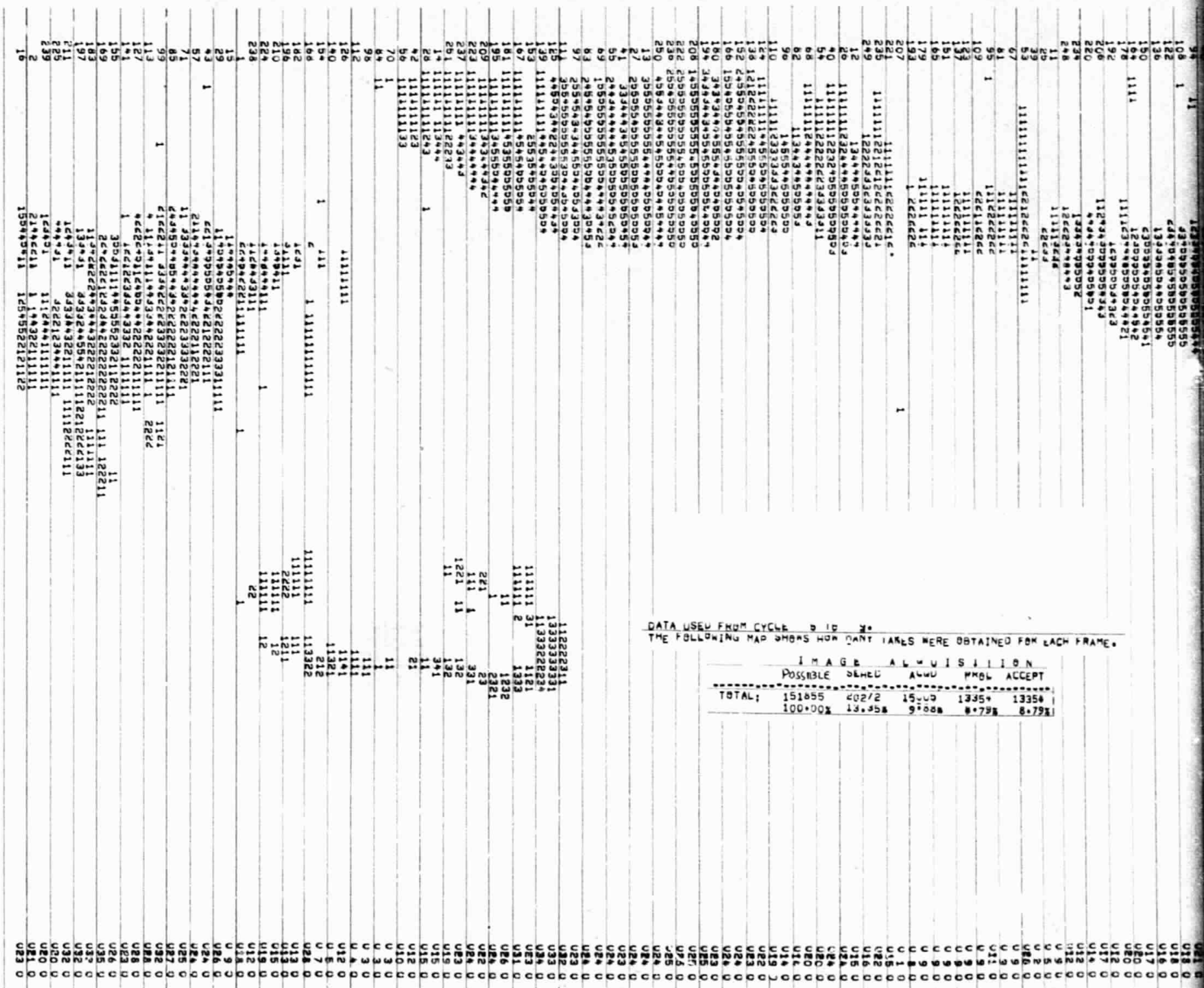
Table 17-2 shows the history of sensor response to a constant input radiance level. Bands 1, 2, and 3 show the same initial decline in response shortly after launch as was seen in Landsat-1. All readings are nominal.

The MSS performance in Landsat-1 and Landsat-2 are similar. Some differences are by design; e.g., Line Length for Landsat-1 is 3216 while for Landsat-2 it is 3249; and calibration lamp current for Landsat-1 is 1.12 amperes, while for Landsat-2 it is 1.17 amperes.

The only significant difference in performance of Landsat-1 and -2 is the different response to sun stimulus in the Sun Cal operations. In Landsat-1, for example, the peak-to-peak voltage for sensor 8 is typically 0.8 to 2.5 volts, while in Landsat-2 it is 3.2 to 4.0.

Line length history is also shown in Table 17-2.

Sun Calibration, performed every two weeks, show nominal performance.

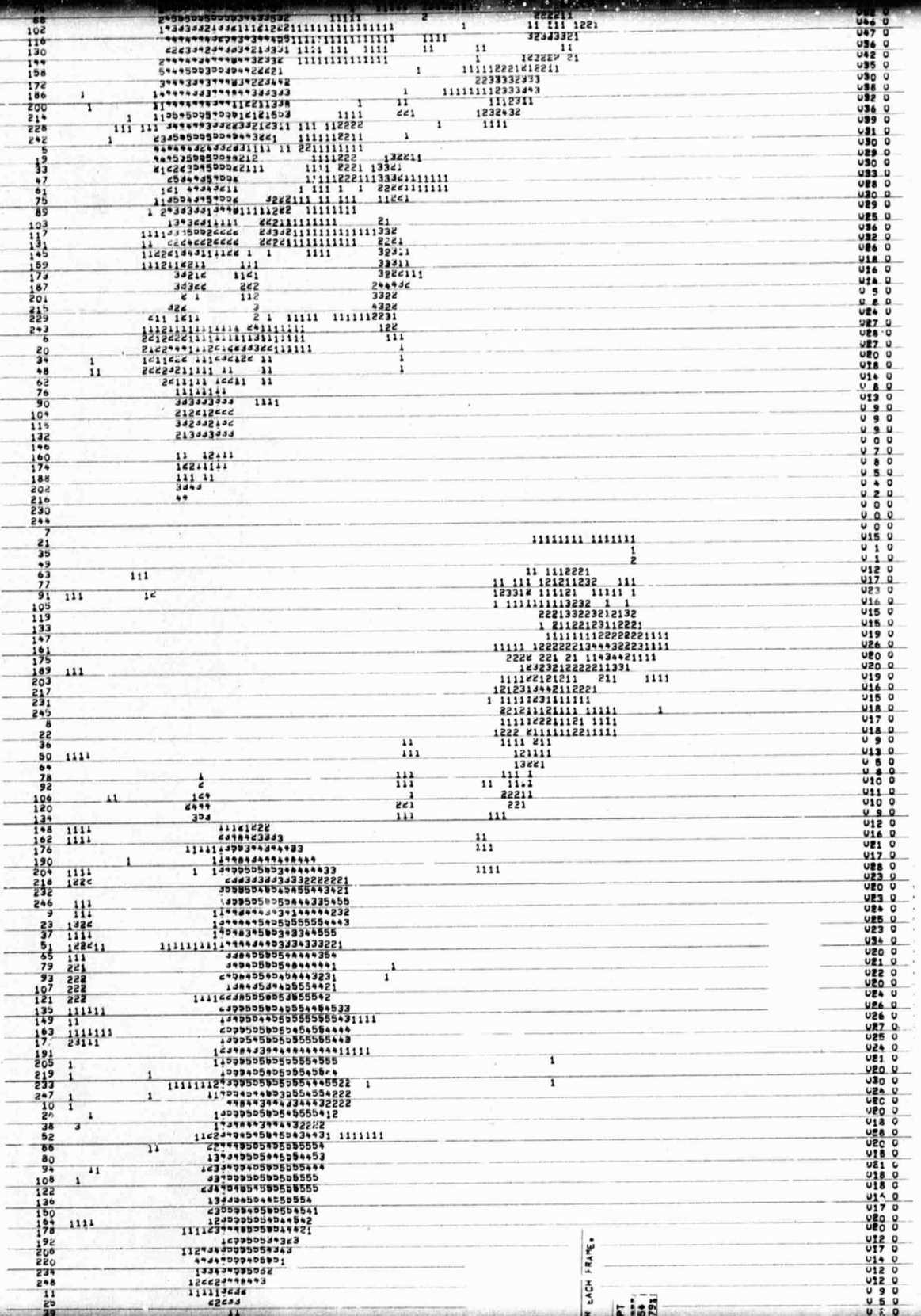


DATA USED FROM CYCLE 5 TO 9.

THE FOLLOWING MAP SHOWS HOW MANY TAKES WERE OBTAINED FOR EACH FRAME.

IMAGE ACQUISITION	POSSIBLE	SCHED	ACQD	PRBL	ACCEPT
TOTAL:	151855	20272	15005	13354	13354
	100.00%	13.35%	9.88%	8.79%	8.79%

FOLDOUT FRAME



FOLDOUT FRAME 2

Figure 17-1. Computer Map of MSS Scenes
This Quarter Landsat-2

FOLDOUT FRAME 3

FOLDOUT FRAME 1

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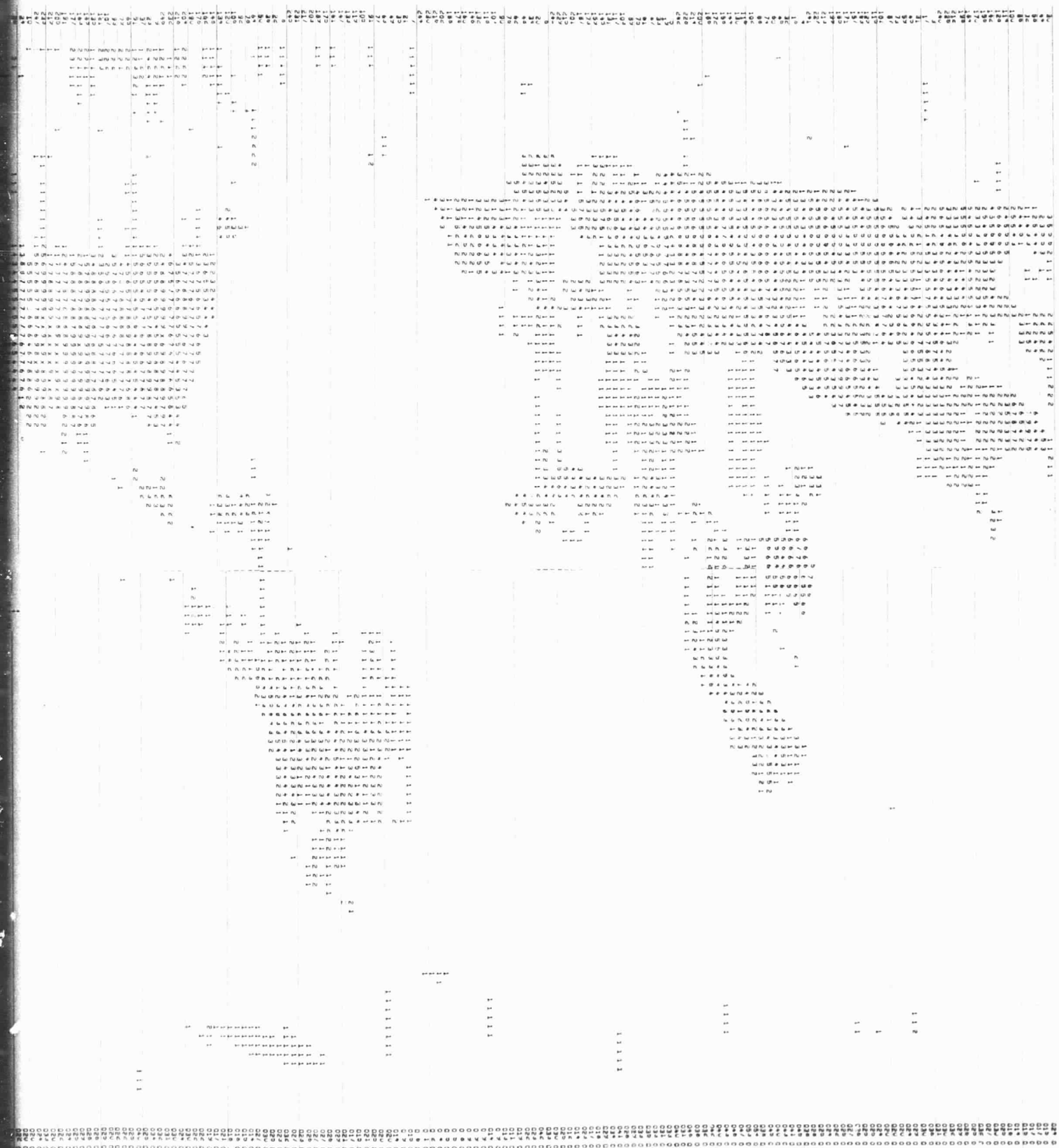

Figure 17-2. Computer Map of MSS Scenes Since Launch Landsat-2

FOLDOUT FRAME 2

Table 17-1. MSS Telemetry - Landsat-2

Function	Name	*T.V. Norm	Orbit						
			27	316	1183	1254	1351	1877	2500
15040	MUX -6 VDC (TMV)	3.92	4.05	4.05	4.02	4.07	4.05	4.07	4.04
15041	A/D SUPPLY (TMV)	5.74	5.95	5.95	5.95	5.95	5.95	5.95	5.95
42	AVERAGE DENSITY (TMV)	1.72	1.71	2.20	2.27	2.30	2.60	2.55	2.39
43	FIBER OPTICS PLATE 1 TEMP (DGC)	22.30	18.13	17.67	19.2	18.4	18.8	20.44	20.41
44	FIBER OPTICS PLATE 2 TEMP (DGC)	22.30	17.87	16.76	17.60	18.1	17.6	18.97	18.86
45	MUX TEMP (DGC)	25.59	23.38	21.69	20.2	25.6	21.9	22.4	20.57
46	ELEC COVER TEMP (DGC)	23.09	20.25	17.94	20.25	21.3	20.5	21.68	21.40
47	PWR. SUP. TEMP. (DGC)	23.85	19.45	18.32	19.0	21.0	19.7	20.4	19.83
48	SCAN MIR REG. TEMP (DGC)	23.44	18.30	17.73	18.1	18.0	18.3	19.36	18.29
49	SCAN MIR DRIVE ELEC. TEMP. (DGC)	24.34	18.96	17.94	17.26	19.6	19.6	19.7	18.49
15050	SCAN MIR DRIVE COVER TEMP. (DGC)	22.50	17.26	17.87	17.26	18.4	17.3	18.99	18.28
51	SCAN MIR TEMP (DGC)	21.87	17.26	17.45	17.0	17.9	17.0	18.6	18.09
52	ROT. SHUT HOUSING TEMP. (DGC)	22.58	23.26	NA	17.61	18.4	17.6	18.98	18.91
53	SCAN MIR REG VOLT (TMV)	4.56	4.7	4.72	4.57	4.57	4.57	4.57	4.57
54	CAL LAMP CURRENT (TMV)	1.18	1.17	1.17	1.20	1.17	1.17	1.17	1.20
55	BAND 1 15 VDC (TMV)	4.97	4.98	4.98	4.97	4.97	4.97	4.97	4.97
56	BAND 2 15 VDC (TMV)	5.0	5.0	5.0	5.0	5.0	5.00	4.99	5.00
57	BAND 3 15 VDC (TMV)	4.88	4.95	4.95	4.95	4.95	4.95	4.95	4.95
58	BAND 4 15 VDC (TMV)	4.83	5.00	5.00	5.00	5.00	5.00	5.00	5.00
59	TLM 15 VDC (TMV)	5.04	5.06	5.07	5.07	5.07	5.07	5.07	5.07
15060	+12 VDC +6 VDC (TMV)	4.92	5.03	5.03	5.02	5.02	5.02	5.02	5.02
61	LOGIC +5 VDC (TMV)	4.86	4.81	4.80	4.80	4.80	4.80	4.88	4.80
62	RECT. +19 VDC (TMV)	4.97	5.03	5.05	5.05	5.05	5.05	5.05	5.05
63	RECT. -19 VDC (TMV)	3.54	3.60	3.60	3.60	3.60	3.60	3.60	3.60
64	BAND 1 HVA (TMV)	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95
65	BAND 1 HVB (TMV)	5.03	OFF	OFF	OFF	OFF	F	F	F
66	BAND 2 HVA (TMV)	4.72	4.70	4.72	4.72	4.72	4.72	4.72	4.72
67	BAND 2 HVB (TMV)	4.70	OFF	OFF	OFF	OFF	F	F	F
68	BAND 3 HVA (TMV)	4.75	4.72	4.74	4.75	4.75	4.75	4.76	4.76
69	BAND 3 HVB (TMV)	4.65	OFF	OFF	OFF	OFF	F	F	F
15070	SHUT MOT. CONTR. INTEG (TMV)	2.49	2.60	2.60	2.60	2.57	2.60	2.50	2.60
15071	SCAN MIRROR DRIVE CLOCK (TMV)	1.93	2.0	2.0	2.02	2.00	2.02	2.00	2.00

*Thermal Vacuum Test Data at 20° C.
NA - Not available

Table 17-2. MSS Response History
Landsat-2
Quantum Level For Selected Word
(0 = Black; 63 = White)

Sensor	Launch	1st Quarter	This Quarter	Band
1	43	42.5	41	
2	41	40.5	40	
3	46	44	42	1
4	46	45	45	
5	44	42	39	
6	46	44	42	
7	47	46	45	
8	44	42	40	
9	48	47	46	2
10	50	48	47	
11	48	48	47	
12	47	45	44	
13	42	41.5	40	
14	44	43	42	
15	47	46	46	3
16	47	46	44	
17	48	47	45	
18	46	45	43	
19	25	25	25	
20	26	27	27	
21	32	32	32	4
22	29	29.5	30	
23	32	32.5	33	
24	28	28	28	
Line Length	3250	3249	3249	

SECTION 18

DATA COLLECTION SYSTEM (DCS)

The DCS Subsystem performed nominally during this report period, continuing message collection at substantially the same rate as had been collected by Landsat-1.

Table 18-1 shows telemetry values since launch. All are nominal.

Table 18-1. DCS Telemetry Values

Func. No.	Name	Orbits						
		5	424	825	1253	1479	1972	2462
16001	Receiver 1 Sig Strength (DBM)*	-123.34	-124.18	-123.04	-122.79	-123.54	-124.57	-124.81
16002	Receiver 1 Temp (DGC)	22.54	23.93	24.00	24.13	24.01	24.19	24.20
16003	Rec-1 Pwr Input Volt (VDC)	2.35	2.36	2.36	2.37	2.37	2.37	2.37
16004	Receiver 2 Sig Volt (DBM)	F	F	F	F	F	F	F
16005	Receiver 2 Temp (DGC)	F	F	F	F	F	F	F
16006	Receiver 2 Input Volt (VDC)	F	F	F	F	F	F	F

*This value is for a CW carrier only; it is not valid during DCS message reception
F = Receiver 2 was OFF

Figure 18-1 shows the number of DCS messages per 18-day cycle at OCC, and the average number of DCP's active per cycle. The close correspondence between the two curves is clear. Also shown is percentage of good messages for each cycle. Cycle 9 has the lowest value for percent good messages, and simultaneously the highest number of messages received. It is evident then, that probably a thousand or so of the "messages" received were in reality only noise. This substantial noise occurred between 26 June and 4 July 1975, and has returned to normal since.

Table 18-2 shows the qualitative performance of the DCS subsystem and Table 18-3 gives statistics of messages received.

Table 18-2. DCS Qualitative Performance

System Threshold*	2900 km
Grazing Angle Effects	Not discernible
Adjacent DCP Interference	Not seen
Ground Transmission System	Satisfactory
Probability of Perfect Reception of any Messages during Window**	*98%

*Observed to date
**Window means "at times when the spacecraft is simultaneously within the horizon of the DCP and the ground receiving station".

Table 18-3. DCS Statistics

Through Orbit	
DCS Platforms (DCP's) Shipped	231
Maximum DCP's Received per Day	114
Messages Received at OCC via Landsat-1	1,152,045
via Landsat-2	176,114
Messages Rejected at OCC via Landsat-1	90,691
via Landsat-2	13,471
Good Messages	91.9%
Maximum Messages per Day (6/15/75) this quarter	1,638
Number of Current Users	44

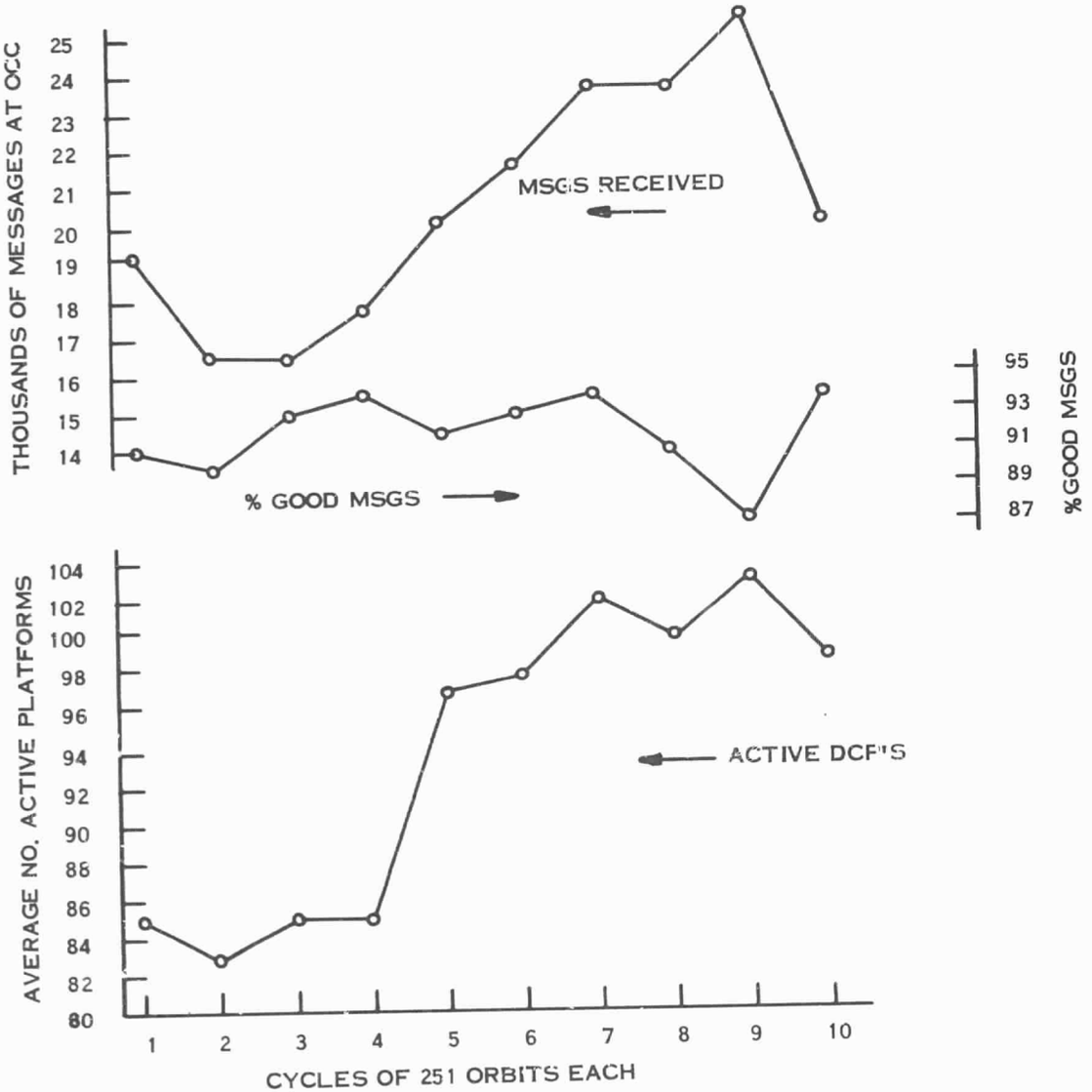

Figure 18-1. DCS Message History

Landsat-2 Anomalies and Observations

Date	Anomaly/Observation	How Observed	Comments
Prelaunch	Forward Scanner Pressure Leak	Spacecraft Integration	Before launch pressure increased. After launch pressure decreased. No anticipated effect on Scanner or S/C mission.
Prelaunch	Defective TLM Functions 1264, 4002, 13200	Spacecraft Integration	Functions are temperatures which are non-critical. Sensors failed prior to launch. Mission unaffected.
3/8/75	Non-Landsat OCC authorized Unencoded command 781, CIU Channel B Off, received by spacecraft from RF interference. Commands 782 or 786, switch comdecs, received at other times.	On-Line	Non-Landsat OCC Authorized Unencoded commands received in Orbit 619, 640, 743, 1575, 1700.
3/17/75	MMCA Pitch Flux Density TLM Drift	Off-Line	Telemetry decreased 5 counts and indicates increase flux density on charged magnet. Investigation underway. Probable sensor drift. No apparent effect on S/C performance.
4/5/75	WBVTR-1 Rewind Failure	On-Line	ECAM Rewind command to WBVTR-1 failed to execute in Orbit 1021. R/T commands failed to execute. Operation resumed Orbit 1476. Investigation continuing.
5/12/75	WBVTR-1 Failed to R/W	On-Line	See entry 4/5/75
5/15/75	WBVTR-1 Failed to R/W	On-Line	See entry 4/5/75
6/9/75	WBVTR-2 had short R/W	On-Line	WBVTR-2 started R/W but stopped prematurely. WBVTR (1 & 2) investigation still continuing while operation resumed.
7/2/75	WBVTR-1 had short R/W	On-Line	See entry 4/5/75 and 6/9/75.

LANDSAT-2

SPACECRAFT ORBIT REFERENCE TABLES

FROM JANUARY, 1975 THROUGH JULY, 1976

ORBITS 0 THROUGH 7756

FLIGHT DAY 0 THROUGH 556

LANDSAT-2

JAN , 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
			•	•		
			•	•		
			•	•		
			•	•		
			•	•		
			•	•		
			•	•		
			•	•		
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			•	•		
			•	•		
			•	•		
			•	•		
			•	•		
22	22	0	0 - 3	150 - 153	11	-1
23	23	1	4 - 17	154 - 167	12	-1
24	24	2	18 - 31	168 - 181	13	-1
25	25	3	32 - 45	182 - 195	14	-1
26	26	4	46 - 59	196 - 209	15	-1
27	27	5	60 - 73	210 - 223	16	-1
28	28	6	74 - 87	224 - 237	17	-1
29	29	7	88 - 95	238 - 245	18	-1
	29	7	96 - 101	9 - 14	1	0
30	30	8	102 - 115	15 - 28	2	0
31	31	9	116 - 129	29 - 42	3	0

LANDSAT-2

FEB, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	32	10	130 - 131	43 - 44	4	0
	32	10	132 - 143	59 - 70	5	0
2	33	11	144 - 157	71 - 84	6	0
3	34	12	158 - 167	85 - 94	7	0
	34	12	168 - 171	109 - 112	8	0
4	35	13	172- 185	113-126	9	0
5	36	14	186- 198	127-139	10	0
6	37	15	199- 212	140-153	11	0
7	38	16	213- 226	154-167	12	0
8	39	17	227- 240	168-181	13	0
9	40	18	241- 254	182-195	14	0
10	41	19	255- 268	196-209	15	0
11	42	20	269- 282	210-223	16	0
12	43	21	283- 296	224-237	17	0
13	44	22	297- 310	238-251	18	0
14	45	23	311- 324	1- 14	1	1
15	46	24	325- 338	15- 28	2	1
16	47	25	339- 352	29- 42	3	1
17	48	26	353- 366	43- 56	4	1
18	49	27	367- 380	57- 70	5	1
19	50	28	381- 394	71- 84	6	1
20	51	29	395- 408	85- 98	7	1
21	52	30	409- 422	99-112	8	1
22	53	31	423- 436	113-126	9	1
23	54	32	437- 449	127-139	10	1
24	55	33	450- 463	140-153	11	1
25	56	34	464- 477	154-167	12	1
26	57	35	478- 491	168-181	13	1
27	58	36	492- 505	182-195	14	1
28	59	37	506- 519	196-209	15	1

LANDSAT-2

MAR, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	60	38	520- 533	210-223	16	1
2	61	39	534- 547	224-237	17	1
3	62	40	548- 561	238-251	18	1
4	63	41	562- 575	1- 14	1	2
5	64	42	576- 589	15- 28	2	2
6	65	43	590- 603	29- 42	3	2
7	66	44	604- 617	43- 56	4	2
8	67	45	618- 631	57- 70	5	2
9	68	46	632- 645	71- 84	6	2
10	69	47	646- 659	85- 98	7	2
11	70	48	660- 673	99-112	8	2
12	71	49	674- 687	113-126	9	2
13	72	50	688- 700	127-139	10	2
14	73	51	701- 714	140-153	11	2
15	74	52	715- 728	154-167	12	2
16	75	53	729- 742	168-181	13	2
17	76	54	743- 756	182-195	14	2
18	77	55	757- 770	196-209	15	2
19	78	56	771- 784	210-223	16	2
20	79	57	785- 798	224-237	17	2
21	80	58	799- 812	238-251	18	2
22	A1	59	813- 826	1- 14	1	3
23	A2	60	827- 840	15- 28	2	3
24	A3	61	841- 854	29- 42	3	3
25	A4	62	855- 868	43- 56	4	3
26	A5	63	869- 882	57- 70	5	3
27	A6	64	883- 896	71- 84	6	3
28	A7	65	897- 910	85- 98	7	3
29	A8	66	911- 924	99-112	8	3
30	A9	67	925- 938	113-126	9	3
31	90	68	939- 951	127-139	10	3

LANDSAT-2

APR, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	91	69	952- 965	140-153	11	3
2	92	70	966- 979	154-167	12	3
3	93	71	980- 993	168-181	13	3
4	94	72	994- 1007	182-195	14	3
5	95	73	1008- 1021	196-209	15	3
6	96	74	1022- 1035	210-223	16	3
7	97	75	1036- 1049	224-237	17	3
8	98	76	1050- 1063	238-251	18	3
9	99	77	1064- 1077	1- 14	1	4
10	100	78	1078- 1091	15- 28	2	4
11	101	79	1092- 1105	29- 42	3	4
12	102	80	1106- 1119	43- 56	4	4
13	103	81	1120- 1133	57- 70	5	4
14	104	82	1134- 1147	71- 84	6	4
15	105	83	1148- 1161	85- 98	7	4
16	106	84	1162- 1175	99-112	8	4
17	107	85	1176- 1189	113-126	9	4
18	108	86	1190- 1202	127-139	10	4
19	109	87	1203- 1216	140-153	11	4
20	110	88	1217- 1230	154-167	12	4
21	111	89	1231- 1244	168-181	13	4
22	112	90	1245- 1258	182-195	14	4
23	113	91	1259- 1272	196-209	15	4
24	114	92	1273- 1286	210-223	16	4
25	115	93	1287- 1300	224-237	17	4
26	116	94	1301- 1314	238-251	18	4
27	117	95	1315- 1328	1- 14	1	5
28	118	96	1329- 1342	15- 28	2	5
29	119	97	1343- 1356	29- 42	3	5
30	120	98	1357- 1370	43- 56	4	5

LANDSAT-2

MAY, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	121	99	1371- 1384	57- 70	5	5
2	122	100	1385- 1398	71- 84	6	5
3	123	101	1399- 1412	85- 98	7	5
4	124	102	1413- 1426	99-112	8	5
5	125	103	1427- 1440	113-126	9	5
6	126	104	1441- 1453	127-139	10	5
7	127	105	1454- 1467	140-153	11	5
8	128	106	1468- 1481	154-167	12	5
9	129	107	1482- 1495	168-181	13	5
10	130	108	1496- 1509	182-195	14	5
11	131	109	1510- 1523	196-209	15	5
12	132	110	1524- 1537	210-223	16	5
13	133	111	1538- 1551	224-237	17	5
14	134	112	1552- 1565	238-251	18	5
15	135	113	1566- 1579	1- 14	1	6
16	136	114	1580- 1593	15- 28	2	6
17	137	115	1594- 1607	29- 42	3	6
18	138	116	1608- 1621	43- 56	4	6
19	139	117	1622- 1635	57- 70	5	6
20	140	118	1636- 1649	71- 84	6	6
21	141	119	1650- 1663	85- 98	7	6
22	142	120	1664- 1677	99-112	8	6
23	143	121	1678- 1691	113-126	9	6
24	144	122	1692- 1704	127-139	10	6
25	145	123	1705- 1718	140-153	11	6
26	146	124	1719- 1732	154-167	12	6
27	147	125	1733- 1746	168-181	13	6
28	148	126	1747- 1760	182-195	14	6
29	149	127	1761- 1774	196-209	15	6
30	150	128	1775- 1788	210-223	16	6
31	151	129	1789- 1802	224-237	17	6

LANDSAT-2

JUN.1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	152	130	1803- 1816	238-251	14	6
2	153	131	1817- 1830	1- 14	1	7
3	154	132	1831- 1844	15- 28	2	7
4	155	133	1845- 1858	29- 42	3	7
5	156	134	1859- 1872	43- 56	4	7
6	157	135	1873- 1886	57- 70	5	7
7	158	136	1887- 1900	71- 84	6	7
8	159	137	1901- 1914	85- 98	7	7
9	160	138	1915- 1928	99-112	8	7
10	161	139	1929- 1942	113-126	9	7
11	162	140	1943- 1955	127-139	10	7
12	163	141	1956- 1969	140-153	11	7
13	164	142	1970- 1983	154-167	12	7
14	165	143	1984- 1997	168-181	13	7
15	166	144	1998- 2011	182-195	14	7
16	167	145	2012- 2025	196-209	15	7
17	168	146	2026- 2039	210-223	16	7
18	169	147	2040- 2053	224-237	17	7
19	170	148	2054- 2067	238-251	18	7
20	171	149	2068- 2081	1- 14	1	8
21	172	150	2082- 2095	15- 28	2	8
22	173	151	2096- 2109	29- 42	3	8
23	174	152	2110- 2123	43- 56	4	8
24	175	153	2124- 2137	57- 70	5	8
25	176	154	2138- 2151	71- 84	6	8
26	177	155	2152- 2165	85- 98	7	8
27	178	156	2166- 2179	99-112	8	8
28	179	157	2180- 2193	113-126	9	8
29	180	158	2194- 2206	127-139	10	8
30	181	159	2207- 2220	140-153	11	8

LANDSAT-2

JUL. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	182	160	2221- 2234	154-167	12	8
2	183	161	2235- 2248	168-181	13	8
3	184	162	2249- 2262	182-195	14	8
4	185	163	2263- 2276	196-209	15	8
5	186	164	2277- 2290	210-223	16	8
6	187	165	2291- 2304	224-237	17	8
7	188	166	2305- 2318	238-251	18	8
8	189	167	2319- 2332	1- 14	1	9
9	190	168	2333- 2346	15- 28	2	9
10	191	169	2347- 2360	29- 42	3	9
11	192	170	2361- 2374	43- 56	4	9
12	193	171	2375- 2388	57- 70	5	9
13	194	172	2389- 2402	71- 84	6	9
14	195	173	2403- 2416	85- 98	7	9
15	196	174	2417- 2430	99-112	8	9
16	197	175	2431- 2444	113-126	9	9
17	198	176	2445- 2457	127-139	10	9
18	199	177	2458- 2471	140-153	11	9
19	200	178	2472- 2485	154-167	12	9
20	201	179	2486- 2499	168-181	13	9
21	202	180	2500- 2513	182-195	14	9
22	203	181	2514- 2527	196-209	15	9
23	204	182	2528- 2541	210-223	16	9
24	205	183	2542- 2555	224-237	17	9
25	206	184	2556- 2569	238-251	18	9
26	207	185	2570- 2583	1- 14	1	10
27	208	186	2584- 2597	15- 28	2	10
28	209	187	2598- 2611	29- 42	3	10
29	210	188	2612- 2625	43- 56	4	10
30	211	189	2626- 2639	57- 70	5	10
31	212	190	2640- 2653	71- 84	6	10

LANDSAT-2

AUG. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	213	191	2654- 2667	85- 98	7	10
2	214	192	2668- 2681	99-112	8	10
3	215	193	2682- 2695	113-126	9	10
4	216	194	2696- 2708	127-139	10	10
5	217	195	2709- 2722	140-153	11	10
6	218	196	2723- 2736	154-167	12	10
7	219	197	2737- 2750	168-181	13	10
8	220	198	2751- 2764	182-195	14	10
9	221	199	2765- 2778	196-209	15	10
0	222	200	2779- 2792	210-223	16	10
11	223	201	2793- 2806	224-237	17	10
12	224	202	2807- 2820	238-251	18	10
13	225	203	2821- 2834	1- 14	1	11
14	226	204	2835- 2848	15- 28	2	11
15	227	205	2849- 2862	29- 42	3	11
16	228	206	2863- 2876	43- 56	4	11
17	229	207	2877- 2890	57- 70	5	11
18	230	208	2891- 2904	71- 84	6	11
19	231	209	2905- 2918	85- 98	7	11
20	232	210	2919- 2932	99-112	8	11
21	233	211	2933- 2946	113-126	9	11
22	234	212	2947- 2959	127-139	10	11
23	235	213	2960- 2973	140-153	11	11
24	236	214	2974- 2987	154-167	12	11
25	237	215	2988- 3001	168-181	13	11
26	238	216	3002- 3015	182-195	14	11
27	239	217	3016- 3029	196-209	15	11
28	240	218	3030- 3043	210-223	16	11
29	241	219	3044- 3057	224-237	17	11
30	242	220	3058- 3071	238-251	18	11
31	243	221	3072- 3085	1- 14	1	12

LANDSAT-2

SEP, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	246	222	3086- 3099	15- 28	2	12
2	245	223	3100- 3113	29- 42	3	12
3	246	224	3114- 3127	43- 56	4	12
4	247	225	3128- 3141	57- 70	5	12
5	248	226	3142- 3155	71- 84	6	12
6	249	227	3156- 3169	85- 98	7	12
7	250	228	3170- 3183	99-112	8	12
8	251	229	3184- 3197	113-126	9	12
9	252	230	3198- 3210	127-139	10	12
10	253	231	3211- 3224	140-153	11	12
11	254	232	3225- 3238	154-167	12	12
12	255	233	3239- 3252	168-181	13	12
13	256	234	3253- 3266	182-195	14	12
14	257	235	3267- 3280	196-209	15	12
15	258	236	3281- 3294	210-223	16	12
16	259	237	3295- 3308	224-237	17	12
17	260	238	3309- 3322	238-251	18	12
18	261	239	3323- 3336	1- 14	1	13
19	262	240	3337- 3350	15- 28	2	13
20	263	241	3351- 3364	29- 42	3	13
21	264	242	3365- 3378	43- 56	4	13
22	265	243	3379- 3392	57- 70	5	13
23	266	244	3393- 3406	71- 84	6	13
24	267	245	3407- 3420	85- 98	7	13
25	268	246	3421- 3434	99-112	8	13
26	269	247	3435- 3448	113-126	9	13
27	270	248	3449- 3461	127-139	10	13
28	271	249	3462- 3475	140-153	11	13
29	272	250	3476- 3489	154-167	12	13
30	273	251	3490- 3503	168-181	13	13

LANDSAT-2

8CY,1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	274	252	3504- 3517	182-195	14	13
2	275	253	3518- 3531	196-209	15	13
3	276	254	3532- 3545	210-223	16	13
4	277	255	3546- 3559	224-237	17	13
5	278	256	3560- 3573	238-251	18	13
6	279	257	3574- 3587	1- 14	1	14
7	280	258	3588- 3601	15- 28	2	14
8	281	259	3602- 3615	29- 42	3	14
9	282	260	3616- 3629	43- 56	4	14
10	283	261	3630- 3643	57- 70	5	14
11	284	262	3644- 3657	71- 84	6	14
12	285	263	3658- 3671	85- 98	7	14
13	286	264	3672- 3685	99-112	8	14
14	287	265	3686- 3699	113-126	9	14
15	288	266	3700- 3712	127-139	10	14
16	289	267	3713- 3726	140-153	11	14
17	290	268	3727- 3740	154-167	12	14
18	291	269	3741- 3754	168-181	13	14
19	292	270	3755- 3768	182-195	14	14
20	293	271	3769- 3782	196-209	15	14
21	294	272	3783- 3796	210-223	16	14
22	295	273	3797- 3810	224-237	17	14
23	296	274	3811- 3824	238-251	18	14
24	297	275	3825- 3838	1- 14	1	15
25	298	276	3839- 3852	15- 28	2	15
26	299	277	3853- 3866	29- 42	3	15
27	300	278	3867- 3880	43- 56	4	15
28	301	279	3881- 3894	57- 70	5	15
29	302	280	3895- 3908	71- 84	6	15
30	303	281	3909- 3922	85- 98	7	15
31	304	282	3923- 3936	99-112	8	15

LANDSAT-2

NOV. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	305	283	3937- 3950	113-126	9	15
2	306	284	3951- 3963	127-139	10	15
3	307	285	3964- 3977	140-153	11	15
4	308	286	3978- 3991	154-167	12	15
5	309	287	3992- 4005	168-181	13	15
6	310	288	4006- 4019	182-195	14	15
7	311	289	4020- 4033	196-209	15	15
8	312	290	4034- 4047	210-223	16	15
9	313	291	4048- 4061	224-237	17	15
10	314	292	4062- 4075	238-251	18	15
11	315	293	4076- 4089	1- 14	1	16
12	316	294	4090- 4103	15- 28	2	16
13	317	295	4104- 4117	29- 42	3	16
14	318	296	4118- 4131	43- 56	4	16
15	319	297	4132- 4145	57- 70	5	16
16	320	298	4146- 4159	71- 84	6	16
17	321	299	4160- 4173	85- 98	7	16
18	322	300	4174- 4187	99-112	8	16
19	323	301	4188- 4201	113-126	9	16
20	324	302	4202- 4214	127-139	10	16
21	325	303	4215- 4228	140-153	11	16
22	326	304	4229- 4242	154-167	12	16
23	327	305	4243- 4256	168-181	13	16
24	328	306	4257- 4270	182-195	14	16
25	329	307	4271- 4284	196-209	15	16
26	330	308	4285- 4298	210-223	16	16
27	331	309	4299- 4312	224-237	17	16
28	332	310	4313- 4326	238-251	18	16
29	333	311	4327- 4340	1- 14	1	17
30	334	312	4341- 4354	15- 28	2	17

LANDSAT-2

DEC. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	335	313	4355- 4368	29- 42	3	17
2	336	314	4369- 4382	43- 56	4	17
3	337	315	4383- 4396	57- 70	5	17
4	338	316	4397- 4410	71- 84	6	17
5	339	317	4411- 4424	85- 98	7	17
6	340	318	4425- 4438	99-112	8	17
7	341	319	4439- 4452	113-126	9	17
8	342	320	4453- 4465	127-139	10	17
9	343	321	4466- 4479	140-153	11	17
10	344	322	4480- 4493	154-167	12	17
11	345	323	4494- 4507	168-181	13	17
12	346	324	4508- 4521	182-195	14	17
13	347	325	4522- 4535	196-209	15	17
14	348	326	4536- 4549	210-223	16	17
15	349	327	4550- 4563	224-237	17	17
16	350	328	4564- 4577	238-251	18	17
17	351	329	4578- 4591	1- 14	1	18
18	352	330	4592- 4605	15- 28	2	18
19	353	331	4606- 4619	29- 42	3	18
20	354	332	4620- 4633	43- 56	4	18
21	355	333	4634- 4647	57- 70	5	18
22	356	334	4648- 4661	71- 84	6	18
23	357	335	4662- 4675	85- 98	7	18
24	358	336	4676- 4689	99-112	8	18
25	359	337	4690- 4703	113-126	9	18
26	360	338	4704- 4716	127-139	10	18
27	361	339	4717- 4730	140-153	11	18
28	362	340	4731- 4744	154-167	12	18
29	363	341	4745- 4758	168-181	13	18
30	364	342	4759- 4772	182-195	14	18
31	365	343	4773- 4786	196-209	15	18

LANDSAT-2

JAN, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	1	344	4787- 4800	210-223	16	18
2	2	345	4801- 4814	224-237	17	18
3	3	346	4815- 4828	238-251	18	18
4	4	347	4829- 4842	1- 14	1	19
5	5	348	4843- 4856	15- 28	2	19
6	6	349	4857- 4870	29- 42	3	19
7	7	350	4871- 4884	43- 56	4	19
8	8	351	4885- 4898	57- 70	5	19
9	9	352	4899- 4912	71- 84	6	19
10	10	353	4913- 4926	85- 98	7	19
11	11	354	4927- 4940	99-112	8	19
12	12	355	4941- 4954	113-126	9	19
13	13	356	4955- 4967	127-139	10	19
14	14	357	4968- 4981	140-153	11	19
15	15	358	4982- 4995	154-167	12	19
16	16	359	4996- 5009	168-181	13	19
17	17	360	5010- 5023	182-195	14	19
18	18	361	5024- 5037	196-209	15	19
19	19	362	5038- 5051	210-223	16	19
20	20	363	5052- 5065	224-237	17	19
21	21	364	5066- 5079	238-251	18	19
22	22	365	5080- 5093	1- 14	1	20
23	23	366	5094- 5107	15- 28	2	20
24	24	367	5108- 5121	29- 42	3	20
25	25	368	5122- 5135	43- 56	4	20
26	26	369	5136- 5149	57- 70	5	20
27	27	370	5150- 5163	71- 84	6	20
28	28	371	5164- 5177	85- 98	7	20
29	29	372	5178- 5191	99-112	8	20
30	30	373	5192- 5205	113-126	9	20
31	31	374	5206- 5218	127-139	10	20

LANDSAT-2

FEB. 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	32	375	5219- 5232	140-153	11	20
2	33	376	5233- 5246	154-167	12	20
3	34	377	5247- 5260	168-181	13	20
4	35	378	5261- 5274	182-195	14	20
5	36	379	5275- 5288	196-209	15	20
6	37	380	5289- 5302	210-223	16	20
7	38	381	5303- 5316	224-237	17	20
8	39	382	5317- 5330	238-251	18	20
9	40	383	5331- 5344	1- 14	1	21
10	41	384	5345- 5358	15- 28	2	21
11	42	385	5359- 5372	29- 42	3	21
12	43	386	5373- 5386	43- 56	4	21
13	44	387	5387- 5400	57- 70	5	21
14	45	388	5401- 5414	71- 84	6	21
15	46	389	5415- 5428	85- 98	7	21
16	47	390	5429- 5442	99-112	8	21
17	48	391	5443- 5456	113-126	9	21
18	49	392	5457- 5469	127-139	10	21
19	50	393	5470- 5483	140-153	11	21
20	51	394	5484- 5497	154-167	12	21
21	52	395	5498- 5511	168-181	13	21
22	53	396	5512- 5525	182-195	14	21
23	54	397	5526- 5539	196-209	15	21
24	55	398	5540- 5553	210-223	16	21
25	56	399	5554- 5567	224-237	17	21
26	57	400	5568- 5581	238-251	18	21
27	58	401	5582- 5595	1- 14	1	22
28	59	402	5596- 5609	15- 28	2	22
29	60	403	5610- 5623	29- 42	3	22

LANDSAT-2

MAR. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	61	404	5624- 5637	43- 56	4	22
2	62	405	5638- 5651	57- 70	5	22
3	63	406	5652- 5665	71- 84	6	22
4	64	407	5666- 5679	85- 98	7	22
5	65	408	5680- 5693	99-112	8	22
6	66	409	5694- 5707	113-126	9	22
7	67	410	5708- 5720	127-139	10	22
8	68	411	5721- 5734	140-153	11	22
9	69	412	5735- 5748	154-167	12	22
10	70	413	5749- 5762	168-181	13	22
11	71	414	5763- 5776	182-195	14	22
12	72	415	5777- 5790	196-209	15	22
13	73	416	5791- 5804	210-223	16	22
14	74	417	5805- 5818	224-237	17	22
15	75	418	5819- 5832	238-251	18	22
16	76	419	5833- 5846	1- 14	1	23
17	77	420	5847- 5860	15- 28	2	23
18	78	421	5861- 5874	29- 42	3	23
19	79	422	5875- 5888	43- 56	4	23
20	80	423	5889- 5902	57- 70	5	23
21	81	424	5903- 5916	71- 84	6	23
22	82	425	5917- 5930	85- 98	7	23
23	83	426	5931- 5944	99-112	8	23
24	84	427	5945- 5958	113-126	9	23
25	85	428	5959- 5971	127-139	10	23
26	86	429	5972- 5985	140-153	11	23
27	87	430	5986- 5999	154-167	12	23
28	88	431	6000- 6013	168-181	13	23
29	89	432	6014- 6027	182-195	14	23
30	90	433	6028- 6041	196-209	15	23
31	91	434	6042- 6055	210-223	16	23

LANDSAT-2

APR, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	92	435	6056- 6069	226-237	17	23
2	93	436	6070- 6083	238-251	18	23
3	94	437	6084- 6097	1- 14	1	24
4	95	438	6098- 6111	15- 28	2	24
5	96	439	6112- 6125	29- 42	3	24
6	97	440	6126- 6139	43- 56	4	24
7	98	441	6140- 6153	57- 70	5	24
8	99	442	6154- 6167	71- 84	6	24
9	100	443	6168- 6181	85- 98	7	24
10	101	444	6182- 6195	99-112	8	24
11	102	445	6196- 6209	113-126	9	24
12	103	446	6210- 6222	127-139	10	24
13	104	447	6223- 6236	140-153	11	24
14	105	448	6237- 6250	154-167	12	24
15	106	449	6251- 6264	168-181	13	24
16	107	450	6265- 6278	182-195	14	24
17	108	451	6279- 6292	196-209	15	24
18	109	452	6293- 6306	210-223	16	24
19	110	453	6307- 6320	224-237	17	24
20	111	454	6321- 6334	238-251	18	24
21	112	455	6335- 6348	1- 14	1	25
22	113	456	6349- 6362	15- 28	2	25
23	114	457	6363- 6376	29- 42	3	25
24	115	458	6377- 6390	43- 56	4	25
25	116	459	6391- 6404	57- 70	5	25
26	117	460	6405- 6418	71- 84	6	25
27	118	461	6419- 6432	85- 98	7	25
28	119	462	6433- 6446	99-112	8	25
29	120	463	6447- 6460	113-126	9	25
30	121	464	6461- 6473	127-139	10	25

LANDSAT-2

MAY, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	122	465	6474- 6487	140-153	11	25
2	123	466	6488- 6501	154-167	12	25
3	124	467	6502- 6515	168-181	13	25
4	125	468	6516- 6529	182-195	14	25
5	126	469	6530- 6543	196-209	15	25
6	127	470	6544- 6557	210-223	16	25
7	128	471	6558- 6571	224-237	17	25
8	129	472	6572- 6585	238-251	18	25
9	130	473	6586- 6599	1- 14	1	26
10	131	474	6600- 6613	15- 28	2	26
11	132	475	6614- 6627	29- 42	3	26
12	133	476	6628- 6641	43- 56	4	26
13	134	477	6642- 6655	57- 70	5	26
14	135	478	6656- 6669	71- 84	6	26
15	136	479	6670- 6683	85- 98	7	26
16	137	480	6684- 6697	99-112	8	26
17	138	481	6698- 6711	113-126	9	26
18	139	482	6712- 6724	127-139	10	26
19	140	483	6725- 6738	140-153	11	26
20	141	484	6739- 6752	154-167	12	26
21	142	485	6753- 6766	168-181	13	26
22	143	486	6767- 6780	182-195	14	26
23	144	487	6781- 6794	196-209	15	26
24	145	488	6795- 6808	210-223	16	26
25	146	489	6809- 6822	224-237	17	26
26	147	490	6823- 6836	238-251	18	26
27	148	491	6837- 6850	1- 14	1	27
28	149	492	6851- 6864	15- 28	2	27
29	150	493	6865- 6878	29- 42	3	27
30	151	494	6879- 6892	43- 56	4	27
31	152	495	6893- 6906	57- 70	5	27

LANDSAT-2

JUN. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	153	496	6907- 6920	71- 84	6	27
2	154	497	6921- 6934	85- 98	7	27
3	155	498	6935- 6948	99-112	8	27
4	156	499	6949- 6962	113-126	9	27
5	157	500	6963- 6975	127-139	10	27
6	158	501	6976- 6989	140-153	11	27
7	159	502	6990- 7003	154-167	12	27
8	160	503	7004- 7017	168-181	13	27
9	161	504	7018- 7031	182-195	14	27
10	162	505	7032- 7045	196-209	15	27
11	163	506	7046- 7059	210-223	16	27
12	164	507	7060- 7073	224-237	17	27
13	165	508	7074- 7087	238-251	18	27
14	166	509	7088- 7101	1- 14	1	28
15	167	510	7102- 7115	15- 28	2	28
16	168	511	7116- 7129	29- 42	3	28
17	169	512	7130- 7143	43- 56	4	28
18	170	513	7144- 7157	57- 70	5	28
19	171	514	7158- 7171	71- 84	6	28
20	172	515	7172- 7185	85- 98	7	28
21	173	516	7186- 7199	99-112	8	28
22	174	517	7200- 7213	113-126	9	28
23	175	518	7214- 7226	127-139	10	28
24	176	519	7227- 7240	140-153	11	28
25	177	520	7241- 7254	154-167	12	28
26	178	521	7255- 7268	168-181	13	28
27	179	522	7269- 7282	182-195	14	28
28	180	523	7283- 7296	196-209	15	28
29	181	524	7297- 7310	210-223	16	28
30	182	525	7311- 7324	224-237	17	28

LANDSAT-2

JUL. 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	183	526	7325- 7338	238-251	18	28
2	184	527	7339- 7352	1- 14	1	29
3	185	528	7353- 7366	15- 28	2	29
4	186	529	7367- 7380	29- 42	3	29
5	187	530	7381- 7394	43- 56	4	29
6	188	531	7395- 7408	57- 70	5	29
7	189	532	7409- 7422	71- 84	6	29
8	190	533	7423- 7436	85- 98	7	29
9	191	534	7437- 7450	99-112	8	29
10	192	535	7451- 7464	113-126	9	29
11	193	536	7465- 7477	127-139	10	29
12	194	537	7478- 7491	140-153	11	29
13	195	538	7492- 7505	154-167	12	29
14	196	539	7506- 7519	168-181	13	29
15	197	540	7520- 7533	182-195	14	29
16	198	541	7534- 7547	196-209	15	29
17	199	542	7548- 7561	210-223	16	29
18	200	543	7562- 7575	224-237	17	29
19	201	544	7576- 7589	238-251	18	29
20	202	545	7590- 7603	1- 14	1	30
21	203	546	7604- 7617	15- 28	2	30
22	204	547	7618- 7631	29- 42	3	30
23	205	548	7632- 7645	43- 56	4	30
24	206	549	7646- 7659	57- 70	5	30
25	207	550	7660- 7673	71- 84	6	30
26	208	551	7674- 7687	85- 98	7	30
27	209	552	7688- 7701	99-112	8	30
28	210	553	7702- 7715	113-126	9	30
29	211	554	7716- 7728	127-139	10	30
30	212	555	7729- 7742	140-153	11	30
31	213	556	7743- 7756	154-167	12	30

APPENDIX C

LANDSAT-2 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title and Date
1	PIR-1N23-ERTS-133	WBVTR-1 Rewind Anomaly, Landsat-2, dated 4/23/75.
2	PIR-1N23-ERTS-134	Landsat-1 and 2 Gating Pattern Comparison, dated 4/24/75.
3	PIR-1N23-ERTS-135	WBVTR-1 Temperature History in Landsat-2, dated 4/29/75.
4	PIR-1N23-ERTS-136	Rewind Tests on WBVTR-1 on Landsat-2 dated 4/30/75.
5	PIR-1N23-ERTS-137	Pre-Operational Verification Test of WBVTR-1 on Landsat-2, dated 5/8/75.
6	PIR-1N23-ERTS-138	Second Incident of WBVTR-1 Failure to Rewind on Landsat-2, dated 5/12/75.
7	PIR-1N23-ERTS-139	Third Incident of WBVTR-1 Failure to Rewind on Landsat-2, dated 5/15/75.
8	PIR-1N23-ERTS-140	Landsat-2 Forward Scanner Pressure Status, dated 5/15/75.
9	PIR-1N23-ERTS-141	WBVTR-1 of Landsat-2: Successful Rewind and Return to Operations, dated 5/21/75.
10	PIR-1N23-ERTS-142	Landsat Antenna Radiation Patterns, dated 6/11/75.
11	PIR-1N23-ERTS-143	WBVTR-2 of Landsat-2: Rewind Dropout Anomaly, dated 6/12/75
12	PIR-1N23-ERTS-145	Landsat-1 and Landsat-2: RBV Thermal Data, dated 6/24/75.
13	PIR-1N23-ERTS-146	Periodic Testing of RBV Subsystem in Landsat-2 -- Revision 1, dated 6/27/75.
14	PIR-1N23-ERTS-147	High MFSE Counts in WBVTR-2 of Landsat-2, dated 7/9/75.
15	PIR-1N23-ERTS-148	First Periodic Test of RBV in Landsat-2, dated 7/14/75.
16	PIR-1N23-ERTS-149	Failure of TM Point 1003-Forward Scanner Pressure - Landsat-2, dated 7/16/75.
17	PIR-1N23-ERTS-150	Aborted Rewind of WBVTR-1 on Landsat-2, dated 7/8/75.
18	PIR-1N23-ERTS-151	WBVTR-1 of Landsat-2: Rewind Dropout Anomaly, dated 7/21/75.
19	PIR-1N23-ERTS-152	Landsat-1 Pitch Flywheel Anomaly, dated 7/23/75.
20	PIR-1N23-ERTS-153	NBR-2 of Landsat-1: Recording Anomaly, dated 7/29/75.