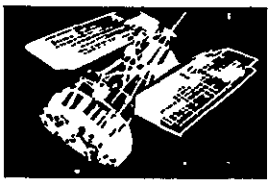
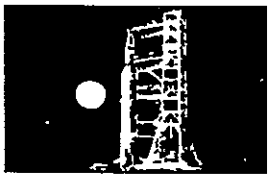
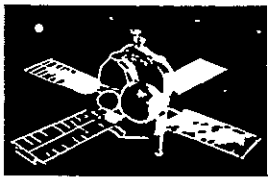
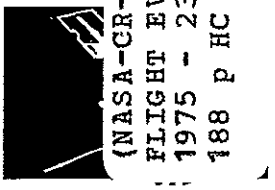
SPACE DIVISION









76SDS4207
29 FEBRUARY 1976

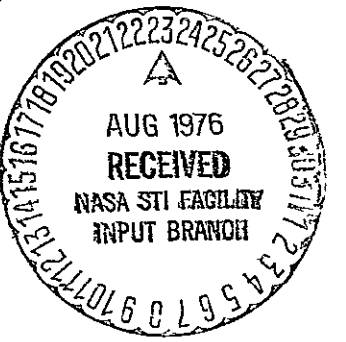
LANDSAT-1 AND LANDSAT-2 FLIGHT EVALUATION REPORT 23 OCTOBER 1975 TO 23 JANUARY 1976

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

(Not Erts)

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GENERAL ELECTRIC

LANDSAT–1

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INTRODUCTION

This is the fifteenth 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 1974 to 23 January 1975	30 April 1975
75SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1975 to 23 April 1975	15 August 1975
75SDS4255	Landsat-1 and Landsat-2 Flight Evaluation Report 23 April 1975 to 23 July 1975	10 October 1975
75SDS4266	Landsat-1 and Landsat-2 Flight Evaluation Report 23 July 1975 to 23 October 1975	1 December 1975

This report contains analysis of performance for Orbits 16550 to 17830 for Landsat-1.

SECTION 1

SUMMARY - LANDSAT-1 OPERATIONS

SECTION 1

SUMMARY LANDSAT-1 OPERATIONS

Landsat-1 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. Landsat-1 continued to perform its imaging mission with the Multispectral Scanner and the remaining Wideband Video Tape Recorder providing image data. The remaining Wideband 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 current variations. The DCS subsystem was turned off after Orbit 12690 and the function assumed by DCS in Landsat-2. Narrow Band Recorder 2 became noisy and was turned off in Orbit 13015. Operation of NBR 2 resumed in Orbit 14116 until failure in Orbit 15253, when its operation was terminated. Battery 6 was turned off between Orbits 13346 and 14100 due to electrical characteristics causing high temperatures. Between Orbits 14780 and 15467, Battery 6 was turned off again due to high temperature. Because high current transient occurred at Battery 6 turn on in Orbit 15467 the battery turn-on command is temporarily suspended from use. Battery 8 was turned off in Orbit 15588 due to electrical characteristics causing high temperature and will not be returned to service because of the battery "ON" command problem. The pitch flywheel stopped again for 45 minutes in Orbit 15309 and 3 minutes in Orbit 15312. Pitch flywheel motor driver duty cycle remained high from Orbit 15191 to Orbit 15393 when it returned to normal. MSS operation was suspended during the pitch flywheel anomaly between Orbit 15309 and 15393. See Table 1-1 for a summary of payload in-orbit operation.

Table 1-1. In-Orbit Payload System Performance Launch Thru Orbit 17804 (1/21/76) 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 Images		206,093
	AVG. Scenes/Day		176
	Total Area Imaged (millions of sq. n. mi.)		1,797
	ON TIME (hr.)		2,172
	ON/OFF Cycles		16,090
	% Real Time Images		78
	% Recorded Images		22
DCS	Messages at OCC		1,152,045
	Non-Perfect MSGS		90,691
	Max. DCP's ACTIVE/DAY		114
	Users		44
	Avg. MSG/ACTIVE 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		312
WPA-2	% Real Time Mode		78.
	% P/B Mode		22
	ON TIME (hr.)		2,106
	ON/OFF Cycles		13,802
WBVTR-1	% Record Mode		38
	% Playback Mode		41
	% Rewind Mode		20
	% Standby Mode		1
	Minor Frame Sync Error Count in P/B	Failed Orb.	9881
	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

SECTION 2

ORBITAL PARAMETERS

Landsat-1 launch and injection was satisfactory. After several 18-day ground trace repeat cycles, orbit maintenance burns were made in Orbits 938, 2416, 6390, 7826, 11367, 11464, 13611 and 14365. An unplanned orbit change occurred due to freon gas expended during the pitch flywheel emergency (Orbits 11125 and 11130).

No orbit maintenance burn occurred during this report period.

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.

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	922.913	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
23 Oct 1975	914.19	900.54	98.951	7285.531	0.000937	103.145	103.261	250.370	349.952	289.612
24 Jan 1976	914.39	900.32	98.936	7285.523	0.000966	103.145	103.261	2.826	80.147	177.049

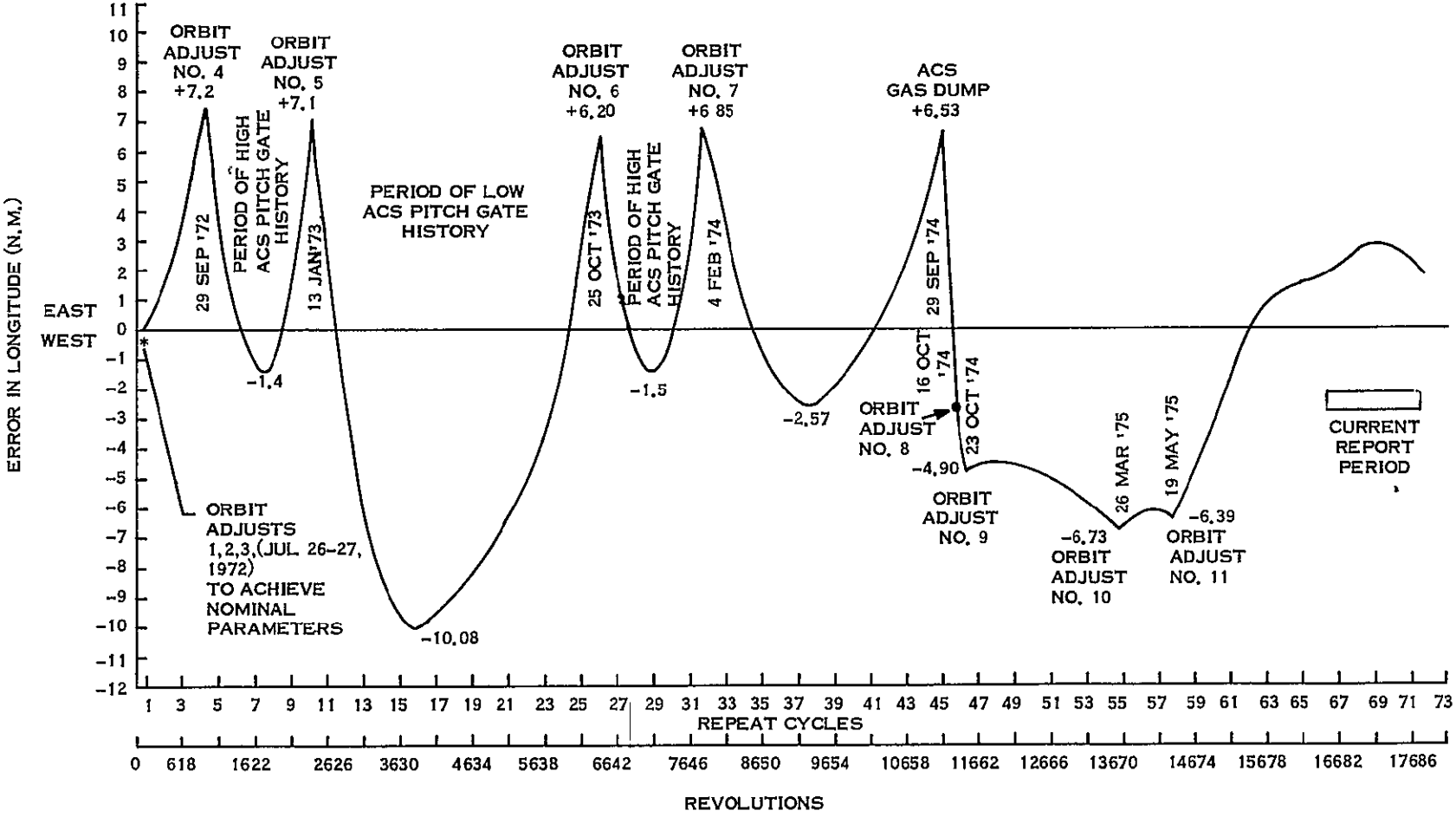

Figure 2-1. Effect of Orbit Adjusts on Landsat-1 Ground Track

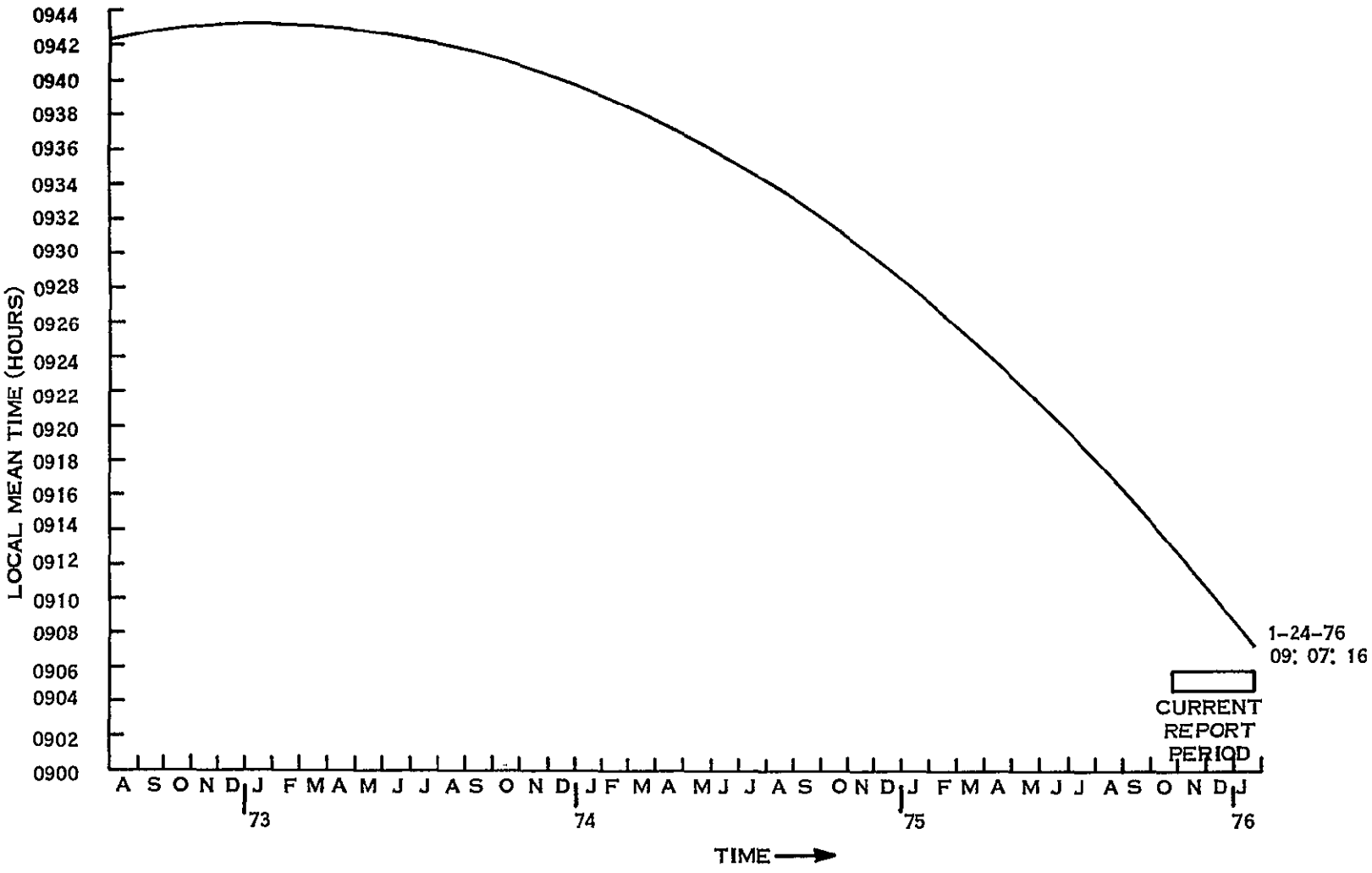

Figure 2-2. Local Mean Time of Descending Node

SECTION 3

POWER SUBSYSTEM (PWR)

LANDSAT-1

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. Solar array degradation was -28.3% at the end of 42 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 depending on the electrochemical degradation of the battery packs and the effect of increasing sun angle on array tracking (see Section 4 also).

A plot of measured and predicted midday solar array current is shown in Figure 3-1. Figure 3-2 shows actual and predicted midday solar array degradation. Figure 3-3 shows actual sun angles to the spacecraft and solar panels. Figure 3-4 is a prediction of the variation of sun angle through 1977 for Landsat-1 and 2.

It is noted in 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 Orbits 16702 and 16703 (3 November 1975) Landsat-1 passed through the partial solar eclipse over the Southern Hemisphere. Real-time adjustments to the auxiliary loads were made to compensate for the loss in array energy.

Battery 8 switched off in Orbit 15588 (15 August 1975), remained off-line throughout this report period The battery probably discharged to zero volts around 1 December 1975, though telemetry verification is impossible because the sensor threshold is 19.33 volts.

Beginning in Orbit 15794, (30 August 1975) an adjustment to the power management program has kept the batteries slightly undercharged to keep them within acceptable temperature limits.

Temperature spread between batteries has ranged from 7.5 to 12.5°C during the current report period, battery 5 in bay 14 having the highest temperature. The wider range and higher peak in temperature was caused by increased sun intensity and sun angle as well as a possible malfunction of the thermal shutter for bay 14. (See Section 11 also.) Battery packs averaged a typical 8.0 to 9.3% Depths of Discharge (DOD) with fairly good charge and discharge characteristics for individual batteries.

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 for 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.

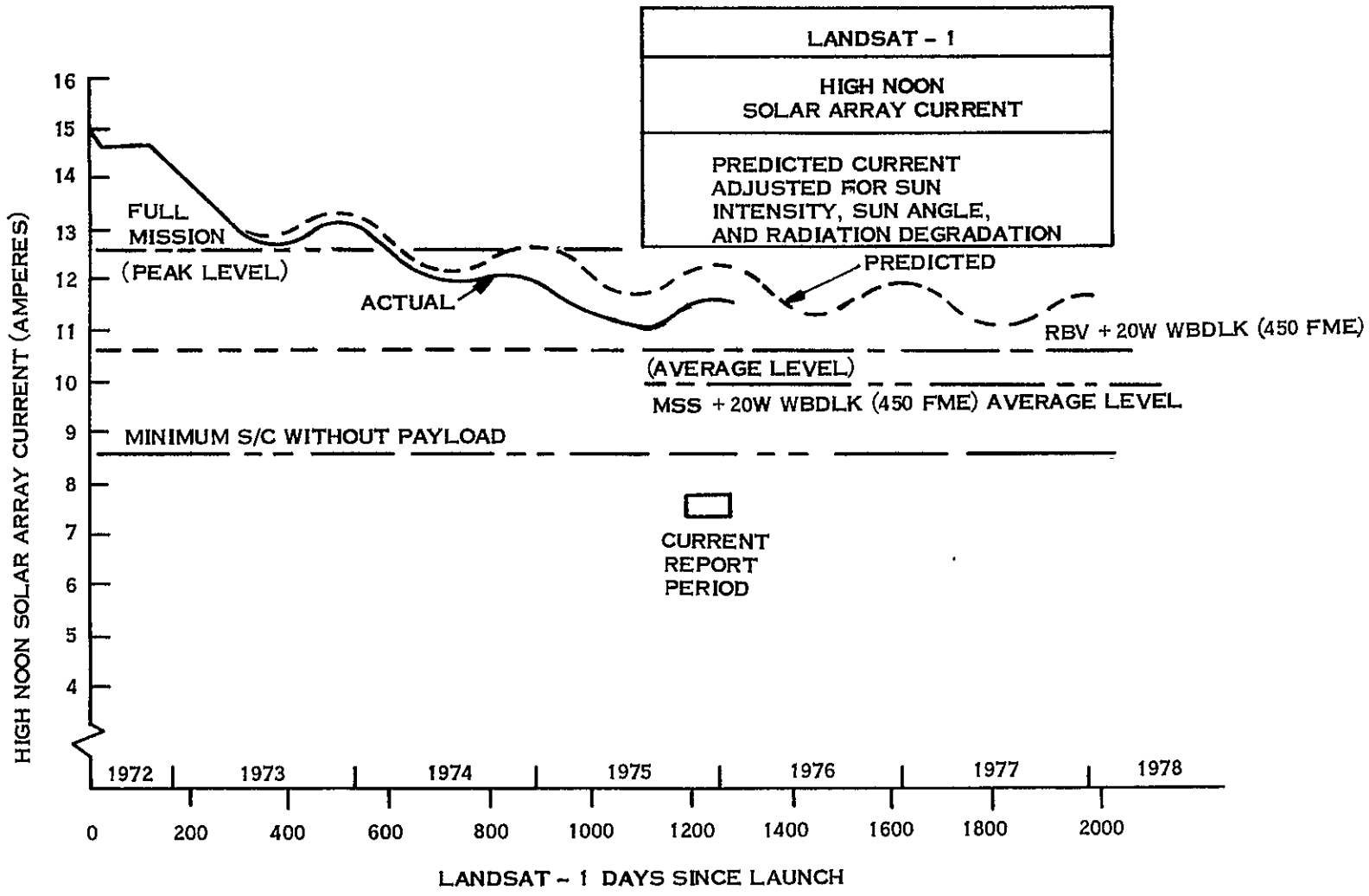

Figure 3-1. Midday Solar Array Current

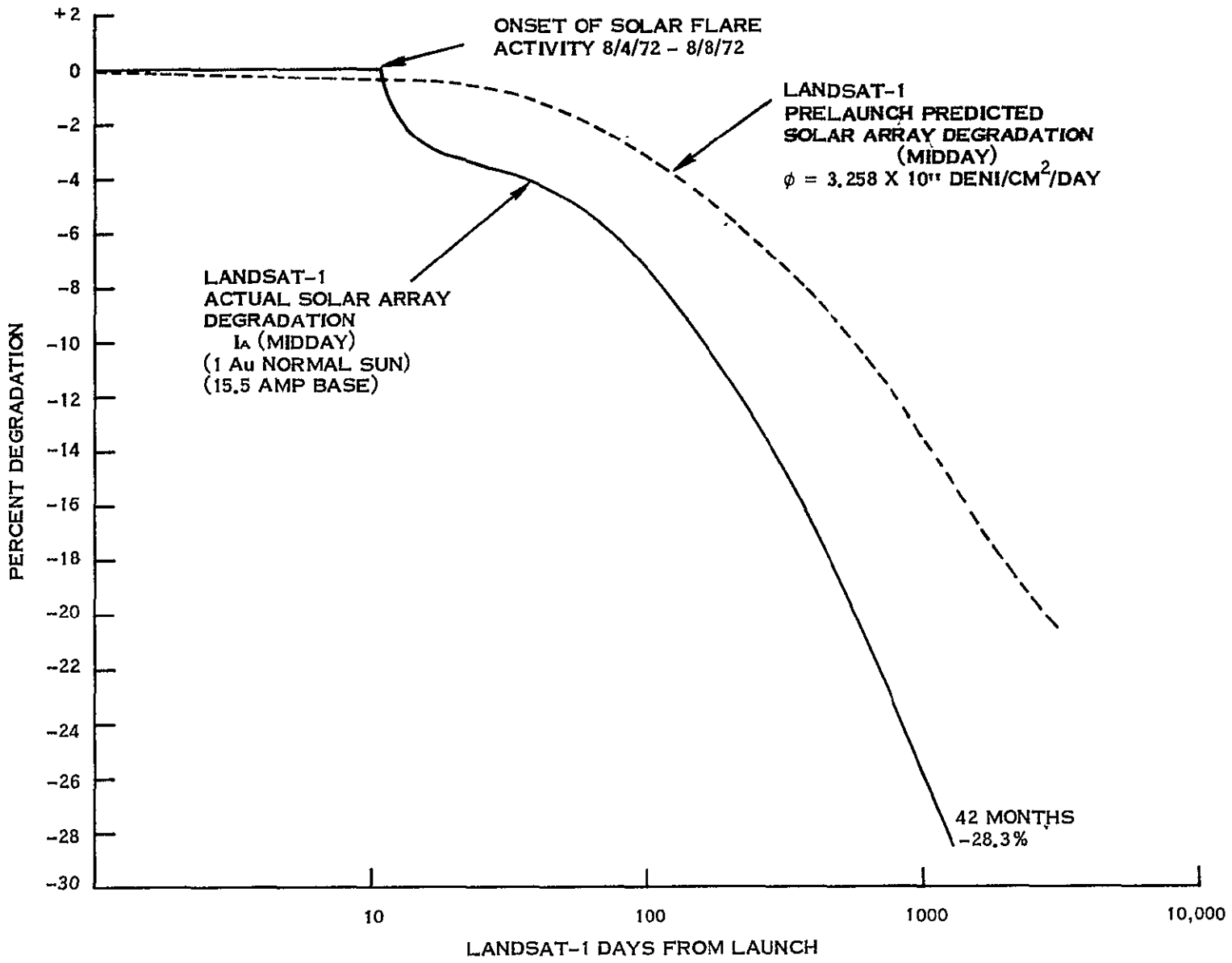

Figure 3-2. I_A (Midday) Degradation vs. Days

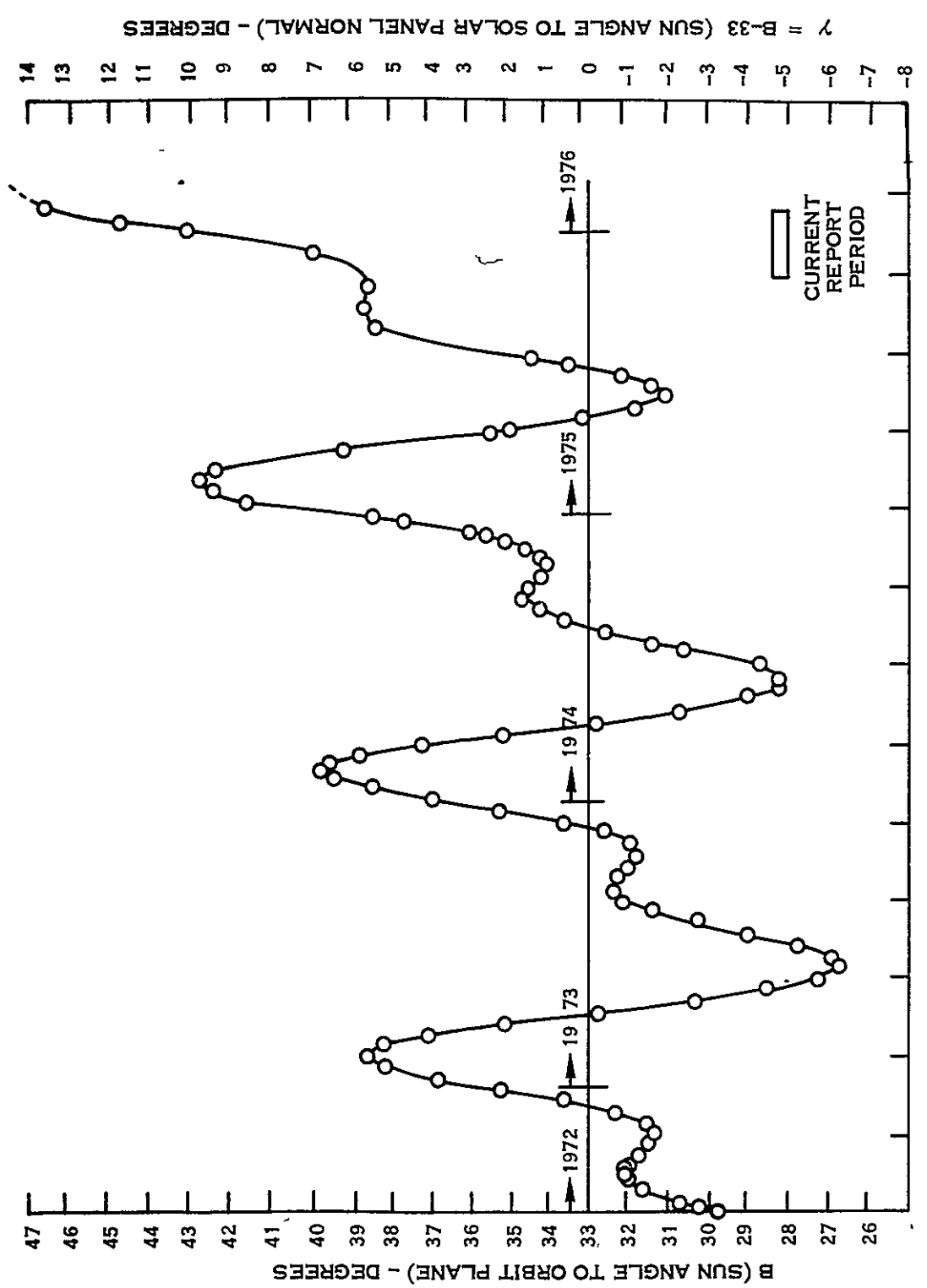

Figure 3-3. Actual β and γ (Paddle) Sun Angles, Landsat-1

FOLDOUT FRAME 1

FOLDOUT FRAME 2

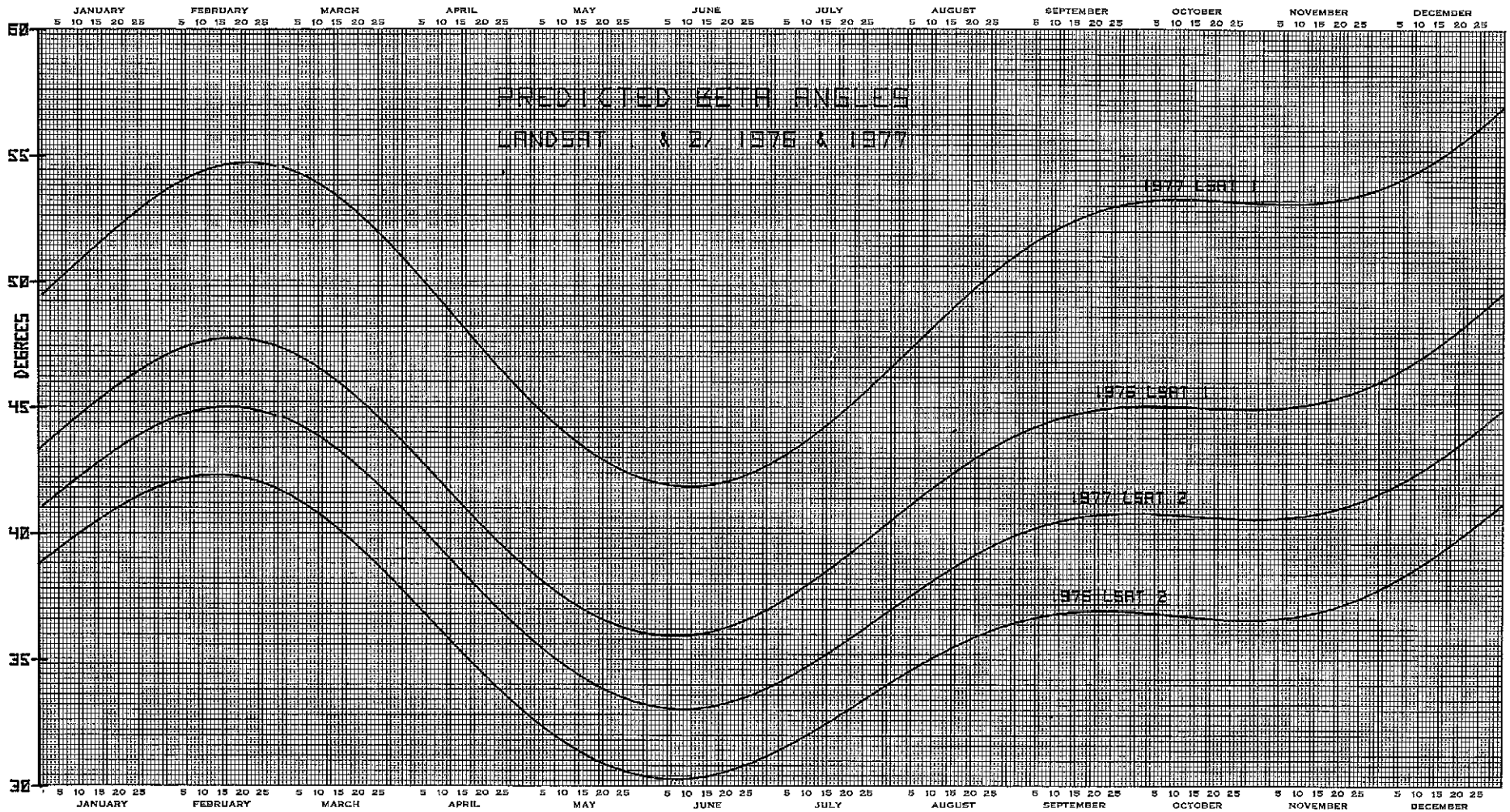

Figure 3-4. Predicted Beta Angles, Landsat 1 & 2, 1976 & 1977

LS-1

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

ORBIT NO.	26	5098	10178	15254	17003	17393	17853
BATT 1 MAX	32.48	32.91	33.25	33.16	32.57	32.05	32.14
2 CHGE	32.48	32.91	33.16	33.16	32.57	32.05	32.05
3 VOLTS	32.48	32.99	33.25	33.16	32.65	32.05	32.14
4	32.48	32.99	33.25	33.16	32.65	32.05	32.14
5	32.48	32.99	33.33	33.25	32.65	32.14	32.22
6 **	32.31	32.91	33.25	28.21	32.57	32.05	32.05
7	32.22	32.91	33.25	33.16	32.65	32.06	32.14
8 ***	32.14	32.91	33.25	33.16	21.81	--	--
AVERAGE +	32.38	32.92	33.25	33.17	32.62	32.06	32.13
BATT 1 END-	28.81	28.30	28.98	29.15	28.72	28.64	28.98
2 OF-	28.81	28.30	28.98	29.15	28.81	28.72	28.98
3 NIGHT	28.81	28.30	28.98	29.15	28.72	28.64	28.89
4 VOLTS	28.89	28.38	28.98	29.15	28.81	28.64	28.98
5	28.89	28.38	29.06	29.23	28.81	28.72	29.06
6 **	28.81	28.30	28.98	28.12	28.72	28.64	28.98
7	28.81	28.30	28.98	29.15	28.81	28.64	28.98
8 ***	28.81	28.30	28.98	29.15	21.81	--	--
AVERAGE +	28.84	28.32	28.99	29.16	28.71	28.66	28.97
BATT 1 (*) CHGE	13.11	13.58	13.96	15.27	14.89	14.68	13.93
2 SHARE	12.93	13.58	13.96	15.27	14.89	14.68	13.93
3 (%)	11.38	11.88	11.95	13.59	13.22	13.69	12.91
4	12.39	11.95	12.28	14.06	14.20	14.05	13.71
5	12.32	11.85	11.98	13.63	13.75	13.43	15.13
6 **	12.80	12.35	11.79	**	16.27	16.38	16.56
7	12.62	12.42	12.13	13.59	13.13	13.08	13.82
8 ***	12.45	12.10	11.98	14.54	***	***	***
BATT 1 LOAD	12.71	12.44	12.58	14.67	14.62	14.39	13.99
2 SHARE	12.90	13.62	13.70	15.88	14.79	15.07	14.35
3 (%)	11.43	11.91	12.28	13.85	13.50	13.94	13.05
4	12.77	13.01	13.12	14.91	14.68	14.74	14.54
5	12.54	12.42	12.60	14.02	13.58	13.09	14.85
6 **	12.53	12.21	11.30	**	15.25	15.22	15.09
7	12.80	12.41	12.50	13.77	13.61	13.50	14.08
8 ***	12.32	11.98	11.97	12.88	***	***	***
BATT 1 TEMP	21.11	24.65	24.76	23.12	22.14	22.59	23.23
2 IN	18.74	21.42	20.89	19.32	18.31	18.45	18.44
3 (^{o}C)	18.77	20.29	20.16	18.77	17.32	17.37	17.67
4	21.57	23.17	23.32	22.71	22.20	22.47	22.75
5	21.92	23.85	24.09	23.69	25.18	26.76	30.66
6 **	21.21	24.37	24.78	22.10	24.52	25.84	29.06
7	21.41	25.01	24.96	23.75	24.02	25.14	27.40
8 ***	21.82	25.14	25.24	24.59	23.13	23.91	25.49
AVERAGE	20.81	23.49	23.53	22.26	22.10	22.82	24.34
S/C REG BUS PWR (W)	176.8	153.4	165.0	137.9	123.4	123.0	123.1
COMP LOAD PWR (W) (P/O S/C REG BUS PWR)	49.0	84.9	41.9	29.4	17.4	17.4	17.4
P/L REG BUS PWR (W)	16.2	13.7	8.9	8.9	9.1	9.4	9.1
C/D RATIO	1.06	1.13	1.21	1.18	1.25	0.95	1.07
TOTAL CHARGE (A-M)	309.2	290.21	*258.3	229.29	211.54	157.15	164.92
TOTAL DISCHARGE (A-M)	290.9	256.28	214.2	194.13	169.71	165.51	153.49
SOLAR ARRAY (A-M)	1044.0	908.0	832.0	876.0	825.0	835.0	830.0
S.A. PEAK I (AMP)	15.8	13.68	12.44	11.60	12.00	12.00	11.68
MIDDAY ARRAY I (AMP)	15.01	12.80	N/A	11.04	11.36	11.44	11.28
SUN ANGLE (DEG)	-3.33	-3.54	-1.82	1.49	6.42	9.14	13.35
MAX R PAD TEMP (^{o}C)	+62.00	+68.00	63.20	62.0	64.40	65.60	63.20
MIN R PAD TEMP (^{o}C)	-62.00	-59.00	-42.79	-42.18	-38.54	-36.71	-33.68
MAX L PAD TEMP (^{o}C)	+57.90	+60.50	56.00	56.00	62.00	63.20	63.20
MIN L PAD TEMP (^{o}C)	-67.00	-64.00	-47.00	-46.25	-42.18	-40.96	-36.11

* After the telemetry failure in Orbit 4896 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.

** Battery 6 turned off in Orbit 14780 was returned to service in Orbit 15467.

*** Battery was turned off in Orbit 15588 and remained off through the end of this report period.

\+ Average of batteries on-line.

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

Function	Description	Unit	Orbits						
			26	5089	10182	15254	17004	17894	17854
6001	BATT 1 DISC	AMP	0.94	0.81	0.81	0.91	0.85	0.80	0.75
6002	2		0.95	*	*	*	*	*	*
6003	3		0.84	0.78	0.80	0.86	0.79	0.79	0.70
6004	4		0.93	0.86	0.86	0.92	0.86	0.83	0.79
6005	5		0.92	0.82	0.82	0.87	0.79	0.77	0.81
6006	6++		0.91	0.78	0.72	0.00	0.88	0.87	0.82
6007	7		0.94	0.82	0.80	0.85	0.79	0.77	0.76
6008	8**		0.91	0.77	0.78	0.80	0.00	0.00	0.00
6011	BATT 1 CHG	AMP	0.58	0.58	0.69	0.52	0.41	0.34	0.35
6012	2		0.57	*	*	*	*	*	*
6013	3		0.50	0.48	0.60	0.46	0.37	0.32	0.32
6014	4		0.54	0.51	0.60	0.48	0.39	0.33	0.34
6015	5		0.54	0.50	0.58	0.46	0.38	0.32	0.37
6016	6++		0.57	0.52	0.56	0.00	0.45	0.38	0.40
6017	7		0.55	0.53	0.60	0.46	0.36	0.31	0.34
6018	8**		0.55	0.52	0.58	0.49	0.00	0.00	0.00
6021	BATT 1 VOLT	VDC	30.87	31.24	31.64	31.62	31.08	30.81	30.84
6022	2		30.87	31.25	31.66	31.62	31.07	30.80	30.83
6023	3		30.87	31.25	31.66	31.62	31.07	30.79	30.82
6024	4		30.90	31.28	31.70	31.65	31.10	30.83	30.86
6025	5		30.95	31.33	31.75	31.71	31.16	30.90	30.92
6026	6++		30.86	31.24	31.65	28.18	31.06	30.79	30.82
6027	7		30.89	31.27	31.68	31.64	31.10	30.83	30.86
6028	8**		30.89	31.27	31.68	31.63	21.81	-	-
6031	BATT 1 TEMP	DGC	21.17	24.48	26.09	23.02	22.17	22.60	23.23
6032	2		18.80	21.39	22.81	19.28	18.36	18.43	18.44
6033	3		18.76	20.17	21.26	18.76	17.35	17.38	17.56
6034	4		21.57	23.04	23.88	22.69	22.24	22.47	22.73
6035	5		21.84	23.77	24.78	23.64	25.22	26.74	30.63
6036	6++		21.24	24.27	25.78	22.08	24.56	25.85	29.03
6037	7		21.43	24.38	26.09	23.67	24.06	25.15	27.41
6038	8**		21.86	25.02	26.21	24.51	23.13	23.91	25.53
6040	RT PAD TEMP	DGC	25.82	27.22	27.16	27.29	32.08	33.45	33.36
6041	R PAD V N	VDC	33.40	33.85	34.36	34.18	33.09	32.56	31.71
6042	R PAD V M	VDC	33.29	33.50	33.60	32.92	31.85	31.46	31.03
6044	LT PAD TEMP	DGC	14.14	16.61	19.11	19.84	25.57	27.30	28.96
6045	L PAD V F	VDC	33.69	34.16	34.67	34.63	33.82	33.50	33.44
6046	L PAD V G	VDC	33.68	34.19	34.72	84.68	33.87	33.54	33.47
6050	S/C UR BUS V	VDC	31.24	31.68	32.60	32.07	31.52	31.22	31.25
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	23.49	23.50	23.49	23.48
6053	AUX REG B V	VDC	23.50	23.50	23.50	23.50	23.50	23.50	23.50
6054	SOLAR I	AMP	14.87	12.69	11.60	10.83	11.14	11.10	10.74
6055+	S/C RG BUS I	AMP	7.11	6.27	6.80	5.63	5.04	5.03	5.03
6056+	S/C RG BUS I	AMP	7.11	6.27	6.79	5.62	5.03	5.01	5.02
6058	PC MOD T 1	DGC	21.82	23.23	23.22	20.63	19.72	19.70	19.75
6059	PC MOD T 2	DGC	21.66	22.53	23.00	21.17	20.39	20.39	20.54
6070	P/L RG BUS V	VDC	24.66	24.68	24.68	24.68	24.67	24.66	24.66
6071	P/L UR BUS V	VDC	31.08	31.53	31.92	31.92	31.36	31 06	31.08
6072+	P/L RG BUS I	AMP	0.57	0.56	0.36	0.36	0.37	0.37	0.38
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	21.44	20.92	20.92	21.14
6076	PR MOD T 2	DGC	20.34	21.45	21.84	19.88	19.59	19.59	19.84
6079	FUSE BLOW V	VDC	24.56	24.57	-24.60	24.59	24.58	24.59	24.57
6080	SHUNT 1 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6081	SHUNT 2 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6082	SHUNT 3 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6083	SHUNT 4 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6084	SHUNT 5 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6085	SHUNT 6 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6086	SHUNT 7 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6087	SHUNT 8 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6100	P/L RG BUS I	AMP	0.58	0.56	0.36	0.36	0.37	0.37	0.38
Total No.	MAJOR FRAMES	FRM	764.0	389.0	384.0	785	786	785	787

*Function 6002, 6012, missing data resulted from disabled telemetry resulting from IC chip failure which affected charge current directly and discharge current indirectly.

+FUNC 6055, 6056, 6072 data is derived from Pseudo FUNC 6155, 6156, 6172 used after charge to Mode 11.

++Battery 6 turned off in Orbit 14780 was returned to service in Orbit 15467.

**Battery 8 was turned off in Orbit 15588 and remained off through the end of this report period.

SECTION 4

ATTITUDE CONTROL SYSTEM (ACS)

LANDSAT-1

SECTION 4

ATTITUDE CONTROL SYSTEM (ACS)

Landsat-1's ACS system accurately maintained the spacecraft's attitude even though the Pitch Flywheel was malfunctioning during the first days of this report period.

With the exception of Orbits 16557 (24 October 1975) through 16613 (28 October 1975), the Pitch Flywheel performed normally and its duty cycle averaged less than 7%. During Orbits 16557 through 16613, the Pitch Flywheel's duty cycle rose about 45% and several short term 100% duty cycles resulted in momentary Pitch Flywheel stoppages. The condition cleared itself without intervention in Orbit 16614 (28 October 1975); MSS activities were not affected during this interval.

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

Due to the Pitch Flywheel's malfunction history, the ACS system is commanded into the Normal mode only during the six consecutive daily orbits of MSS activity. During the remaining daily orbits of non-MSS activity, the ACS system is commanded into the Roll Diff Tach High Gain mode to unload Roll momentum and conserve freon.

Positive 0.6° Pitch Position Bias is employed to limit the Pitch Wheel's speed between -10 RPM and -100 RPM and to prevent it from "siezing" with an excess of stored momentum.

Since continuous NBTR coverage is no longer available to account for all pneumatic gating, Figure 4-1 was prepared to approximate average gating frequency. The approximate slope of the curve in Figure 4-1 indicates a gating frequency of approximately 4, -Roll gates per day. Figure 4-1 also shows that the freon pressure dropped the fastest between Orbits 17000 (24 November '75) and 17160 (6 December '75). These orbits occurred during Landsat 1's seasons of maximum gating activity, and the pressure drop this period is consistent with Landsat 1's seasonal gating history.

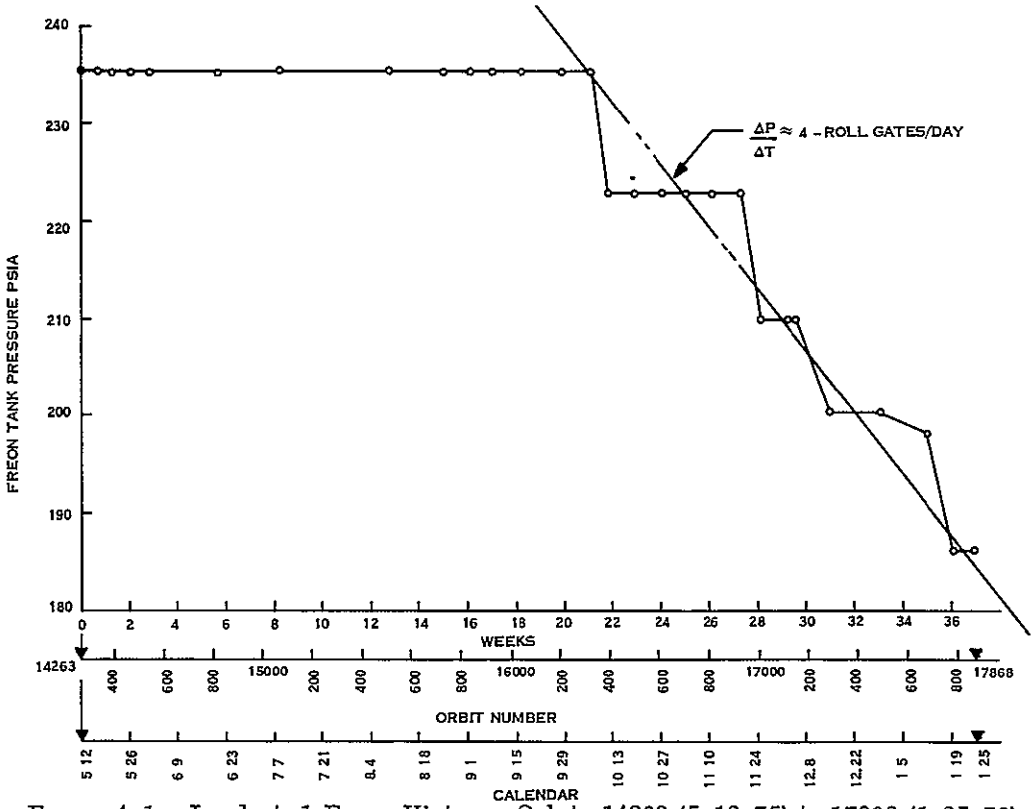

Figure 4-1. Landsat-1 Freon History, Orbits 14263 (5-12-75) to 17868 (1-25-76)

Figure 4-2 predicts Landsat-1's remaining freon life as a function of gating frequency and Figure 4-3 plots remaining Roll gates as a function of tank pressure.

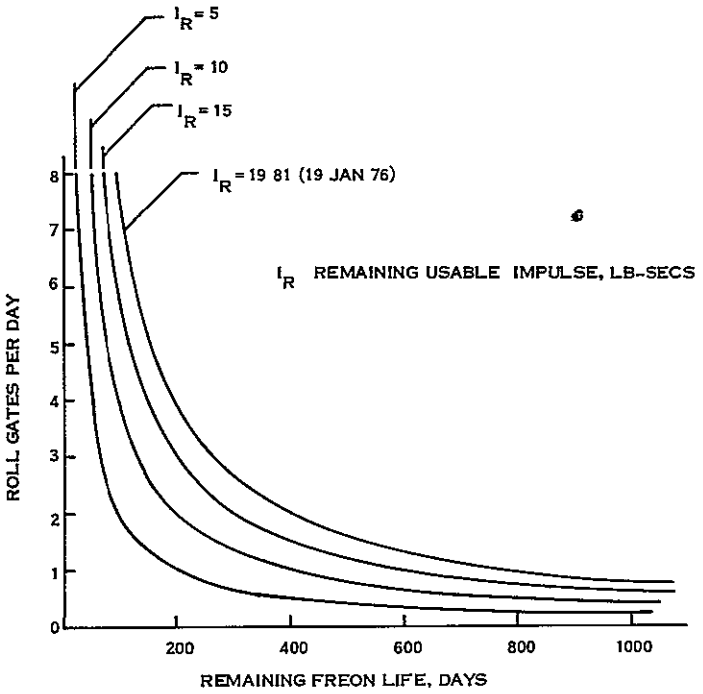

Figure 4-2. Landsat-1 Remaining Freon Life vs. Gating Frequency

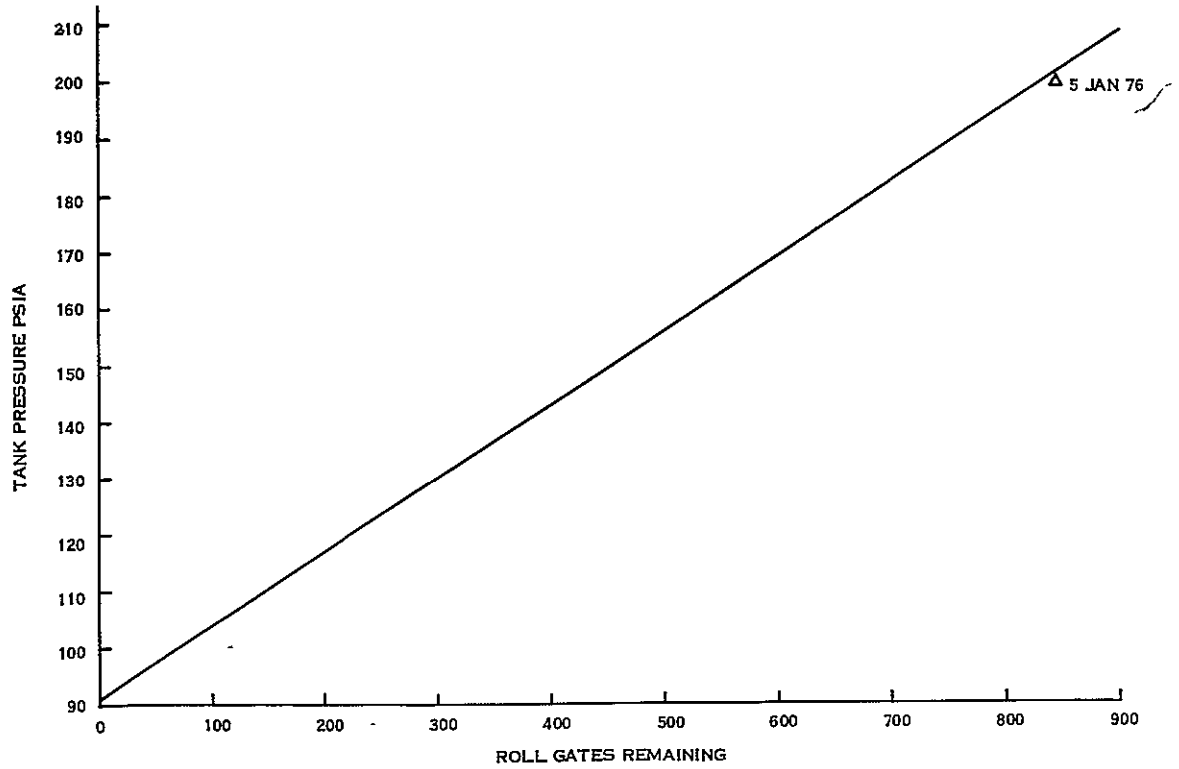

Figure 4-3. Landsat-1 Pressure - Roll Gate, Prediction

During early January, 1976, (approximately Orbit 17660, 11 January 1976) solar array tracking errors began to appear due to the increasing value of Beta angle. As Beta increased, the sun sensors' field of view for optimum response is exceeded, particularly with the ACS in the Normal mode where sun sensor shadowing exists. When the ACS is commanded into the Roll Diff Tach High Gain mode, the spacecraft assumes a minus Roll attitude error which causes the Right Sun Sensor to rotate toward the sun. The Sun Sensor receives more exposure and drives the Right Solar Array into alignment with the sun. Left Solar Array tracking error is relatively constant at 6^{o} to 8^{o} lagging, regardless of ACS mode.

Maximum values of Beta angle increase cyclically with time and during this season, should peak at 47.8^{o} on 18 February 1976. The effect of solar array misalignment on payload operations during this season should be minimal; however, as maximum Beta angle values continue to increase in the future, solar arry tracking will degrade accordingly.

RMP 1 is functioning normally. Pressure/temperature ratios have all been satisfactory.

The forward scanner pressure decreased from 2.81 in Orbit 16530 (21 October 1975) to 2.80 in Orbit 17868 (25 January 1976) 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	15254	16530	17408	17826
1084 RMP 1 Gyro Temperature	DGC	44.5	23.06	21.22	42.40	43.11	43.83	43.32
1094 RMP 2 Gyro Temperature	DGC	74.3	75.10	43.45	24.05	25.15	26 08	25.68
1222 SAD RT MTR HSING Temp	DGC	21.1	22.00	20.55	22.89	23.69	24.54	23.57
1242 SAD LT MTR HSING Temp	DGC	27.0	30.38	28.18	29.53	30 79	31.74	31 31
1223 SAD RT MTR WNDNG Temp	DGC	25 3	26.54	24 63	27.06	27.45	28 10	27.15
1243 SAD LT MTR WNDNG Temp	DGC	28.7	32.92	30 32	31 98	33.44	34.52	33.94
1228 SAD RT HSG Pressure	PSI	7 6	7.35	7.12	6.88	6 88	6 85	6 80
1248 SAD LT HSG Pressure	PSI	7.0	6 86	6 47	6.18	6.18	6 13	6.10
1007 FWD Scanner MTR Temp	DGC	19.8	19.88	18 46	20.36	20.63	21.14	20.67
1016 Rear Scanner MTR Temp	DGC	20 5	19.83	17 86	19.24	20.02	20 68	20.19
1003 FWD Scanner Pressure	PSI	4.6	4 02	3.50	3.00	2.81	2 80	2.80
1012 Rear Scanner Pressure	PSI	7.8	7.87	7.44	6 97	6.96	6.96	6 96
1212 Gas Tank Pressure	PSI	1988.0	1702 34	1454.19	235 44	223 05*	202.86	186.06
1210 Gas Tank Temperature	DGC	22 6	24 30	22.56	24.36	25.20	25.88	25.30
1213 Manifold Pressure	PSI	56.7	57 44	58.73	61.67	61.30	61.65	61.67
1211 Manifold Temperature	DGC	21 9	23.62	21.77	23.82	24.78	25.59	24 97
1059 CLB Power Supply Card Temp	DGC	37.1	40.54	38.83	40.58	41.46	42 19	41.66
1260 ACS Baseplate 1	DGC	25.4	27.93	25.36	26.54	27.84	28.87	28.57
1261 ACS Baseplate 2	DGC	22.9	24.73	23.00	25 05	26 14	27.04	26.65
1262 ACS Baseplate 3	DGC	23.4	23.69	21.97	24.95	25.85	26 66	26.00
1263 THO1 STS	DGC	-6 8	-0.97	-3.41	1.22	5.29	6 91	7.58
1264 THO2 STS	DGC	-14.6	-9.42	-8.27	-4.50	-1.96	-1.17	1 74
1265 THO3 STS	DGC	-3.1	9.31	7.58	12.92	15.91	17.84	19.67
1266 THO4 STS	DGC	-13.9	2.85	-1.85	2.40	5 29	7.61	7.06
1267 THO5 STS	DGC	-8.9	-1.16	-5.17	2.92	9 37	11.62	13.56
1224 SAD R FSST	DGC	39 5	60.21	63.25	64 74	66.72	66.83	64.16
1244 SAD L FSST	DGC	27.1	51.11	53.21	54.69	57.40	58.99	59.65

*Pressure OROP due to PCM count step, not to loss of freon

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

Function	Units	Orbit						
		31	5099	10182	15254	16530	17408	17826
1057 CLB Power Supply Volts	TMV	2.8	2.78	2.78	2.78	2.8	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	.11	.11	.11	.11
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	-23.78	-23.78	-23.76	-23.76
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	-3.85	-3.67	-3.64	-3 65
1240 SAD LT MTR WNDNG Volts	VDC	-4.8	-4.09	-3.36	-3.43	-3.50	-3.39	-3.37
1227 SAD RT -15 VDC Conv.	VDC	14.9	14 88	14.89	14 87	14.87	14.87	14.87
1247 SAD LT -15 VDC Conv.	VDC	15 2	15.13	15.14	15.06	15.10	15.09	15 10
1056 CLB ± 6 VDC	TMV	2.4	2 35	2.35	2.35	2.35	2.35	2.35
1055 CLB ± 10 VDC TMV	TMV	2.75	2.75	2.74	2.74	2 74	2.74	2.74

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

Function	Units	Orbits						
		13198	13569	14001	15254	16530	17408	17826
1141 Pitch Fine-Error	DEG	- 0.40	- 0 08	- 0 02	- 2 13	- 82	- .79	- .80
1143 Pitch Flywheel Speed	RPM	- 10.49	- 26.86	- 1.21	12.92	- 43.34	- 76 11	- 66 00
1038 Pitch MTR DRVR CCW	PCT	4.96	5 81	4.55	3.28	5.19	3.30	2.52
1039 Pitch MTR DRVR CW	PCT	2.29	2.17	5.10	19.65	1.65	1.52	.58
1030 Roll Fine Error	DEG	- 2.25	- 0.20	- 0.20	- 2.52	- 2.53	- 2.50	- 2.86
1127 Roll Rear Flywheel Speed	RPM	715.78	756.92	782.08	714.05	716.75	726.87	734.39
1126 Roll Fwd Flywheel Speed	RPM	641 82	674.47	693 31	641 32	642.77	646.51	643.76
1022 Roll Rear MTR DRVR CCW	PCT	0.01	0.68	0.90	.13	.03	.01	.00
1025 Roll Rear MTR DRVR CW	PCT	4.26	5.22	5.52	4.17	4 15	4.45	4.57
1023 Roll Fwd MTR DRVR CCW	PCT	0.01	0.66	0.72	.08	.03	.02	.00
1024 Roll Fwd MTR DRVR CW	PCT	4.15	4.94	5.35	4.24	4.13	4.01	4.11
1035 Yaw Tach	RPM	-206.08	-116.50	- 93.72	-169.52	-202.90	-216.35	-199.31
1033 Yaw MTR DRVR CW	PCT	0.04	1.53	1.84	.09	.04	08	.05
1034 Yaw MTR DRVR CCW	PCT	0.07	1.60	1.76	.68	.68	62	.57
1221 SAD Right Tach	DEG/MIN	3.37	3.37	2.81	3.37	3.38	3.37	3.41
1241 SAD Left Tach	DEG/MIN	2 80	2.81	2 81	2.79	2 77	2.78	2.76

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

SECTION 5

COMMAND CLOCK SUBSYSTEM (CMD)

LANDSAT-1

SECTION 5

COMMAND CLOCK SUBSYSTEM (CMD)

The Command Clock Subsystem operated nominally in this report period. On January 1, 1976, during Orbit 17516, the spacecraft clock was advanced by approximately 4 seconds. This over-compensation was adjusted on 2 January during Orbit 17542 by moving the clock back by about 4 seconds. Figure 5-1 shows the history of the S/C clock drift since launch.

Figure 5-2 shows the cumulative drift since launch (15.5 seconds slower in 39 months). The rate of drift is also shown. The rate now is increasing, having bottomed out at the end of 3 years at -0.55 milliseconds per orbit. Table 15-1 shows typical telemetry values since launch. All are nominal.

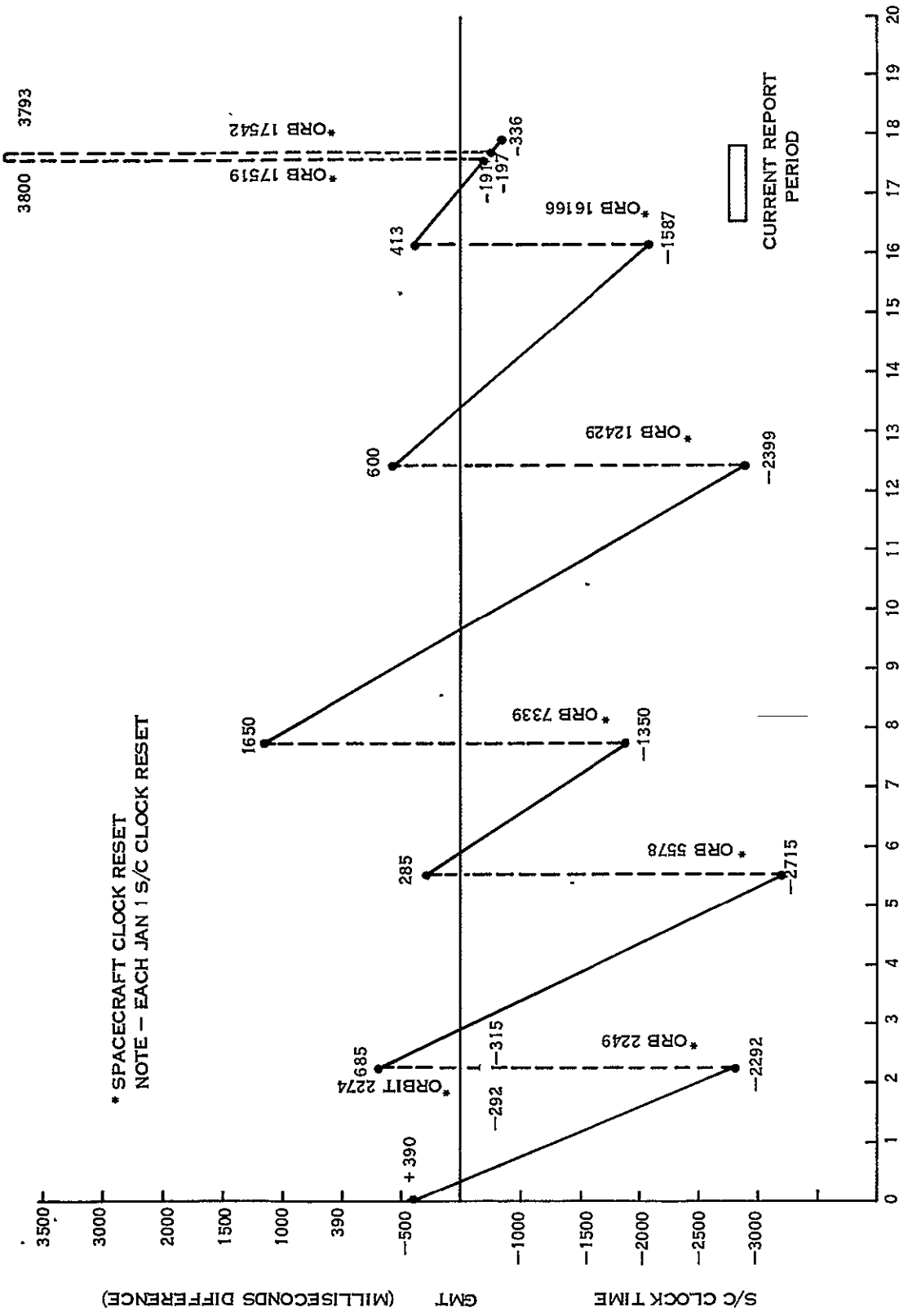

Figure 5-1. Landsat-1 Spacecraft Clock Drift History

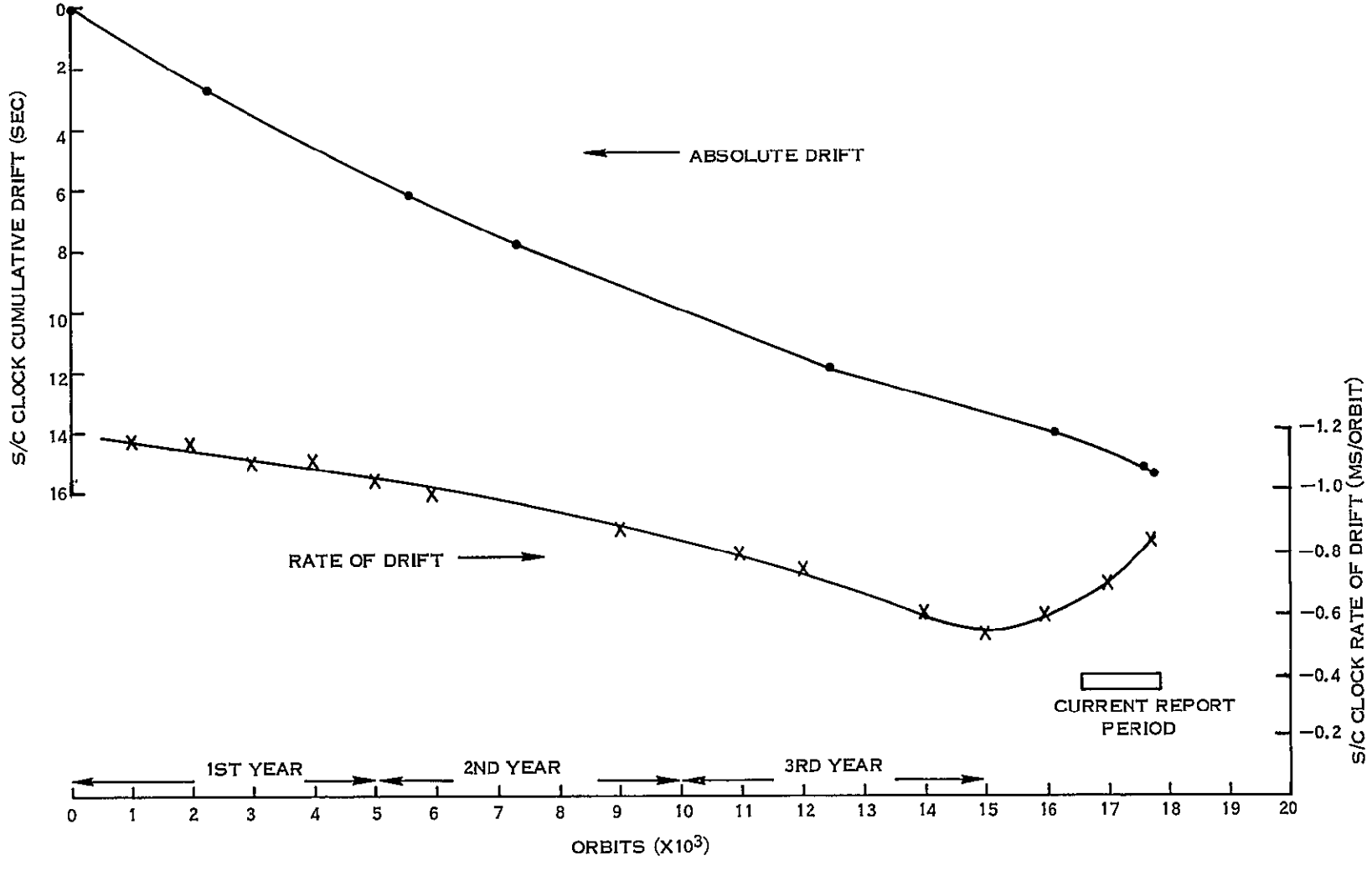

Figure 5-2. Landsat-1 Spacecraft Drift and Drift Rate

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

Function No	Name	Mode	Units	Orbit					
				35	5099	10182	16987	17405	17824
8005	Pri. Power Supply Temp	-	°C	37.31	39.37	39.50	38 19	38 17	37.63
8006	Red. Power Supply Temp	-	°C	35 73	38 08	38 38	37 05	37 01	36 99
8007	Pri. Osc Temp	-	°C	31.14	31.98	32 11	31 11	31 14	31 11
8008	Red. Osc Temp	-	°C	30 47	31.39	31.42	30 48	30.48	30 48
8009	Pri. Osc Output	-	TMV	0 95	0 96	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	2 96	3.11	3 12
8012	10 kHz	Pri.-Red.	TMV	3 10	3 07	3 08	3 08	3 07	3 08
8013	2 5 kHz	Pri -Red	TMV	2 95	2 95	2 95	2 96	2 95	2 96
8014	400 Hz	Pri -Red	TMV	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
8016	Red +4 V Power Supply	Red Clk ON	VDC	3 95	3 95	3 95	3 95	3 94	3 94
8017	Pri +6 V Power Supply	Pri Clk ON	VDC	6 06	6 07	6 07	6 10	6 09	6 10
8018	Red +6 V Power Supply	Red. Clk ON	VDC	6 00	5 94	5 94	5 96	5 95	5 96
8019	Pri -6 V Power Supply	Pri Clk ON	VDC	-6 02	-6 02	-6 03	-6 04	-6 03	-6 03
8020	Red -6 V Power Supply	Red Clk ON	VDC	-5 99	-6 00	-6 00	-6.01	-6 00	-6 00
8021	Pri -23 V Power Supply	Pri Clk ON	VDC	-22.88	-22.89	-22 89	-22.93	-22.92	-22 92
8022	Red -23 V Power Supply	Red Clk ON	VDC	-22 98	-23 00	-23 01	-23 04	-23 05	-23 04
8023	Pri -29 V Power Supply	Pri Clk ON	VDC	-29 13	-29.16	-29 15	-29.14	-29 13	-29.13
8024	Red -29 V Power Supply	Red. Clk ON	VDC	-29 07	-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	-12.35	-12 35	-12 35
8102	CIU B -12 V	CIU B ON	VDC	-12 26	-12 26	-12 23	-12 26	-12 26	-12 26
8103	CIU A -5 V	CIU A ON	VDC	-5 32	-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
8105	CIU A Temp	CIU A ON	°C	24 47	24 77	25 04	24 41	24 61	24 58
8106	CIU B Temp	CIU B ON	°C	24 96	25 31	25.45	24.81	24 99	24.92
8201	Receiver RF-A Temp	-	°C	**	**	28.67	27 28	27 32	27.14
8202	Receiver RF-B Temp	-	°C	27 98	28 22	**	**	**	**
8203	D MOD A Temp	-	°C	25 41	25.73	37 98	36.79	36 99	36 87
8204	D MOD B Temp	-	°C	35 03	35 61	26.12	25 00	25 00	24 89
8205	Receiver A AGC	Receiver A ON	DBM	**	**	-96 77	-94 72	-83.77	-89.11
8206	Receiver B AGC	Receiver B ON	DBM	-94.74	-84 67	**	**	**	**
8207	Amp A Output	Receiver A ON	TMV	**	**	2 31	2 54	2 74	2 81
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 10	1 10	1 10
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 12	1 10	1 11
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
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 39	5 39	5 39
8218	Regulator B -10 V	Receiver B ON	TMV	5.50	5.50	**	**	**	**

**Units not in use

SECTION 6

TELEMETRY SUBSYSTEM

LANDSAT-1

SECTION 6

TELEMETRY SUBSYSTEM (TLM)

The Telemetry Subsystem has performed nominally in this report period. Table 6-1 shows typical telemetry values since launch. Telemetry values are nominal despite the drift upwards of temperatures. As seen in Section 11, spacecraft temperatures reached all-time high values during this period. These temperatures are expected to subside to prior levels as the earth's distance from the sun increases in its yearly orbit. Functions 1011, 6012, 7010 and 12238 remain inoperative.

Memory, Section 11, continues to be used in the telemetry matrix.

Table 6-1. TLM Telemetry Summary

Function No.	Function Name	Unit	Orbit						
			35	5099	10592	15233	16987 ~	17405	17824
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	21 94	20 72	20 00	22 97
9004	Formatter A Converter	VDC	5 99	5.99	5.99	5 99	5 99	5 99	6 02
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	23.55	25 79	26 15	32 03
9009	Analog Mux A Converter	VDC	26.01	21.18	26.20	26 32	26 34	26 35	26 35
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 Temp	°C	25.00	26.83	27 49	25 63	26 38	27 25	29 10
9014	Preregulator A Voltage	VDC	19 93	19.95	19 94	19 98	19 99	19 98	19 99
9015	Preregulator B Voltage	VDC	**	**	**	**	**	**	**
9016	Reprogrammer Temp	°C	22.00	22.50	22.53	22 50	23 50	23 35	27 41
9017	Memory A Converter	VDC	6 00	5.99	6.00	5 97	5 97	5.97	6 00
9018	Memory A Temp	°C	17.51	17 50	17.50	17 50	17.17	15 95	17 59
9019	Memory B Converter	VDC	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.68	17.63	17.51	17 50	16 32	16 15	18 30
9100	Reflected Power (Xmtr A)	dBm	11.95	12.32	12.38	11.37	12 53	12 25	13 10
9101	Xmtr A -20 VDC	VDC	-19.75	-19 76	-19.75	-19 84	-19 82	-19 83	-19 82
9102	Xmtr B -20 VDC	VDC	**	**	**	**	**	**	**
9103	Xmtr A Temp	°C	20 95	21 14	22.01	21 98	23 82	24 17	31 92
9104	Xmtr B Temp	°C	21.69	21.95	22 76	22 91	25 30	25 37	33 54
9105	Xmtr A Power Output	dBm	25.12	25.35	25.24	25.00	24 88	24 86	25 00
9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**

** Units not used since prelaunch

SECTION 7

ORBIT ADJUST SUBSYSTEM (OAS)
LANDSAT-1

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.

No orbit adjustment was made during this report period.

The subsystem pressure/temperature parameters continue to be normal. During this report, there has been a considerable rise in the temperature of the -Y thrust chamber due to increased sun intensity and sun angle (See Section 11 Also). There is 64.85 pounds of hydrazine fuel remaining from an initial pre-launch load of 67.00 pounds. Figure 2-1 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. In Table 7-2, it should be noted that the first four sample orbits occurred in periods of low sun intensity.

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 %	2.15	540	75	-X
44	2.	26 Jul 72 21 44 46	250.0	1975	103.4%		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	12 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 21 40 00 4	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	101 8%	0 01	490 09	72.5	+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	15254	17004	17394	17854
2001	Prop. Tank Temp.	^{o}C	22.03	22.86	23.28	21.62	22.03	22.69	24.07
2003	Thrust Chamber No. 1 (-x) Temp. **	^{o}C	29.57	29.93	30.55	30.52	29.83	28.93	26.52
2004	Thrust Chamber No. 2 (+x) Temp. **	^{o}C	38.76	40.28	38.91	36.25	37.99	37.53	35.93
2005	Thrust Chamber No. 3 (-y) Temp. **	^{o}C	34.55	34.41	36.09	38.45	46.35	50.05	57.50
2006	Line Pressure	psia	539.29	486.87	490.61	486.87	490.51	490.83	494.55

** 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)

LANDSAT-1

SECTION 8

MAGNETIC MOMENT COMPENSATING ASSEMBLY (MMCA)

The spacecraft was corrected for unbalanced magnetic moments in Orbits 73, 85, 110, 220, 11181, 11185, and 11186, 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	15254	17004	17394	17854
4001	A1 Board Temp	°C	19.77	19.03	19.11	17.59	17.20	17.20	17.59
4002	A2 Board Temp	°C	23.58	23.05	23.13	21.83	21.46	21.47	21.79
4003	Hall Current	TMV	3.48	3.48	3.48	3.47	3.48	3.48	3.47
4004	Yaw Flux Density	TMV	3.11	3.11	3.15	4.02	4.03	4.03	4.03
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	3.27	3.28

SECTION 9

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

LANDSAT-1

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. Telemetry values are nominal despite the drift upwards of temperatures. As seen in Section 11, spacecraft temperatures reached all-time high values during this period. These temperatures are expected to subside to prior levels as the earth's distance from the sun increases in its yearly orbit.

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. The scatter of data points reflect variations in the ground station calibration and readout.

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

Functions			Orbit						
No.	Name	Units	35	5099	10592	15233	16987	17405	17824
11001	USB Rcvr AGC	DBM	-122 78	-131.99	-129.81	-105 41	-97 18	-98.05	-114.78
11002	USB Xmtr Pwr	WTS	1.60	0.29	1.54	1.53	1.52	1 47	1.55
11003	USB Rcvr Error	KHZ	21.79	-21.32	-23.25	-18.01	-13.98	-9.69	-17.52
11004	USB Xpond Temp	DGC	22.92	22.64	25 64	25.11	26 58	29.45	32.19
11005	USB Xpond Press	PSI	15.91	15.91	15.92	15.94	16.04	16.14	16.34
11007	USB Xmtr A -15V	VDC	-15.20	-15.20	**	**	0.0	0.0	0.0
11008	USB Xmtr B -15V	VDC	**	**	-15.20	-14.96	-15.20	-15.20	-15.20
11009	USB Range -15V	VDC	-14.76	-14.76	-14.58	-14.58	-14.58	-14.58	-14.58
11101	PMP Pwr A Volt	VDC	-15.12	-15.18	**	**	0.0	0.0	0.0
11102	PMP Pwr B Volt	VDC	**	**	-15.12	-14.82	-14.78	-14 75	-14.81
11103	PMP Temp A	DGC	30.44	30.23	26.60	26.09	28.50	31.86	36.90
11104	PMP Temp B	DGC	**	**	31.64	31.67	33.42	37.10	42.29

** Units Not in Use

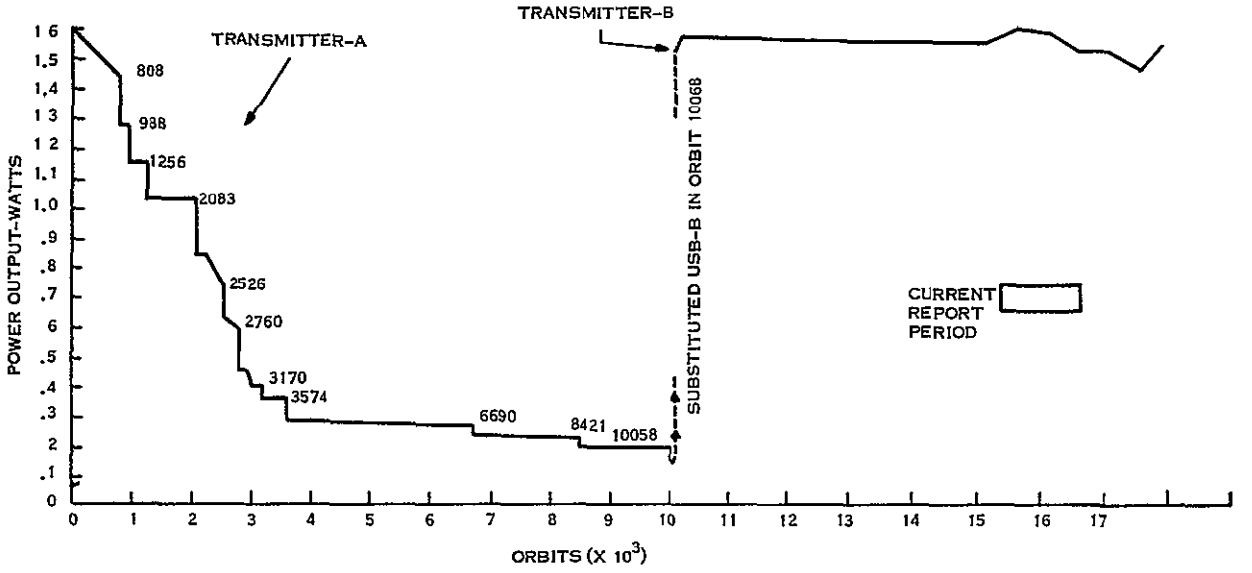

Figure 9-1. USB Power Output History (Landsat-1)

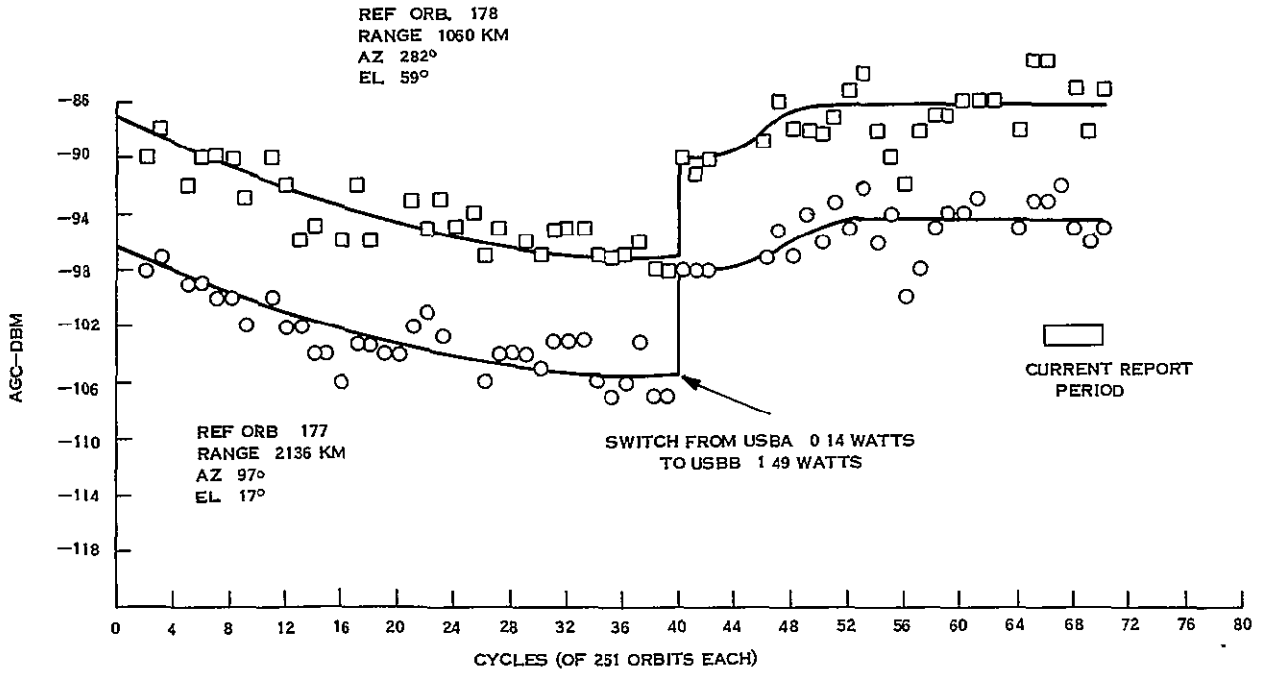

Figure 9-2. USB (Link 4) AGC Readings at Goldstone with 30' Antenna, Landsat-1

SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM

LANDSAT-1

SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM (EIS)

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	15254	17004	17394	17854
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	26.82	28.20	29.14	31.49

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 circuits have been operating 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

LANDSAT-1

SECTION 11

THERMAL SUBSYSTEM (THM)

The Thermal Subsystem on Landsat-1 has maintained adequate control of spacecraft temperatures since launch. However, temperatures along bay 11 through 17 reached all-time peaks during this report period. The following factors have contributed to the unusual rise in temperature.

1. The sun intensity increased from 1.012 of the mean value at the beginning of this report period to a peak of 1.034 during the first week of January. Though the intensity declined slightly since then, it still has a high value of 1.032 at the end of this report period.
2. By 23 January 1976 the sun angle increased to 46.2^{o} compared to 41.6^{o} for the same time a year ago. This increased the intercept of solar flux on bays 11 through 17 which are normally warmer than others.
3. The length of satellite day increased more than 2 minutes above the span a year ago. This increased the time for heat absorption and reduced the time for heat rejection.
4. A possible malfunction of the thermal shutter for bay 14. Telemetry for shutter position for bay 14 has shown a constant value of 58.5^{o} since 5 January 1976, although the bellows temperature has risen to about 31.6^{o} (orbital average) by the end of the current report period. It has not been possible to determine whether this is caused by a telemetry failure or a shutter malfunction.

The temperatures are expected to decrease with decreasing sun intensity and sun angle.

Table 11-1 shows average analog telemetry values from data recorded on the NBTR. Figure 11-1 shows a typical thermal profile for average bay temperatures of the sensory ring in this report period.

No switching of the compensation loads was made during this report period. A history of all switchings of the compensation loads 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			Orbits						
No.	Description	Unit	26	5098	10182	15254	17004	17394	17854
7001	THM TH01 ST1	DGC	19.52	20.85	21.65	19.48	19.45	19.79	20.53
7002	THM TH02 SBO	DGC	18.60	19.95	20.60	18.52	18.37	18.41	18.52
7003	THM TH03 STI	DGC	18.48	20.16	20.87	18.11	17.75	17.85	18.30
7004	THM TH10 TCB	DGC	19.47	20.25	20.36	19.76	20.52	21.06	22.35
7005	THM TH04 STI	DGC	18.39	19.71	20.35	17.86	17.51	17.61	17.91
7006	THM TH05 SBO	DGC	17.57	18.39	18.81	17.20	16.62	16.61	16.78
7007	OA-X THRUSTER	DGC	21.95	22.95	22.90	22.25	22.11	22.06	21.98
7008	THM TH06 STO	DGC	15.95	16.61	16.90	15.34	14.77	14.78	14.92
7009	THM TH06 SBI	DGC	19.38	20.35	20.93	18.98	18.14	18.21	18.52
7010	THM TH07 STI	DGC	18.61	*	*	*	**	**	**
7011	THM TH08 STO	DGC	21.78	22.77	22.88	22.03	21.81	21.79	21.65
7012	THM TH09 SBI	DGC	21.81	22.87	23.08	22.20	22.31	22.52	22.97
7013	THM TH10 SBO	DGC	18.78	19.53	19.64	19.00	19.22	19.50	20.07
7014	THM TH11 STI	DGC	22.37	23.35	23.57	22.80	23.73	24.43	26.10
7015	THM TH12 SBO	DGC	22.87	23.17	23.03	22.86	24.60	25.86	28.39
7016	THM TH13 STI	DGC	20.95	22.02	22.47	22.00	23.74	25.15	28.77
7017	RBV BEAM CTR LN	DGC	21.53	22.62	22.84	21.88	22.41	22.84	23.87
7018	THM TH14 STO	DGC	20.38	21.40	21.93	21.83	23.96	25.89	30.96
7019	NBR RAD OUTBD B4	DGC	5.09	5.86	6.00	4.37	3.76	3.89	4.37
7020	THM TH15 SBI	DGC	21.14	23.24	23.99	22.18	23.93	25.46	29.63
7021	THM TH16 STI	DGC	20.73	22.90	23.68	21.64	22.66	23.78	26.82
7022	THM TH17 SBI	DGC	20.22	22.76	23.56	21.47	21.76	22.69	24.88
7023	THM TH18 SBO	DGC	21.90	24.29	25.19	23.47	23.57	24.20	25.44
7030	THM TH08 BUR	DGC	16.05	17.07	17.42	15.35	15.05	15.00	15.09
7031	THM TH06 BUR	DGC	13.59	14.17	14.28	12.97	12.31	12.32	12.40
7032	THM TH09 BUR	DGC	19.92	20.75	20.74	20.17	20.28	20.38	20.56
7033	THM TH12 BUR	DGC	21.51	22.16	22.76	22.65	24.66	26.02	29.42
7034	THM TH15 BUR	DGC	19.70	21.67	22.38	21.33	23.35	24.86	28.86
7035	THM TH18 BUR	DGC	20.11	21.36	22.02	20.54	21.01	21.43	22.17
7040	THM TH01 TCB	DGC	19.27	20.46	21.26	19.19	19.21	19.49	19.94
7041	THM TH02 TCB	DGC	17.99	19.23	19.89	17.80	17.51	17.55	17.70
7042	THM TH03 TCB	DGC	18.34	19.94	20.92	17.79	17.48	17.50	17.64
7043	THM TH04 TCB	DGC	18.95	19.94	20.26	18.60	18.23	18.23	18.44
7044	THM TH05 TCB	DGC	16.27	16.98	17.32	15.90	15.36	15.38	15.57
7045	THM TH07 TCB	DGC	18.41	19.21	19.45	18.25	17.86	17.87	18.01
7046	THM TH09 TCB	DGC	19.38	20.37	20.64	19.85	19.73	19.89	20.13
7048	THM TH11 TCB	DGC	21.98	22.94	23.18	22.80	24.05	24.88	26.85
7049	THM TH12 TCB	DGC	21.92	22.46	22.35	22.30	24.21	25.73	29.54
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	22.26	24.38	26.28	31.21
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	22.74	24.64	26.50	31.57
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	22.68	23.99	25.11	28.17
7053	THM TH17 TCB	DGC	21.73	24.08	25.02	23.33	22.87	23.59	25.17
7054	THM TH18 TCB	DGC	20.02	22.20	23.35	21.04	20.86	21.25	21.79
7060	THM SHUTTER BY 1	DEG	25.85	33.12	38.62	24.41	24.30	27.26	31.45
7061	THM SHUTTER BY 2	DEG	6.62	8.65	13.28	1.73	0.0	0.58	1.17
7062	THM SHUTTER BY 3	DEG	10.96	23.58	30.24	17.30	13.32	13.35	13.62
7063	THM SHUTTER BY 4	DEG	30.60	35.71	37.92	29.50	26.97	27.00	27.75
7064	THM SHUTTER BY 5	DEG	15.03	16.25	15.00	8.08	3.46	5.19	5.19
7065	THM SHUTTER BY 7	DEG	17.14	24.64	21.96	14.50	8.50	9.00	9.00
7067	THM SHUTTER BY 9	DEG	33.26	38.44	39.50	38.24	38.26	38.44	38.53
7068	THM SHUTTER BY 10	DEG	24.68	28.68	27.31	26.03	27.35	32.50	40.69
7069	THM SHUTTER BY 11	DEG	39.66	46.89	48.96	46.97	53.10	56.94	62.45
7070	THM SHUTTER BY 12	DEG	43.81	46.63	45.68	45.95	57.92	64.89	70.31
7071	THM SHUTTER BY 13	DEG	40.39	46.38	44.79	42.84	51.83	60.51	62.63
7072	THM SHUTTER BY 14	DEG	34.20	39.70	41.91	34.28	46.51	56.41	58.50
7073	THM SHUTTER BY 15	DEG	45.40	58.74	64.79	55.15	69.16	76.95	82.15
7074	THM SHUTTER BY 16	DEG	24.50	48.46	53.54	38.76	46.86	54.50	64.40
7075	THM SHUTTER BY 17	DEG	39.06	54.96	61.88	51.06	46.99	52.21	63.68
7076	THM SHUTTER BY 18	DEG	29.70	43.15	51.20	35.12	33.09	36.30	40.95
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	8.31	8.31	8.31
7083	THM Q1 S ZENER V	VDC	8.31	8.32	8.35	8.31	8.32	8.32	8.35
7084	THM Q2 S ZENER V	VDC	8.19	8.19	8.20	8.19	8.19	8.19	8.20
7085	THM Q3 S ZENER V	VDC	8.15	8.15	8.15	8.15	8.15	8.15	8.15
7090	THM PSM MOUNT	DGC	21.60	22.54	22.98	21.43	21.91	22.48	24.02
7091	THM IND ATTITUDE	DGC	19.40	20.42	20.88	19.13	18.66	18.75	19.16
7092	THM RBV RADIATOR	DGC	16.65	17.22	17.47	16.55	17.23	17.67	18.68
7093	THM RBVC CTR BM	DGC	20.30	21.61	21.87	20.73	21.49	21.97	23.24
7094	THM WBVTR ROOT	DGC	12.96	15.71	16.07	13.77	12.82	13.27	14.42
7095	THM WBVTR RAD CT	DGC	4.61	8.17	8.68	6.99	6.83	7.12	7.56
7096	THM WBVTR STRAP	DGC	16.62	19.32	19.66	17.29	15.56	16.00	17.07
7097	THM WB MT BAY 1	DGC	20.56	19.52	21.37	16.97	17.32	17.55	18.23
7098	THM WB MAT BAY 1	DGC	20.22	18.90	20.39	17.12	17.66	18.00	18.39
7099	THM WBVTR SEP 3	DGC	18.60	20.55	21.05	18.45	17.69	17.90	18.49
7100	THM WBVTR SEP 17	DGC	21.31	23.66	24.28	22.02	21.89	22.68	24.61
7101	THM WBVTR 1 CENT	DGC	21.49	23.72	24.01	21.63	19.03	19.50	20.67
7102	THM WBVTR 2 BAY	DGC	17.46	18.92	19.32	17.23	16.77	16.97	17.55
7103	THM WBVTR 2 BY 15	DGC	21.00	23.16	23.82	21.73	22.28	23.38	26.34
7104	THM WBVTR 2 CTR	DGC	19.35	21.51	21.81	19.54	18.39	18.97	20.59
7105	THM NBTR B SEP 6	DGC	18.06	19.30	19.79	17.82	17.30	17.50	18.32
7106	THM NBTR B SEP 1	DGC	20.82	22.35	22.99	21.61	22.92	24.25	27.72
7107	THM NBTR BM CTR	DGC	19.37	21.04	21.34	19.51	19.76	20.29	21.93
7108	THM MSS MOUNT 14	DGC	19.18	21.15	21.70	20.06	21.54	22.88	26.45
7109	THM OA -Y THRUSTER	DGC	22.21	23.80	24.69	24.40	27.33	29.36	34.20
7110	THM MSS WBVTR BM	DGC	18.14	20.06	20.53	18.18	18.09	18.42	19.56
7111	THM OA +X THRUSTER	DGC	20.30	19.92	21.23	18.07	18.60	18.86	19.48
7130	THM AUX P1 T	DGC	15.69	8.49	-18.90	9.68	19.51	25.64	21.76
7131	THM AUX P2 T	DGC	10.63	1.59	.41	5.64	19.70	14.42	23.25

*Function 7010 became invalid after an integrated circuit chip failure in the TMP 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
15584	x	x	0	0	x	0	0	0

* Note: x = ON
0 = OFF

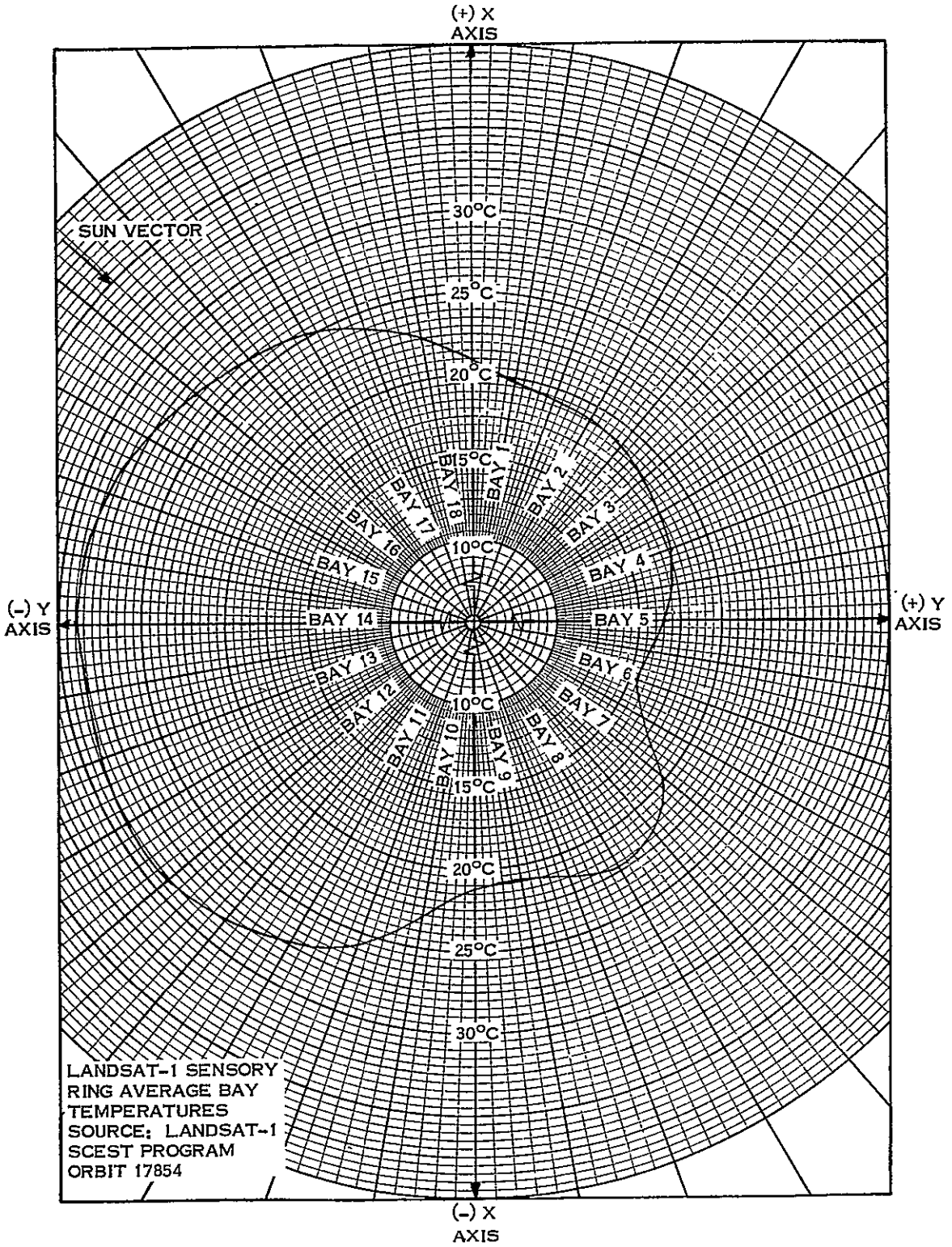

Figure 11-1. Landsat-1 Sensory Ring Thermal Profile

SECTION 12

NARROWBAND TAPE RECORDERS

LANDSAT-1

SECTION 12

NARROW BAND TAPE RECORDERS (NBR)

Narrowband Recorder NBR-B, which was turned off in Orbit 15256, has remained inactive during the entire reporting period.

Narrowband Recorder NBR-A operated satisfactorily during this period, and has provided coverage for MSS real-time operations as well as approximately 3-1/2 hours daily of normal orbital telemetry recording and playback functions.

Table 12-1 gives cumulative operating hours for both recorders by modes, and Table 12-2 gives typical telemetry values.

Table 12-1. NBR Operating Hours by Modes, Landsat-1

NBR	ON	OFF	Playback	Record
A	14122	16570	566	13556
B	11909	12666	476	11433

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

Function		Typical Telemetry Values - Orbits					
No.	Name	6	3750-3751	10862	15256	15888	17684
10001	A - Motor Cur. (ma)						
	Record	190.10	189.20	186.31	192.63	192.63	195.8
	P/B	180.00	178.69	180.00	N.A.	*	*
10101	B - Motor Cur. (ma)						
	Record	193.26	193.04	198.95	198.95	*	*
	P/B	188.18	185.44	187.89	202.1	*	*
10002	A - Pwr Sup. Cur. (ma)						
	Record	320.56	338.20	339.81	343.24	339.81	339.81
	P/B	535.78	568.38	567.75	N.A.	*	*
10102	B - Pwr Sup. Cur. (ma)						
	Record	317.62	336.05	350.00	346.75	*	*
	P/B	570.78	553.63	567.50	580.51	*	*
10003	A - Rec. Temp. (DGC)	25.47	34.40	23.60	22.00	23.00	21.20
10103	B - Rec. Temp. (DGC)	24.58	23.41	23.41	23.18	18.18	19.54
10004	A - Supply (VDC)	-24.47	-24.44	-24.62	-24.62	-24.62	-24.62
10104	B - Supply (VDC)	-24.44	-24.51	-24.29	-24.57	-24.71	-24.71

N.A. - Data not available
* - No data. NBR-B out of service

SECTION 13
WIDEBAND TELEMETRY SUBSYSTEM
LANDSAT-1

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. The scatter of data points reflect variations in the ground station calibration and readout.

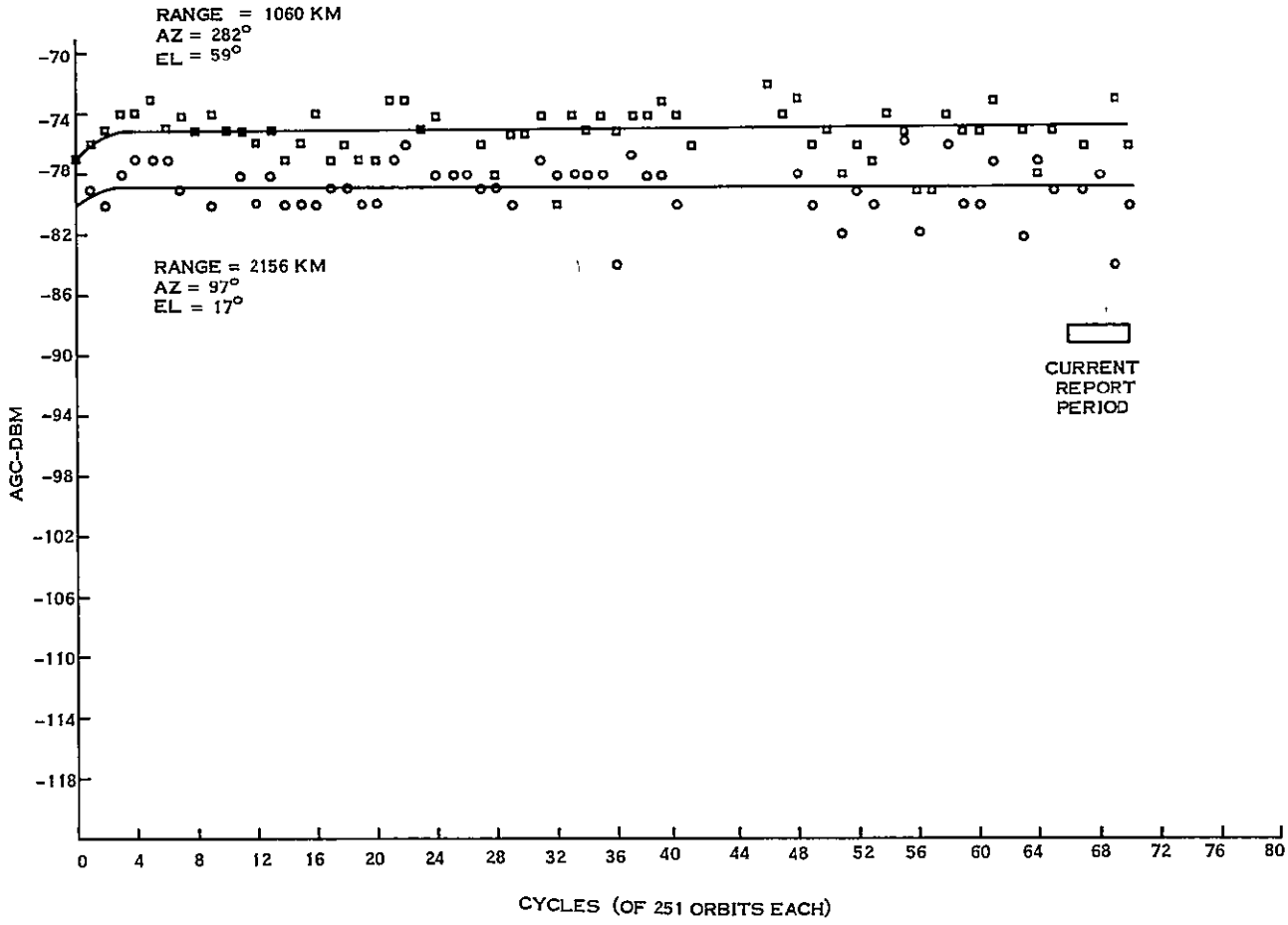

Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna - Landsat-1

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	4096	10602	15233	16987	17405	17824
12101	Temp TWT Coll. (Max)	(DgC)	35 38	34 24	35.96	29 77	23.49	26.26	23 88
12102	Helix Current	(Ma)	7.32	7.70	7.67	7.90	7.56	7.78	7.94
12103	TWT Cath. Cur.	(Ma)	44.30	43.85	42.72	43.70	41.30	42.61	42 65
12104	Forward Pwr	(DBM)	43.57	43.57	43 47	43.52	43.34	43 52	43 49
12105	Reflected Pwr	(DBM)	31.59	32.79	32 62	33.07	32.42	32 71	33 11
12228	Loop Str. AFC Con Volt (1)	(MHz)	1 11	-0.78	-1.12	-1.05	-1 63	-1 47	-1.17
12229	Mod Temp VDC	(DgC)	21.70	20.88	21.50	21.78	22.64	18.95	20.45
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.68	2.69	2.69	2.65	2.68	2.69	2.67
12234	-15 VDC Pwr Sup A	(TMV)	5.90	5.98	5.92	5.81	5.97	5.97	5.80
12236	+5 VDC Pwr Sup A	(TMV)	3.97	4.01	4.01	3.97	3.90	4.02	3 97
12239	-5 VDC Pwr Sup A	(TMV)	5.24	telemetry point defective					
12240	-24.5 VDC Unreg Volt A	(TMV)	5.43	5.52	5.46	5 44	5.56	5.56	5.47
12242	Inv. Temp	(DgC)	23.03	22.96	23.86	23.66	21.26	19.16	23 44

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

SECTION 14

ATTITUDE MEASUREMENT SENSOR

LANDSAT-1

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	15254	16530	17408	17826
3004	Case-Temp 1	DGC	18.92	19.42	19.71	18.54	18.37	18.93	19.40
3005	Assembly-Temp 2	DGC	19.15	19.76	19.96	18.73	18.70	19.19	19.74

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS

LANDSAT-1

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

WBVTR-2 has not been operated since its failure in Orbit 148.

WBVTR-1 was removed from operational service after Orbit 9881 because of high minor frame sync error counts. The recorder has remained inactive since suspension of engineering tests after Orbit 10861.

Pressure and temperature telemetry values for WBVTR-1 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	15260	15700	16530	17810
13022	Press. Trans. (PSI)	15.73	15.59	15.66	15.73
13023	Temp. Trans. (DgC)	18.55	16.36	17.36	19.50
13024	Temp. Elec. (DgC)	15.00	13.84	14.75	15.38

SECTION 16

RETURN BEAM VIDICON

LANDSAT-1

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. An assessment of the RBV performance was given in ERTS-1 Flight Evaluation Report 23 July to 23 October, 1972.

SECTION 17

MULTISPECTRAL SCANNER SUBSYSTEM

LANDSAT-1

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. Figure 17-2 shows the number of scenes imaged in the first 3 years of operation. Figure 17-3 shows the number of scenes imaged after the 3 year period and before the start of this quarter. The sum of these three maps shows the number of scenes imaged since launch. In these maps, only those scenes received by U.S. ground stations are shown. Scenes transmitted to Canada, Brazil and Italy (34% of total) are not shown.

Table 17-1 shows typical telemetry values since launch. The higher temperatures shown in Orbit 17824, reflect general spacecraft temperature increases due to the earth-sun distance approaching its lowest value, but a new operating procedure adds greatly to the reported value, even though there is no real change in equipment temperature. The temperatures reported are computer-derived average temperatures for the NBR on-time. Until recently, the NBR was ON throughout the orbit, so that with MSS ON only 8% of this time, "averages" were relatively low. Recently, to prolong its life, the NBR is ON only to span MSS operations. Now with MSS ON about 70% of the NBR ON-time, "averages" are much higher. With this adjustment, all telemetry values are nominal.

Table 17-2 shows the history of sensor response to a constant input radiance level. Each sensor is sampled at 5 radiance levels, and all show essentially the same trends. Only one of these levels (the second highest) is listed in Table 17-2. Sensor 4 has declined most (22 %) since launch. This is twice the average sensor decline. Sensor 13 remains apparently stable at its elevated level - 13 % - since launch.

Line length history is also shown in Table 17-2, and remains satisfactory.

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

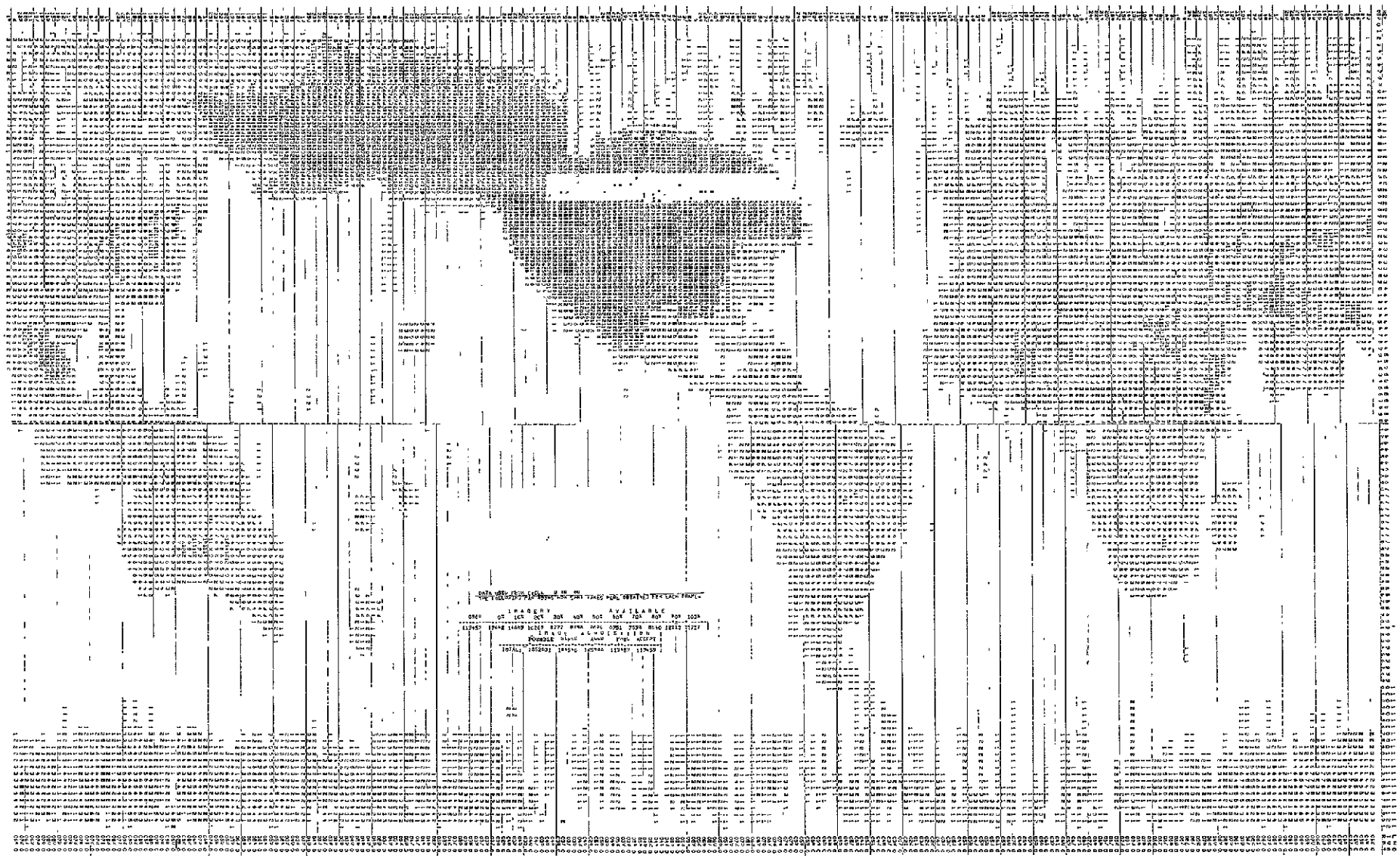

Figure 17-2. Computer Map of MSS Scenes for First 8 Years Operation - Landsat-1

FOLDOUT FRAME 1

REPRODUCIBILITY OF THI
ORIGINAL PAGE IS POOR

FOLDOUT FRAME 2

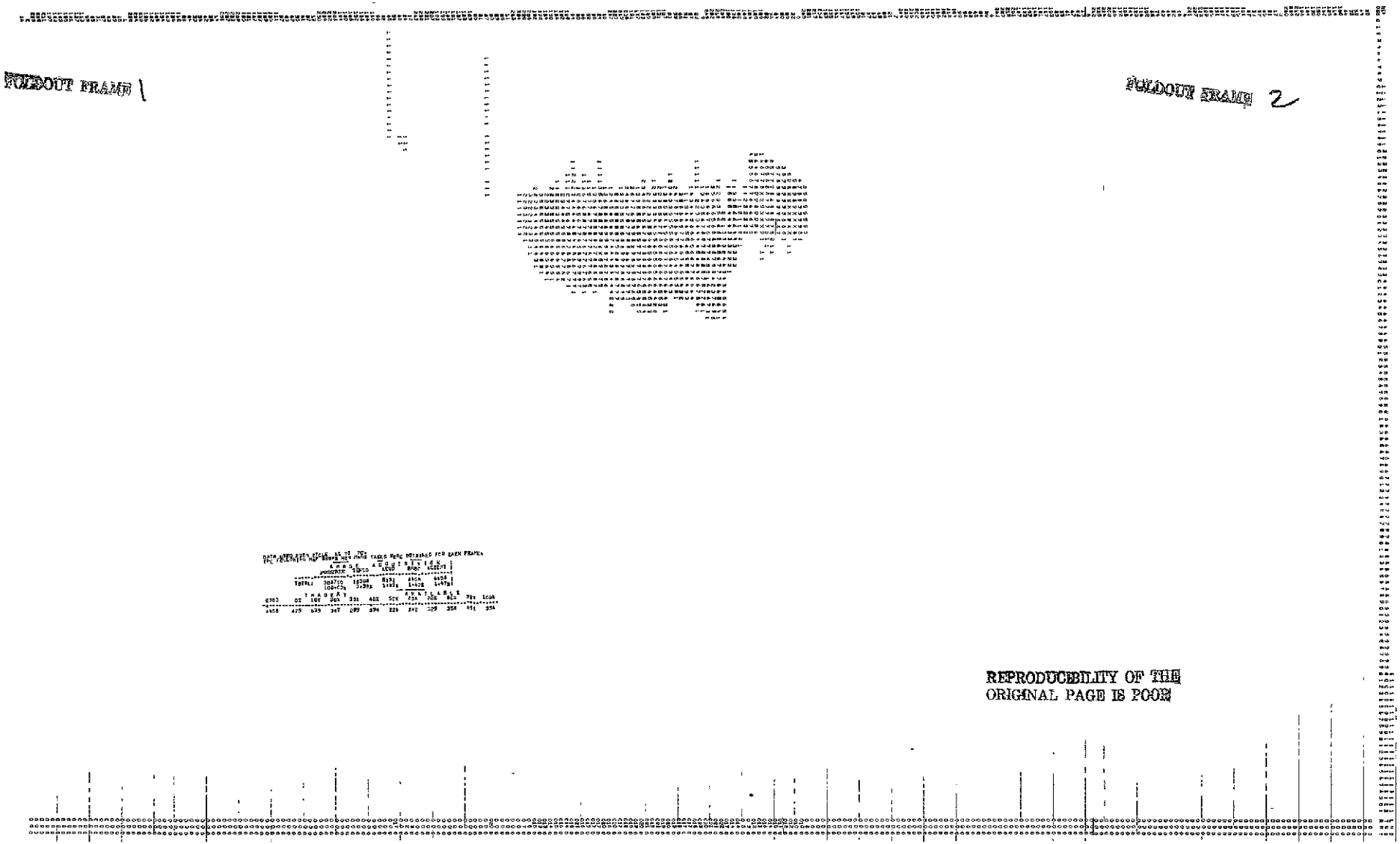

Figure 17-3. Scenes from End of Three-Year Period to Start of this Quarter - Landsat-1

Table 17-1. MSS Telemetry Values

Function No.	Name		Telemetry Values in Orbits						
			20	5060	10587	15233	16987	17405	17824
15044	FOPT 2 T	(DGC)	17.46	19.84	19.75	18.15	18.62	18.40	20.14
15046	ELEC CVR T	(DGC)	19.37	21.83	21.96	20.20	19.76	18.66	21.49
15048	SCAN MIR REG T	(DGC)	16.35	19.77	20.48	20.94	20.99	20.29	23.63
15050	SCAN MIR DR. COIL T	(DGC)	15.94	19.30	19.78	19.21	19.85	19.59	22.64
15052	ROT SHUT HSG T	(DGC)	16.91	20.07	20.23	18.74	18.89	18.84	20.52
15043	FOPT 1 T	(DGC)	17.67	20.01	19.93	18.35	18.84	18.62	20.33
15045	MUX PWR CASE T	(DGC)	21.19	22.03	23.87	26.92	24.23	22.50	30.84
15047	PWR SUP T	(DGC)	17.41	20.00	20.21	19.83	20.00	19.34	21.88
15049	SCAN MIR DR. ELC T	(DGC)	16.12	19.41	20.23	21.16	21.10	20.40	23.83
15051	SCAN MIR HSG T	(DGC)	15.60	19.05	19.49	18.40	19.32	18.78	22.00
15040	MUX -6 VDC	(TMV)	4.03	4.03	3.98	4.02	4.03	4.03	4.07
15042	AVE DENS DATA	(TMV)	1.67	2.13	2.05	2.28	2.10	1.78	2.08
15054	CAL LAMP CUR A	(TMV)	1.12	1.12	1.12	1.12	1.12	1.12	1.12
15056	BAND 2 $\pm$ 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10
15058	BAND 4 $\pm$ 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10
15060	+ 12 -6 VDC REG	(TMV)	4.82	5.02	4.97	5.02	5.02	5.02	5.02
15062	+ 19 VDC REC OUT	(TMV)	4.80	4.90	4.97	5.03	5.03	5.03	5.03
15064	BAND 1 HV A	(TMV)	5.10	5.16	5.12	5.12	5.12	5.12	5.13
15066	BAND 2 HV A	(TMV)	4.50	4.52	4.52	4.50	4.50	4.57	4.52
15068	BAND 3 HV A	(TMV)	4.60	4.62	4.62	4.62	4.63	4.62	4.62
15070	SHUT MOT CON OUT	(TMV)	2.43	2.44	2.47	2.51	2.50	2.50	2.50
15041	S/D CONV REF V	(TMV)	5.93	5.93	5.87	5.93	5.93	5.93	5.93
15053	SCAN MIR REG V	(TMV)	4.42	4.51	4.51	4.61	4.61	4.60	4.60
15055	BAND 1 $\pm$ 15 V	(TMV)	4.97	4.97	4.92	4.97	4.97	4.97	4.97
15057	BAND 3 $\pm$ 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	$\pm$ 5 VDC LOGIC REG	(TMV)	4.82	4.81	4.77	4.76	4.82	4.81	4.77
15063	-19 VDC REG OUT	(TMV)	3.43	3.39	3.50	3.58	3.58	3.57	3.57
15071	SCAN MIR DR. CLK	(TMV)	1.93	1.97	1.98	2.00	2.00	1.96	1.97

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

Band	Sensor	Quantum Level: 1st Year — Launch	1st Year — 2-4 Quar.	2nd Yr. — 5-8 Quar.	3rd Yr. — 9-12 Quar.	4th Yr. — 13 Quatr.	4th Yr. — This Quar.	% Change Since Launch
1	1	43	39	39	38	37	37	-14
	2	44	39	40	40	39	39	-12
	3	43	38	40	40	39	40	-6
	4	43	38	39	39	38	38	-12
	5	41	36	35	34	32	32	-22
	6	43	39	41	41	40	40	-7
	7	47	43	43	42	41	41	-13
	8	46	41.5	41	41	40	40	-13
2	9	47	44	42.5	42	41	40	-15
	10	46	42	41.5	41	41	41	-11
	11	47	42.5	42	42	41	41	-13
	12	45	42	42.5	42	42	42	-6
	13	46	46	49	51	52	52	+13
	14	44	42	42	42	42	42	-5
3	15	45	42.5	42	41	41	41	-9
	16	40	37.5	37.5	37	37	37	-8
	17	42	39	40	40	40	40	-5
	18	44	40	40.5	41	41	41	-7
	19	28	28	27	25	23	23	-18
	20	25	26	25	23	21	21	-16
4	21	26	27	26.5	25	23	23	-12
	22	23	23	22	21	19	19	-18
	23	22	22.5	23	21	21	21	-5
	24	24	23.5	24	23	22	22	-8
	Line Length	3221	3219	3217	3216	3216	1314	-0.2

SECTION 18

DATA COLLECTION SUBSYSTEM

LANDSAT-1

SECTION 18

DATA COLLECTION SUBSYSTEM (DCS)

The Data Collection Subsystem was turned OFF after Orbit 12690 on 19 January 1975, and has not been used since.

The DCS operated without anomaly throughout its operational period. Only Receiver #1 was used.

APPENDIX A

LANDSAT-1 ANOMALY LIST

APPENDIX B

LANDSAT-1 SPACECRAFT ORBIT REFERENCE TABLES

LANDSAT-1

SPACECRAFT ORBIT REFERENCE TABLES

FROM JULY 1975 THRU DECEMBER 1976

ORBIT 14953 THRU 22621

FLIGHT DAY 1073 THRU 1622

LANDSAT-1

JUL, 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	1123	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

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SEP. 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	244	1135	15817-15830	140-153	11	43
2	245	1136	15831-15844	154-167	12	43
3	246	1137	15845-15858	168-181	13	43
4	247	1138	15859-15872	182-195	14	43
5	248	1139	15873-15886	196-209	15	43
6	249	1140	15887-15900	210-223	16	43
7	250	1141	15901-15914	224-237	17	43
8	251	1142	15915-15928	238-251	18	43
9	252	1143	15929-15942	1- 14	1	44
10	253	1144	15943-15956	15- 28	2	44
11	254	1145	15957-15970	29- 42	3	44
12	255	1146	15971-15984	43- 56	4	44
13	256	1147	15985-15998	57- 70	5	44
14	257	1148	15999-16012	71- 84	6	44
15	258	1149	16013-16026	85- 98	7	44
16	259	1150	16027-16039	99-111	8	44
17	260	1151	16040-16053	112-125	9	44
18	261	1152	16054-16067	126-139	10	44
19	262	1153	16068-16081	140-153	11	44
20	263	1154	16082-16095	154-167	12	44
21	264	1155	16096-16109	168-181	13	44
22	265	1156	16110-16123	182-195	14	44
23	266	1157	16124-16137	196-209	15	44
24	267	1158	16138-16151	210-223	16	44
25	268	1159	16152-16165	224-237	17	44
26	269	1160	16166-16179	238-251	18	44
27	270	1161	16180-16193	1- 14	1	45
28	271	1162	16194-16207	15- 28	2	45
29	272	1163	16208-16221	29- 42	3	45
30	273	1164	16222-16235	43- 56	4	45

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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

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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

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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

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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	1264	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

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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

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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	18425-18438	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

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APR. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	92	1348	18788-18800	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

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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

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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

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JUL 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	183	1439	20056-20069	112-125	9	80
2	184	1440	20070-20083	126-139	10	80
3	185	1441	20084-20097	140-153	11	80
4	186	1442	20098-20111	154-167	12	80
5	187	1443	20112-20125	168-181	13	80
6	188	1444	20126-20139	182-195	14	80
7	189	1445	20140-20153	196-209	15	80
8	190	1446	20154-20167	210-223	16	80
9	191	1447	20168-20181	224-237	17	80
10	192	1448	20182-20195	238-251	18	80
11	193	1449	20196-20209	1- 14	1	81
12	194	1450	20210-20223	15- 28	2	81
13	195	1451	20224-20237	29- 42	3	81
14	196	1452	20238-20251	43- 56	4	81
15	197	1453	20252-20265	57- 70	5	81
16	198	1454	20266-20279	71- 84	6	81
17	199	1455	20280-20293	85- 98	7	81
18	200	1456	20294-20306	99-111	8	81
19	201	1457	20307-20320	112-125	9	81
20	202	1458	20321-20334	126-139	10	81
21	203	1459	20335-20348	140-153	11	81
22	204	1460	20349-20362	154-167	12	81
23	205	1461	20363-20376	168-181	13	81
24	206	1462	20377-20390	182-195	14	81
25	207	1463	20391-20404	196-209	15	81
26	208	1464	20405-20418	210-223	16	81
27	209	1465	20419-20432	224-237	17	81
28	210	1466	20433-20446	238-251	18	81
29	211	1467	20447-20460	1- 14	1	82
30	212	1468	20461-20474	15- 28	2	82
31	213	1469	20475-20488	29- 42	3	82

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AUG, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	214	1470	20489-20502	43- 56	4	#2
2	215	1471	20503-20516	57- 70	5	#2
3	216	1472	20517-20530	71- 84	6	#2
4	217	1473	20531-20544	85- 98	7	#2
5	218	1474	20545-20557	99-111	8	#2
6	219	1475	20558-20571	112-125	9	#2
7	220	1476	20572-20585	126-139	10	#2
8	221	1477	20586-20599	140-153	11	#2
9	222	1478	20600-20613	154-167	12	#2
10	223	1479	20614-20627	168-181	13	#2
11	224	1480	20628-20641	182-195	14	#2
12	225	1481	20642-20655	196-209	15	#2
13	226	1482	20656-20669	210-223	16	#2
14	227	1483	20670-20683	224-237	17	#2
15	228	1484	20684-20697	238-251	18	#2
16	229	1485	20698-20711	1- 14	1	#3
17	230	1486	20712-20725	15- 28	2	#3
18	231	1487	20726-20739	29- 42	3	#3
19	232	1488	20740-20753	43- 56	4	#3
20	233	1489	20754-20767	57- 70	5	#3
21	234	1490	20768-20781	71- 84	6	#3
22	235	1491	20782-20795	85- 98	7	#3
23	236	1492	20796-20808	99-111	8	#3
24	237	1493	20809-20822	112-125	9	#3
25	238	1494	20823-20836	126-139	10	#3
26	239	1495	20837-20850	140-153	11	#3
27	240	1496	20851-20864	154-167	12	#3
28	241	1497	20865-20878	168-181	13	#3
29	242	1498	20879-20892	182-195	14	#3
30	243	1499	20893-20906	196-209	15	#3
31	244	1500	20907-20920	210-223	16	#3

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SEP, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	245	1501	20921-20934	224-237	17	#3
2	246	1502	20935-20948	238-251	18	#3
3	247	1503	20949-20962	1- 14	1	#4
4	248	1504	20963-20976	15- 28	2	#4
5	249	1505	20977-20990	29- 42	3	#4
6	250	1506	20991-21004	43- 56	4	#4
7	251	1507	21005-21018	57- 70	5	#4
8	252	1508	21019-21032	71- 84	6	#4
9	253	1509	21033-21046	85- 98	7	#4
10	254	1510	21047-21059	99-111	8	#4
11	255	1511	21060-21073	112-125	9	#4
12	256	1512	21074-21087	126-139	10	#4
13	257	1513	21088-21101	140-153	11	#4
14	258	1514	21102-21115	154-167	12	#4
15	259	1515	21116-21129	168-181	13	#4
16	260	1516	21130-21143	182-195	14	#4
17	261	1517	21144-21157	196-209	15	#4
18	262	1518	21158-21171	210-223	16	#4
19	263	1519	21172-21185	224-237	17	#4
20	264	1520	21186-21199	238-251	18	#4
21	265	1521	21200-21213	1- 14	1	#5
22	266	1522	21214-21227	15- 28	2	#5
23	267	1523	21228-21241	29- 42	3	#5
24	268	1524	21242-21255	43- 56	4	#5
25	269	1525	21256-21269	57- 70	5	#5
26	270	1526	21270-21283	71- 84	6	#5
27	271	1527	21284-21297	85- 98	7	#5
28	272	1528	21298-21310	99-111	8	#5
29	273	1529	21311-21324	112-125	9	#5
30	274	1530	21325-21338	126-139	10	#5

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OCT.1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	275	1531	21339-21352	140-153	11	5
2	276	1532	21353-21366	154-167	12	5
3	277	1533	21367-21380	168-181	13	5
4	278	1534	21381-21394	182-195	14	5
5	279	1535	21395-21408	196-209	15	5
6	280	1536	21409-21422	210-223	16	5
7	281	1537	21423-21436	224-237	17	5
8	282	1538	21437-21450	238-251	18	5
9	283	1539	21451-21464	1- 14	1	6
10	284	1540	21465-21478	15- 28	2	6
11	285	1541	21479-21492	29- 42	3	6
12	286	1542	21493-21506	43- 56	4	6
13	287	1543	21507-21520	57- 70	5	6
14	288	1544	21521-21534	71- 84	6	6
15	289	1545	21535-21548	85- 98	7	6
16	290	1546	21549-21561	99-111	8	6
17	291	1547	21562-21575	112-125	9	6
18	292	1548	21576-21589	126-139	10	6
19	293	1549	21590-21603	140-153	11	6
20	294	1550	21604-21617	154-167	12	6
21	295	1551	21618-21631	168-181	13	6
22	296	1552	21632-21645	182-195	14	6
23	297	1553	21646-21659	196-209	15	6
24	298	1554	21660-21673	210-223	16	6
25	299	1555	21674-21687	224-237	17	6
26	300	1556	21688-21701	238-251	18	6
27	301	1557	21702-21715	1- 14	1	7
28	302	1558	21716-21729	15- 28	2	7
29	303	1559	21730-21743	29- 42	3	7
30	304	1560	21744-21757	43- 56	4	7
31	305	1561	21758-21771	57- 70	5	7

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NOV 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	306	1562	21772-21785	71- 84	6	#7
2	307	1563	21786-21799	85- 98	7	#7
3	308	1564	21800-21812	99-111	8	#7
4	309	1565	21813-21826	112-125	9	#7
5	310	1566	21827-21840	126-139	10	#7
6	311	1567	21841-21854	140-153	11	#7
7	312	1568	21855-21868	154-167	12	#7
8	313	1569	21869-21882	168-181	13	#7
9	314	1570	21883-21896	182-195	14	#7
10	315	1571	21897-21910	196-209	15	#7
11	316	1572	21911-21924	210-223	16	#7
12	317	1573	21925-21938	224-237	17	#7
13	318	1574	21939-21952	238-251	18	#7
14	319	1575	21953-21966	1- 14	1	#8
15	320	1576	21967-21980	15- 28	2	#8
16	321	1577	21981-21994	29- 42	3	#8
17	322	1578	21995-22008	43- 56	4	#8
18	323	1579	22009-22022	57- 70	5	#8
19	324	1580	22023-22036	71- 84	6	#8
20	325	1581	22037-22050	85- 98	7	#8
21	326	1582	22051-22063	99-111	8	#8
22	327	1583	22064-22077	112-125	9	#8
23	328	1584	22078-22091	126-139	10	#8
24	329	1585	22092-22105	140-153	11	#8
25	330	1586	22106-22119	154-167	12	#8
26	331	1587	22120-22133	168-181	13	#8
27	332	1588	22134-22147	182-195	14	#8
28	333	1589	22148-22161	196-209	15	#8
29	334	1590	22162-22175	210-223	16	#8
30	335	1591	22176-22189	224-237	17	#8

LANDSAT-1

DEC, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	336	1592	22190-22203	238-251	18	08
2	337	1593	22204-22217	1- 14	1	09
3	338	1594	22218-22231	15- 28	2	09
4	339	1595	22232-22245	29- 42	3	09
5	340	1596	22246-22259	43- 56	4	09
6	341	1597	22260-22273	57- 70	5	09
7	342	1598	22274-22287	71- 84	6	09
8	343	1599	22288-22301	85- 98	7	09
9	344	1600	22302-22314	99-111	8	09
10	345	1601	22315-22328	112-125	9	09
11	346	1602	22329-22342	126-139	10	09
12	347	1603	22343-22356	140-153	11	09
13	348	1604	22357-22370	154-167	12	09
14	349	1605	22371-22384	168-181	13	09
15	350	1606	22385-22398	182-195	14	09
16	351	1607	22399-22412	196-209	15	09
17	352	1608	22413-22426	210-223	16	09
18	353	1609	22427-22440	224-237	17	09
19	354	1610	22441-22454	238-251	18	09
20	355	1611	22455-22468	1- 14	1	10
21	356	1612	22469-22482	15- 28	2	10
22	357	1613	22483-22496	29- 42	3	10
23	358	1614	22497-22510	43- 56	4	10
24	359	1615	22511-22524	57- 70	5	10
25	360	1616	22525-22538	71- 84	6	10
26	361	1617	22539-22552	85- 98	7	10
27	362	1618	22553-22565	99-111	8	10
28	363	1619	22566-22579	112-125	9	10
29	364	1620	22580-22593	126-139	10	10
30	365	1621	22594-22607	140-153	11	10
31	366	1622	22608-22621	154-167	12	10

APPENDIX C

LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD

APPENDIX C

LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD

None issued.

LANDSAT–2

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

INTRODUCTION

This is the fifth 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:

Document No.	Title	Date
75SDS4214	Landsat-2 Launch and Flight Activation Evaluation Report, 22 to 26 January 1975, Launch through Orbit 50 and Orbit Adjust Operation.	21 March 1975
75SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 January 1975 to 23 April 1975.	15 August 1975
75SDS4255	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 April 1975 to 23 July 1975.	10 October 1975
75SDS4266	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 July 1975 to 23 October 1975.	1 December 1975

This report contains analysis of performance for Orbits 3815 to 5100 for Landsat-2.

SECTION 1

SUMMARY

LANDSAT-2 OPERATIONS

SECTION 1

SUMMARY LANDSAT-2 OPERATIONS

The Landsat-2 spacecraft was launched from the Western Test Range on January 22, 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 affect 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 operation to Orbit 1659 when normal operation was resumed. WBVTR-1 had a new anomaly in Orbit 2863 on August 3, 1975 when ground stations were unable to obtain video sync lockup because of failure of one head to produce video, and WBVTR-1 operations were then discontinued. Tests were made thru Orbit 4893 on 8 January 1976, after which all use of the recorder stopped. Spacecraft performance has not been degraded by these anomalies. Table 1-1 shows cumulative in-orbit payload system performance.

Table 1-1. In-Orbit Payload Systems Performance Launch Thru Orbit 5070 (1/21/76) Landsat-2

RBV	Total Scenes Imaged	729
	Avg. Scenes/Day	66
	Total Area Imaged (millions of sq. mi.)	6.4
	ON TIME (hr)	7.8
	ON/OFF Cycles	55
	% Real Time Images	98
	% Recorded Images	2
MSS	Total Scenes Imaged	63,706
	Avg. Scenes/Day	179
	Total Area Imaged (millions of sq. n. mi.)	555.5
	ON TIME (hr)	702.6
	ON/OFF Cycles	5351
	% Real Time Images	60
	% Recorded Images	40
DCS	Messages at OCC	398,082
	Non-Perfect MSGS	29,073
	Max. DCP's ACTIVE/DAY	110
	Users	46
	Avg. MSG/ACTIVE Orbit	158
	ON TIME (hr)	8,632
WPA-1	% Real Time Mode	1
	% Playback Mode	99
	ON TIME (hr)	86.2
	ON/OFF Cycles	554
WPA-2	% Real Time Mode	60
	% P/B Mode	40
	ON TIME (hr)	552.1
	ON/OFF Cycles	3,441
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)	105.6
	Cycles Head-Tape Contact	1,693
	ON TIME (hr)	133.6
WBVTR-2	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	MFSE Count in P/B	< 10
	Time Head-Tape Contact (hr)	346.7
	Cycles Head-Tape Contact	4,641
	ON TIME (hr)	439.0

SECTION 2

ORBITAL PARAMETERS

LANDSAT-2

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. This has been done by controlling the ACS pitch gates through the use of pitch position bias mode. (See Section 4 also.) Therefore, no orbit maintenance burn of the OAS was required during the current report period.

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 January 1976, Landsat-2 has descending equatorial crossings at approximately 9:28 AM local time as opposed to 9:07 AM for Landsat-1. A projection of the variation of local mean time at the descending nodes for both spacecrafts is given in Figure 2-3.

The Brouwer Mean Orbital Parameters for Landsat-2 are given in Table 2-1. Appendix B gives ground trace repeat cycle predictions.

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 47	99 096	7285 820	0 001260	103 151	-	256 040	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 July 1975	917 45	897 68	99 071	7285 733	0 001356	103 150	103 265	166 118	264 891	13 726
23 Oct 1975	916 70	898 49	99 059	7285 762	0 001250	103 150	103 266	282 749	353 366	257 271
24 Jan 1976	917 36	897 81	99 046	7285 754	0 001342	103 150	103 266	31 621	84 584	148 179

1 Post launch

2 After the sequence of phasing maneuvers completed in Orbit 212

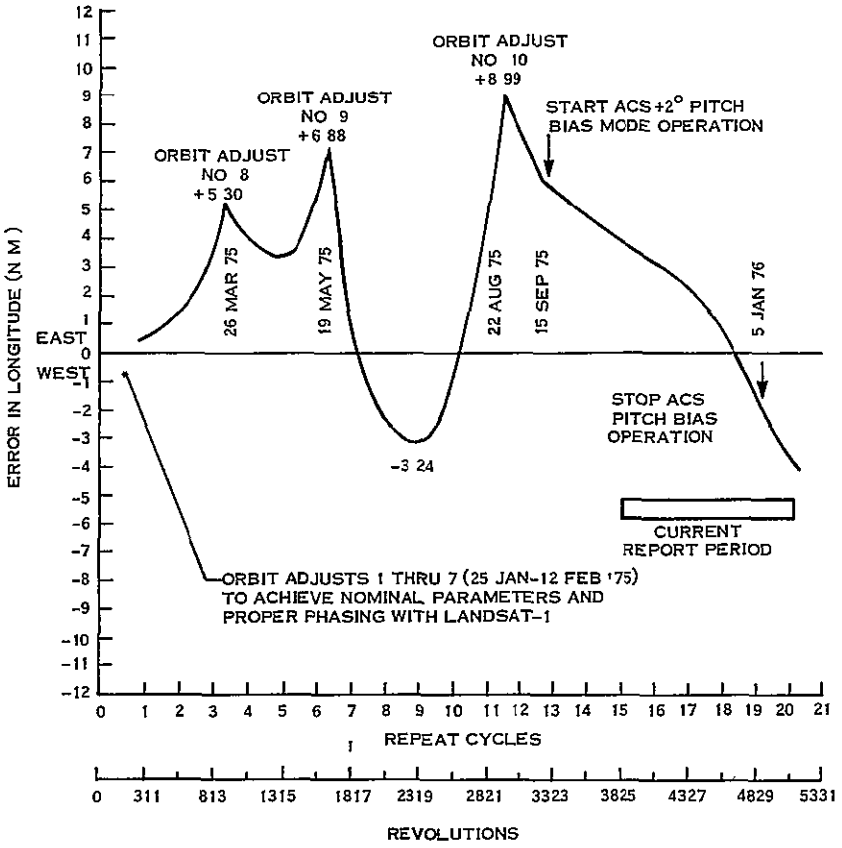

Figure 2-1. Effect of Orbit Adjusts on Landsat-2 Ground Track

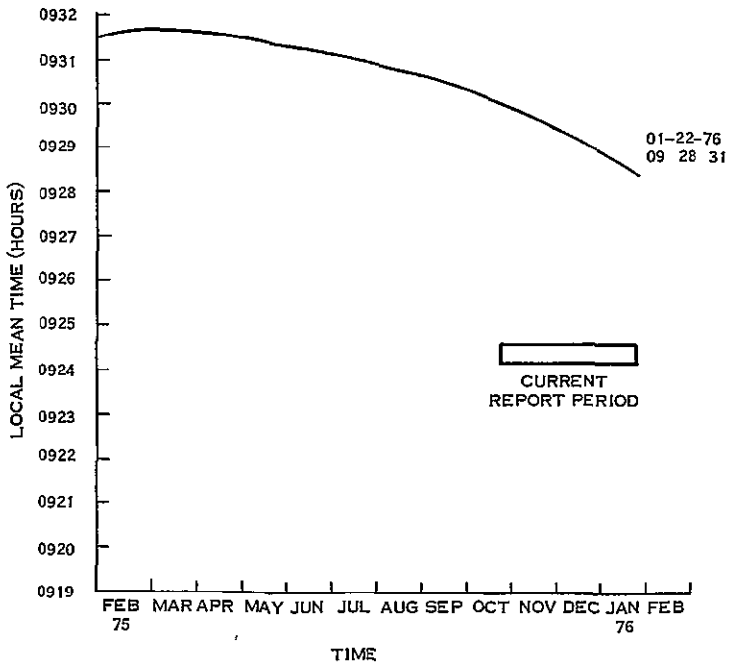

Figure 2-2. Local Mean Time of Descending Node

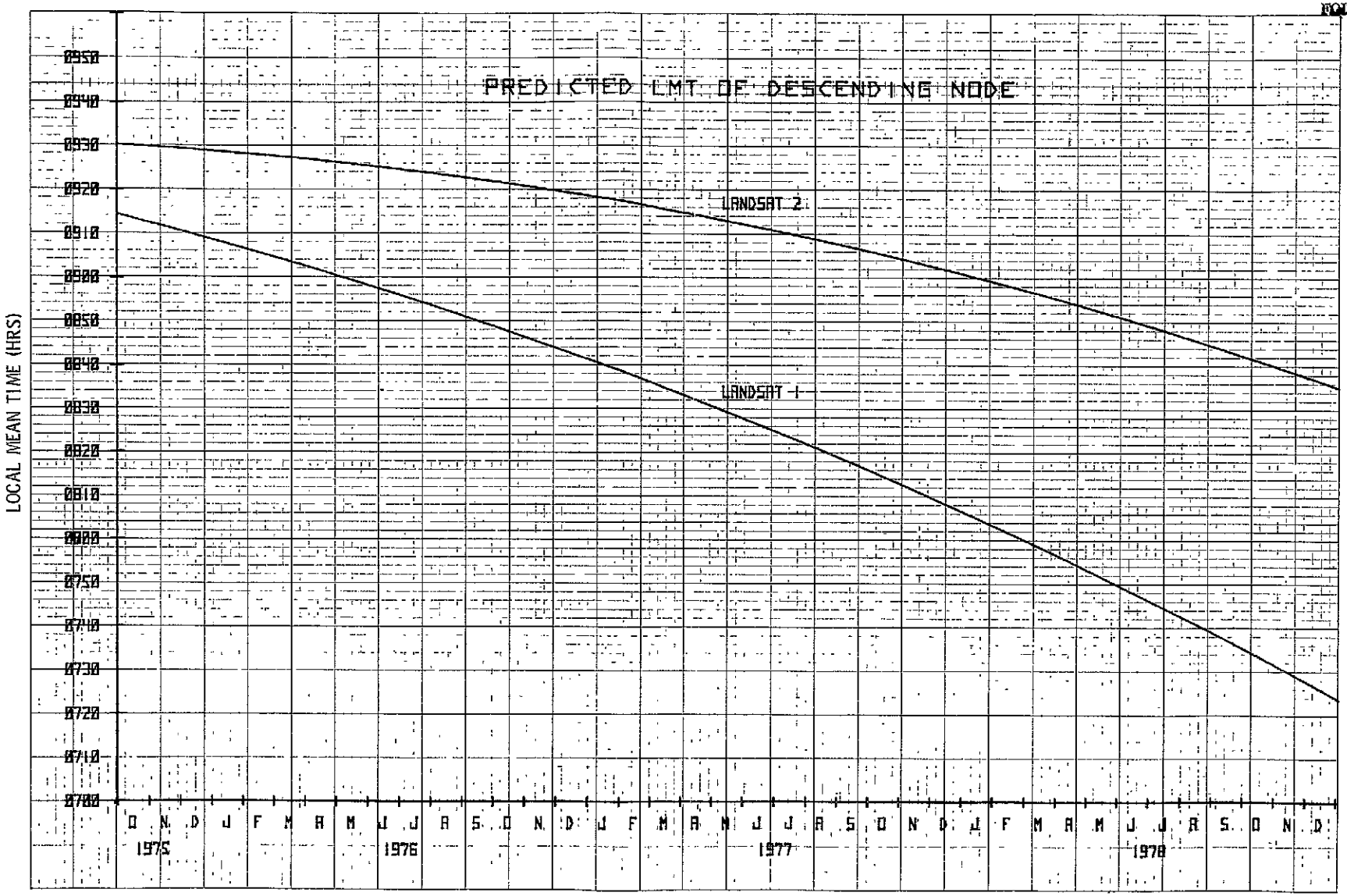

Figure 2-3. Predicted Limit of Descending Node

SECTION 3

POWER SUBSYSTEM (PWR)

LANDSAT-2

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 and payload 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 higher 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 until the end of the current report period.

During Orbit 3971 (3 November 1975) Landsat-2 passed through the partial solar eclipse over the Southern Hemisphere. Real time adjustments to the auxiliary loads were made to compensate for the loss in array energy.

The battery packs averaged a typical 9.0-10.0% depth of discharge (DOD) during this report period but has peaked as high as about 16% during nights, with long WBR playbacks. Compensation loads have been reduced to minimize the peaks in DOD, leaving only loads 3, 4 and 8 on at the end of the current report period. (See Table 11-2 for a history of compensation load switchings since launch.) Battery temperature spread ranged from 5.0 to 8.5°C and is expected to be in the lower range during the on-coming period of lower 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 time span used in Table 3-2 is the playback period from the NBR.

The shunt limiter on Landsat-2 has operated several times since launch and has held the solar array bus voltage at specified levels.

Figure 3-3 shows the actual variation in sun angle to orbit plane and solar panels for Landsat-2. Figure 3-4 is a prediction of the variations of the sun angle through 1977 for Landsat-1 and 2.

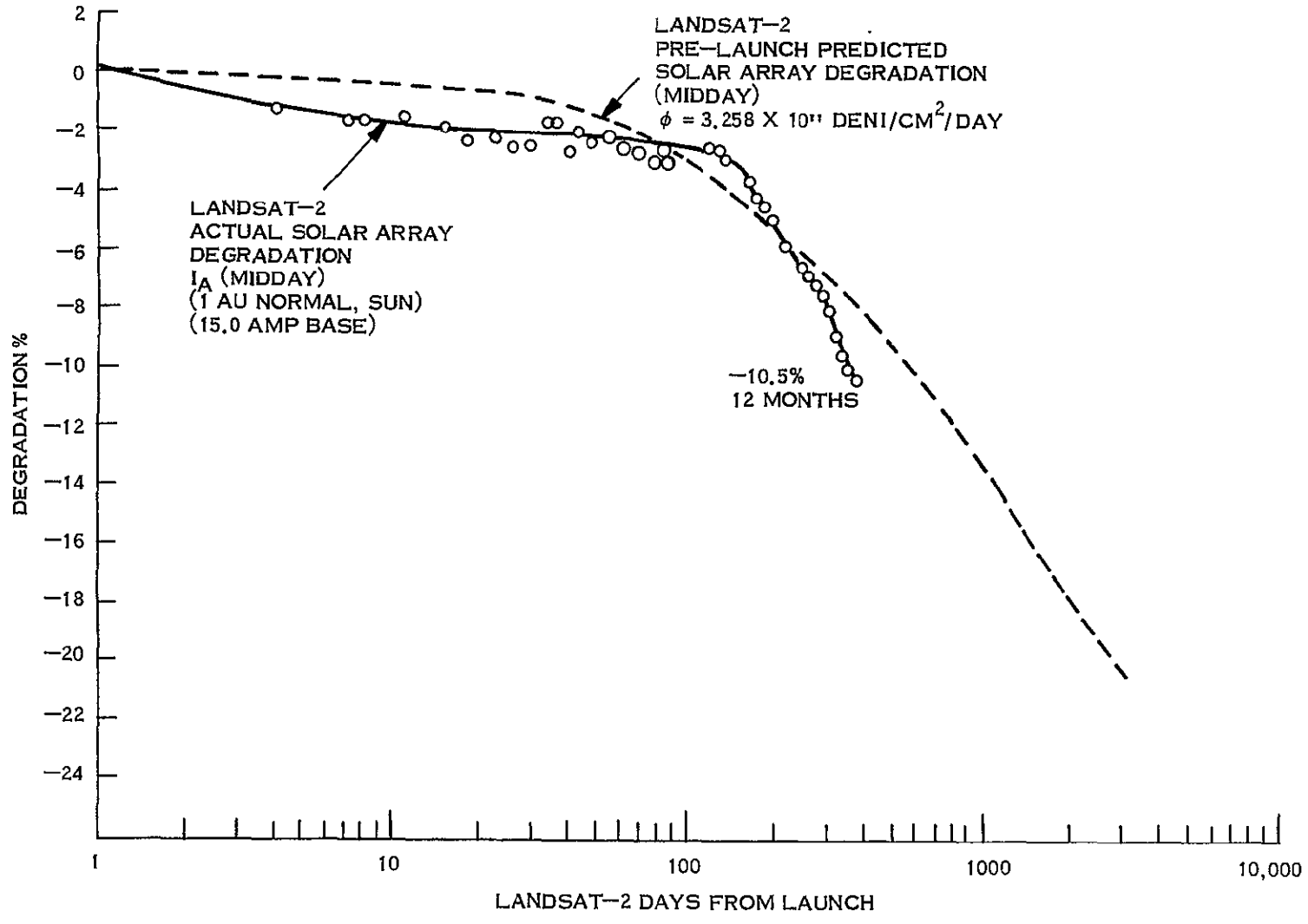

Figure 3-1. Landsat-2 I_A (Midday) Degradation vs. Days

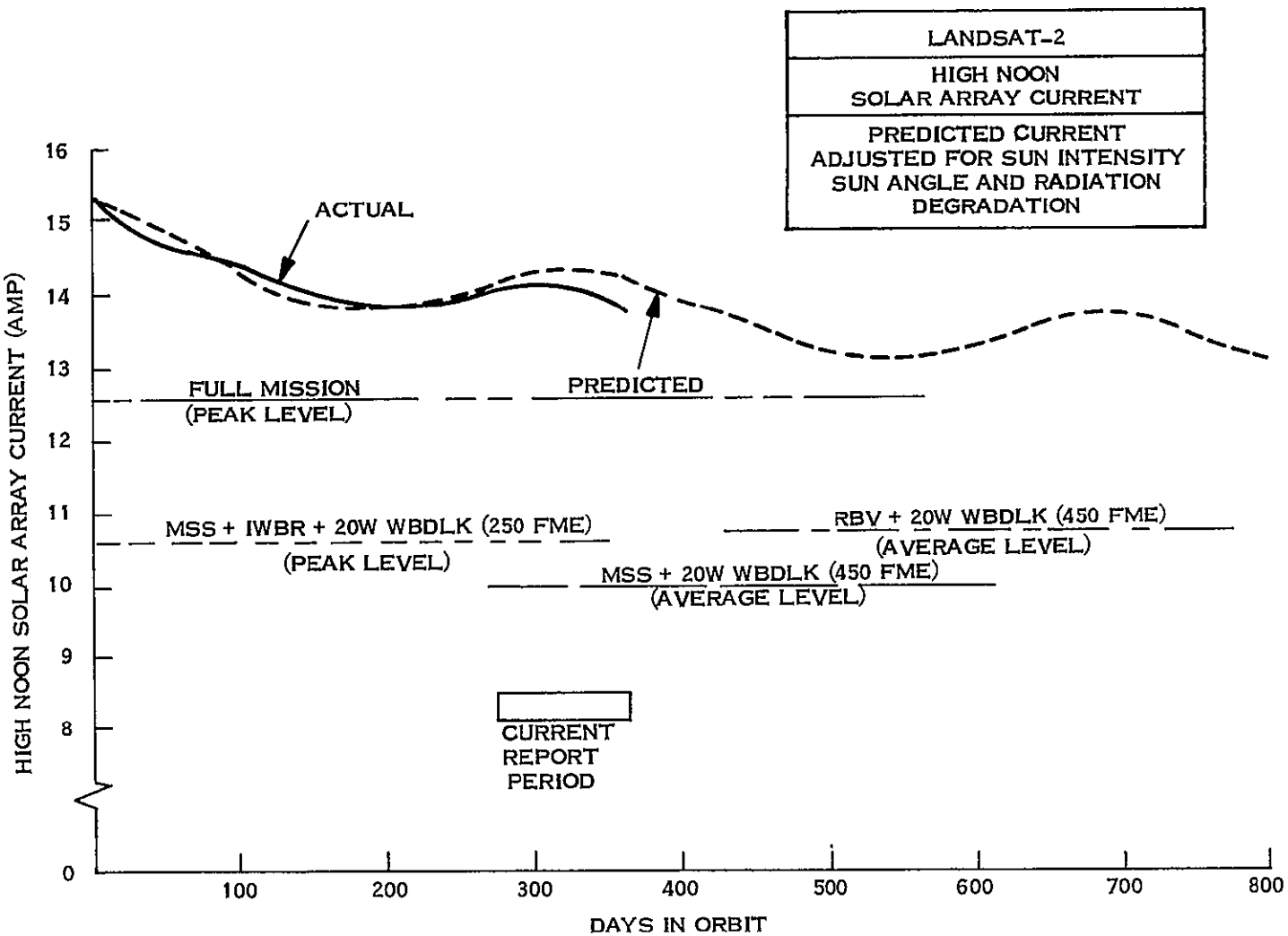

Figure 3-2. Landsat-2 Midday Solar Array Current

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

Pwr. Mgmt. Orbit No.	50	1251	2540	3820	4250	4669	5100
Batt 1 Max	33.43	33.08	33.25	33.60	32.91	32.91	32.66
2 Chge	33.40	33.05	33.14	33.48	32.89	32.89	32.63
3 Volt	33.35	33.00	33.09	33.43	32.83	32.92	32.57
4	33.45	33.02	33.20	33.54	32.85	32.94	32.68
5	33.42	33.08	33.25	33.59	32.91	32.91	32.65
6	33.41	33.07	33.24	33.50	32.90	32.90	32.64
7	33.45	33.11	33.28	33.54	32.93	32.93	32.68
8	33 45	33.10	33.27	33.53	32.93	32.93	32.68
Average	33 42	33.07	33.21	33.53	32.89	32.92	32.65
Batt 1 End-of-Night	29.32	28.98	29.06	28.89	29.06	28.80	29.06
2	29.38	28.95	29.12	28.87	29.04	28.78	29.04
3	29.32	28.98	29.07	28.89	29.07	28.81	29.07
4	29.34	29.00	29.09	28.91	29.09	28.83	29.09
5	29.40	28.97	29.06	28.89	29.06	28.89	29.06
6	29.31	28.96	28.96	28.79	28.96	28.79	28.96
7	29.34	29.00	29.08	28.91	29.08	28.82	29.08
8	29.34	29.00	29.00	28.82	29.00	28.82	29.00
Average	29.34	28.98	29.05	28.87	29.04	28.82	29.04
Batt 1 Chge	12.76	12.36	12.13	12.57	12.76	13.21	12.43
2 Share	11.68	12.24	12.45	12.12	11.77	11.67	11.42
3 (%)	12.24	13.21	13.67	13.62	12.96	13.08	12.48
4	11.99	12.62	12.50	12.34	11.91	12 10	11.76
5	12.84	12.01	11.52	11.83	12.50	12.49	13.24
6	13.35	12.71	13.20	13.02	14.02	13.12	14.32
7	12.90	12.86	12.81	12.83	12.90	13.01	12.97
8	12.24	11.99	11.72	11.65	11.18	11.32	11.38
Batt 1 Load	12.60	11.97	11.35	11.40	11.20	11.50	11.80
2 Share	12.70	14.12	13.99	13.51	13.75	13.44	13.34
3 (%)	12.67	13.14	14.38	13.81	14.43	13.64	13.74
4	12.44	12.57	12.99	12.87	12.84	12.67	12.48
5	12.34	11.59	11.58	11.87	11.92	12.34	12.36
6	12.70	12.10	11.30	11.91	11.33	11.84	11.56
7	12.47	12.42	12.35	12.56	12.53	12.63	12.70
8	12.04	12.08	12.06	12.08	12.00	11.94	12.02
Batt 1 Temp	21.46	20.20	21.34	22.02	21.78	21.82	21.94
2 in	20.25	19.98	21.44	21.02	20.13	19.67	19.94
3 (°C)	18.60	18.22	19.18	18.72	17.79	17.62	17.86
4	20.83	20.73	20.91	20.98	20.15	20.18	20.36
5	24.98	22.11	22.31	23.14	23.66	24.16	27.27
6	24.26	21.78	23.01	23.70	24.28	24.20	27.28
7	24.71	22.59	23.62	24.34	24.66	24.62	26.32
8	23.63	22.04	22.71	23.29	23.30	23.40	24.41
Average	22.34	20.95	21.81	22.15	21.97	21.96	23.17
S/C Reg Bus Pwr. (W)	*	161.38	185.0	190.2	147.6	154.7	149.3
Comp Load Pwr. (W)	*	34.06	41.2	41.2	19.4	24.8	24.8
P/L Reg Bus Pwr. (W)	*	9.59	9.6	9.6	9.8	12.6	9.8
C/D Ratio	1.15	1.08	1.10	1.28	1.20	1.24	1.11
Total Charge (A-M)	271.9	250.98	267.55	298.55	248.35	257.99	223.46
Total Discharge (A-M)	237.2	229.67	244.33	233.14	206.73	207.49	201.45
Solar Array (A-M)	1106	1032	981	999	1006	1009	1003
S.A. Peak I (Amp)	16.05	15.37	14.67	14.82	14.74	14.82	14.43
Midday Array I (Amp)	*	14.51	13.88	14.04	14.12	13.96	13.72
Sun Angle (Deg)	*	0.08	-1.22	1.55	2.10	4.84	8.35
Max R Pad Temp (°C)	*	60.80	59.60	64.40	64.40	65.60	63.20
Min R Pad Temp (°C)	*	-38.67	-38.00	-37.40	-36.80	-36.20	-35.00
Max L Pad Temp (°C)	*	57.69	56.92	60.0	62.15	64.31	62.15
Min L Pad Temp (°C)	*	-45.71	-45.00	-44.29	-43.57	-43.57	-42.14

* Data not processed and unavailable

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

Function	Description	Unit	Orbits						
			50	1253	2532	3810	4251	4670	5102
6001	Batt 1 Disc I	Amp	1.01	0.89	0.85	0.68	0.87	0.75	0.74
6002	2		1.01	0.97	0.97	0.82	1 04	0.90	0.84
6003	3		1.00	0.97	0.99	0.85	1 06	0.92	0 87
6004	4		1.00	0.93	0.93	0.79	0.97	0.85	0.73
6005	5		0.99	0.86	0.85	0.73	0.91	0.84	0 78
6006	6		1 02	0.90	0.86	0.72	0.87	0.80	0 73
6007	7		1.00	0.91	0.91	0.77	0.94	0.87	0.80
6008	8		0 97	0.89	0.87	0.74	0.91	0.82	0.75
6011	Batt 1 Chg I	Amp	0.47	0.43	0.57	0.51	0 51	0.45	0.42
6012	2		0.43	0.46	0.57	0.49	0.48	0.40	0.38
6013	3		0.45	0.45	0.61	0.54	0.52	0.44	0.42
6014	4		0 44	0.43	0.57	0 50	0.48	0.41	0.39
6015	5		0.47	0.41	0.54	0.48	0.50	0.42	0.44
6016	6		0.49	0.44	0.60	0.53	0.55	0.45	0.47
6017	7		0.47	0.44	0.60	0.52	0.52	0.44	0.43
6018	8		0.45	0.41	0.55	0.48	0.46	0.38	0.38
6021	Batt 1 Volt	VDC	31.50	31.18	30.92	31.17	31.06	31.02	31.11
6022	2		31.48	31.15	30.90	31.16	31.04	31.00	31.09
6023	3		31.49	31.16	30.91	31.16	31.05	31.01	31.10
6024	4		31.49	31.16	30.91	31.17	31.05	31.01	31.10
6025	5		31.50	31.18	30.92	31.18	31.05	31.02	31.11
6026	6		31 49	31.16	30.90	31.15	31.03	31.01	31.08
6027	7		31.52	31.20	30.94	31.20	31.08	31 05	31 14
6028	8		31.49	31.17	30.92	31.17	31.06	31.03	31.11
6031	Batt 1 Temp	DGC	21.59	20.23	20.93	22.02	21.74	21.88	21.91
6032	2		20.53	20.05	20.75	20.93	20.14	19.74	19 90
6033	3		18.80	18.30	18.66	18.84	17.80	17.65	17.77
6034	4		20.90	20.75	20.88	21.05	20.17	20.20	20.33
6035	5		25.16	22.15	22 22	23.26	23.59	24.22	27.18
6036	6		24.37	21 79	22 55	23 86	24.24	24.26	27.19
6037	7		24.83	22.62	23.26	24.36	24.67	24.67	26.19
6038	8		23.75	22.05	22.52	23.37	23.31	23.47	24.36
6040	Rt. Pad Temp	DGC	28.96	26.72	26.16	29.31	29.43	30.50	30.90
6041	Rt. Pad VM	VDC	33.72	33.74	33.56	33.51	33.48	33.23	32.86
6042	Rt. Pad VN	VDC	33.46	33.00	33.18	33.25	32.98	32.62	32.44
6044	Lt. Pad Temp	DGC	25.56	21.86	21.16	24.71	24.88	26.38	28.22
6045	Lt. Pad VF	VDC	34 40	33.99	33.80	33.95	33.94	33.87	33.82
6046	Lt. Pad VG	VDC	34.48	34.09	33.91	34.04	34.03	33.94	33.91
6050	S/C UR Bus V	VDC	31.73	31.41	31.14	31.35	31.30	31.26	31.33
6051	S/C RG Bus V	VDC	24.57	24.58	24.57	24.57	24.57	24.58	24.58
6052	Aux Reg AV	VDC	23.36	23.39	23.40	23.42	23.44	23.44	23 44
6053	Aux Reg BV	VDC	23.37	23.40	23.39	23.39	23.41	23.44	23 44
6054	Solar I	Amp	14.81	14.24	13.76	13.85	13.86	13.74	13.40
6056	S/C RG Bus I	Amp	7.23	6.62	7.17	7.37	6.25	6.24	6.28
6068	PC Mod T1	DGC	21.67	21.42	21.98	22.16	20.28	20.18	20.77
6059	PC Mod T2	DGC	20.44	20.06	20.53	20.68	19.51	19.43	19 56
6070	P/L RG Bus V	VDC	24.61	24.60	24.60	24.60	24.60	24.60	24.60
6071	P/L UR Bus V	VDC	31.85	31.49	31.21	31.44	31.37	31.32	31.40
6073	P Aux AV	VDC	23.47	23.50	23.51	23.49	23.51	23.51	23 51
6074	P Aux BV	VDC	23.46	23.50	23.51	23.50	23.51	23.51	23.51
6075	PR Mod T1	DGC	20.84	20.69	21.39	21.44	20.57	20.14	20.32
6076	PR Mod T2	DGC	22.13	22.01	22.38	22.54	21.91	21.64	21.79
6079	Fuse Blow V	VDC	24.48	24 47	24.48	24.50	24.49	24.47	24.49
6080	Shunt 1 I	Amp	0 0	0.0	0.0	0.0	0.00	0.00	0.00
6081	2		0.0	0.0	0.0	0.0	0.009	0.00	0.00
6082	3		0.0	0.0	0.0	0.0	0.00	0.00	0.00
6083	4		0.0	0.0	0.0	0.0	0.00	0.00	0.00
6084	5		0.0	0.0	0.0	0.0	0.00	0.00	0.00
6085	6		0.0	0.0	0.0	0.0	0.00	0.00	0.00
6086	7		0.0	0.0	0.0	0.0	0.00	0.00	0.00
6087	8		0.0	0.0	0.0	0.0	0.00	0.00	0.00
6100	P/L RG Bus I	Amp	0.38	0.42	0.80	0 0	0.66	0.48	0.54
Total No.	Major Frames	Frm	396	785	387	384	784	785	785

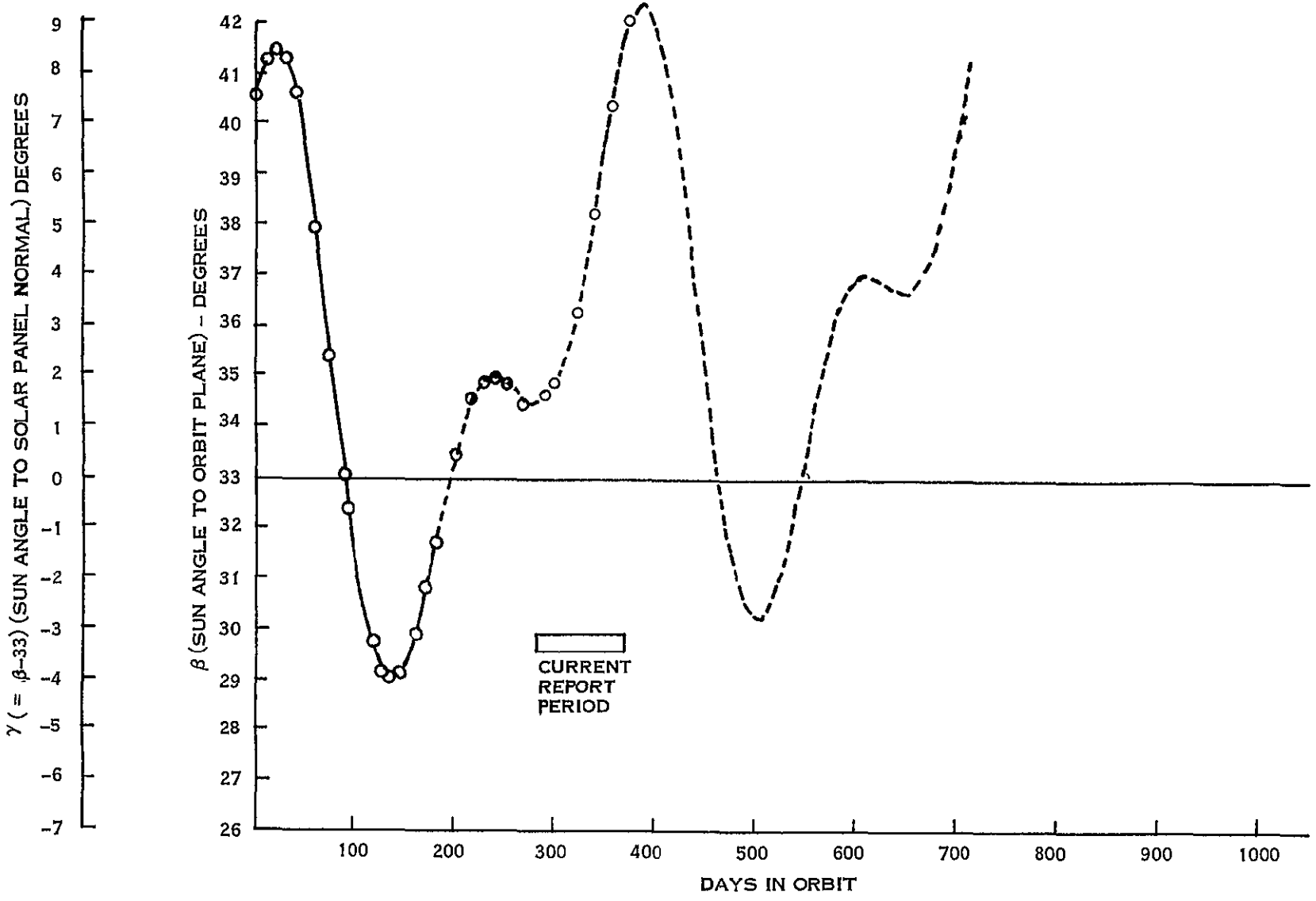

Figure 3-3. Landsat-2 Actual β and γ (Paddle) Sun Angles

FOLDOUT FRAME 1

FOLDOUT FRAME 2

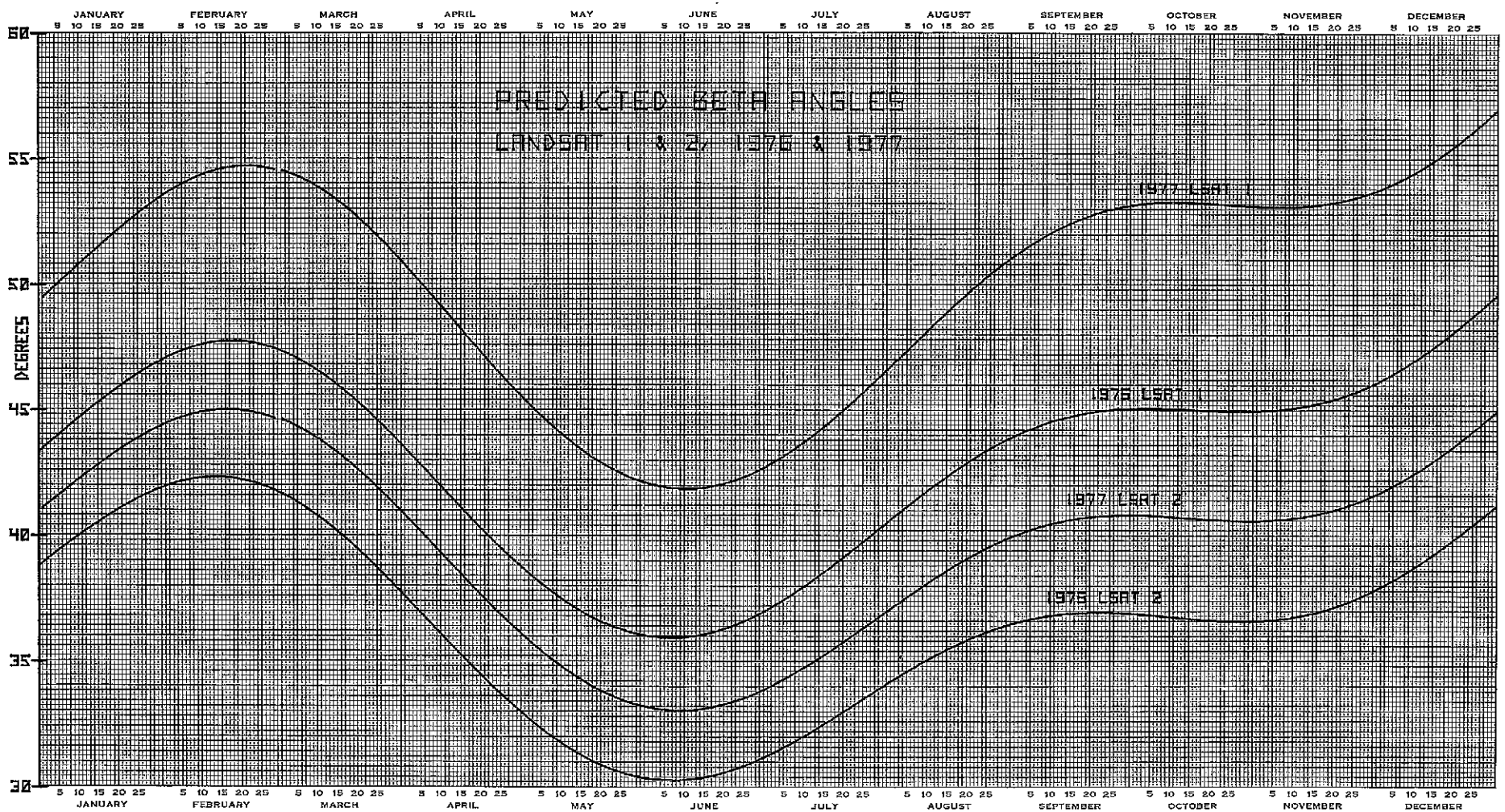

Figure 3-4. Predicted Beta Angles for Landsat-1 and Landsat-2 - 1976 and 1977

SECTION 4

ATTITUDE CONTROL SUBSYSTEM (ACS)

LANDSAT-2

SECTION 4

ATTITUDE CONTROL SYSTEM (ACS)

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

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

In mid September (Orbit 3288, 15 September 1975) a program was implemented to control spacecraft ground track drift by limiting the number of pitch gates occurring in each orbit and by assigning them polarity. The ACS system is commanded into the $+2^{o}$ Pitch Position Bias mode during satellite night for specific durations centered about satellite midnight. In addition, the program is implemented in either alternate or successive orbits, depending upon the number of properly polarized pitch gates required to affect the spacecraft's ground track drift and/or drift rate.

Table 4-1 summarizes the sequences maintained to date and Figure 2-1 in Section 2 shows the effects of these sequences on the spacecraft's orbit.

Table 4-1. Landsat-2, $+2^{o}$ Pitch Position Bias Summary

Time Span	Implementation	Duration Centered About Satellite Midnight (Minutes)	Resulting Average Number of Pitch Gates Per Day
15 Sept to 18 Sept	Alternate Orbits	25	5 + pitch
18 Sept to 12 Oct	Consecutive Orbits	50	2 - pitch
12 Oct to 18 Oct	Alternate Orbits	25	2 to 4 + pitch
18 Oct to 14 Nov	Consecutive Orbits	50	2 to 5 - pitch
14 Nov to 18 Nov	Alternate Orbits	25	2 to 3 + pitch
18 Nov to 18 Dec	Consecutive Orbits	50	2 to 3 - pitch
18 Dec to 5 Jan	Alternate Orbits	25	1 to 2 + pitch
5 Jan to 11 Feb	Discontinued	--	10 to 11 + pitch

Secondary benefits have also been derived from this effort. The requirements for routine orbit adjusts have been eliminated and freon is being conserved due to the metering effects of controlled pneumatic gating.

Freon Useable Impulse declined predictably during this report period as shown in Figures 4-1 and 4-2.

RMP 2, commanded into operation shortly after ACS acquisition as the primary control of the yaw subsystem has functioned normally.

Both Solar Array Drives (SAD) performed normally and maintained proper solar panel alignment with the sun line during satellite day. Motor voltages and temperatures are within specifications.

Typically, flywheel duty cycles have averaged seven percent or less. Pitch and Yaw flywheel speeds have averaged less than -150 RPM while the Roll flywheels have averaged +760 RPM. Sun transient response due to dual scanner mode operation has been similar to Landsat-1 and is normal.

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

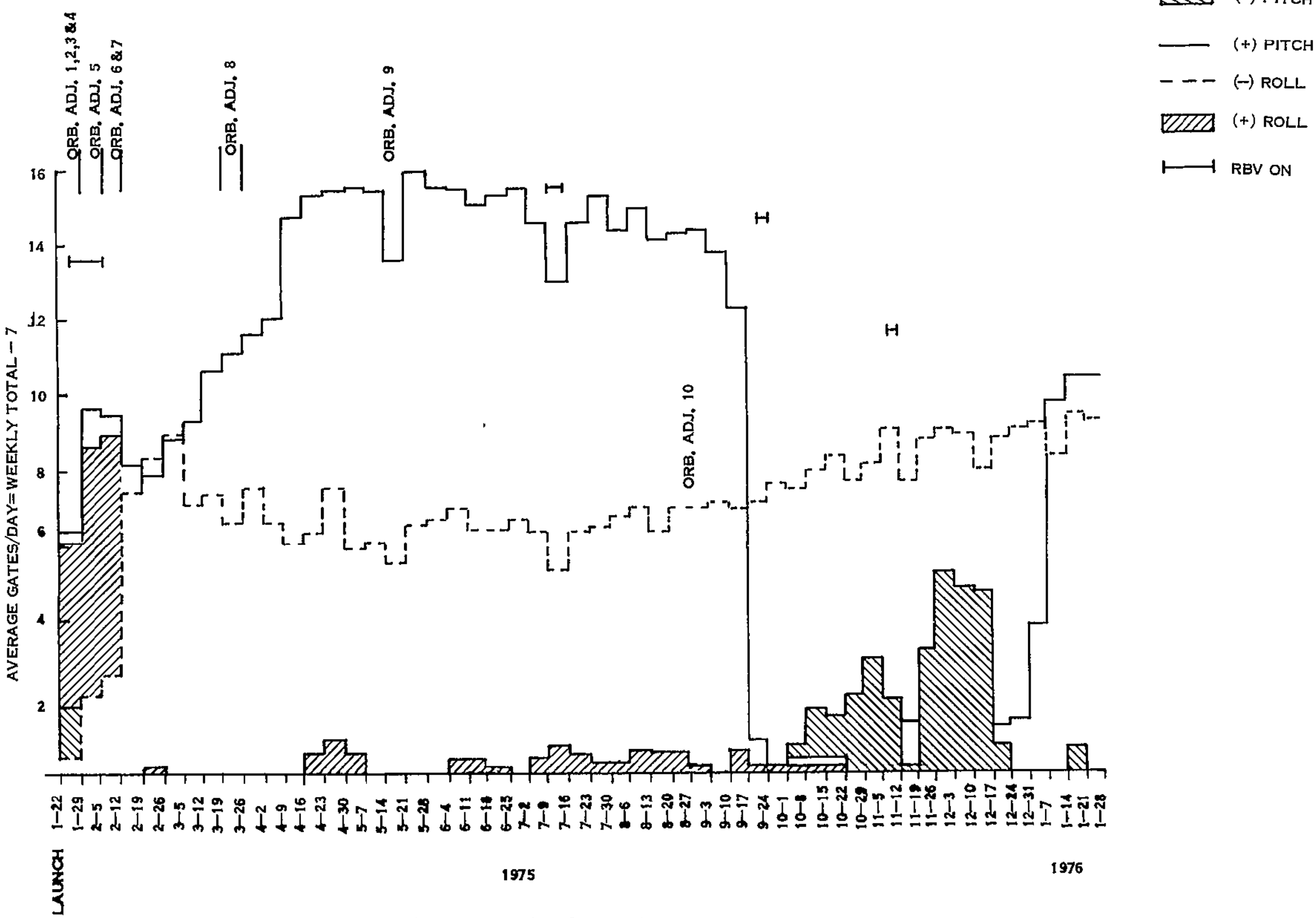

Figure 4-1. Landsat-2 Gating Frequency vs Time

FOLDOUT FRAME 1

FOLDOUT FRAME 2

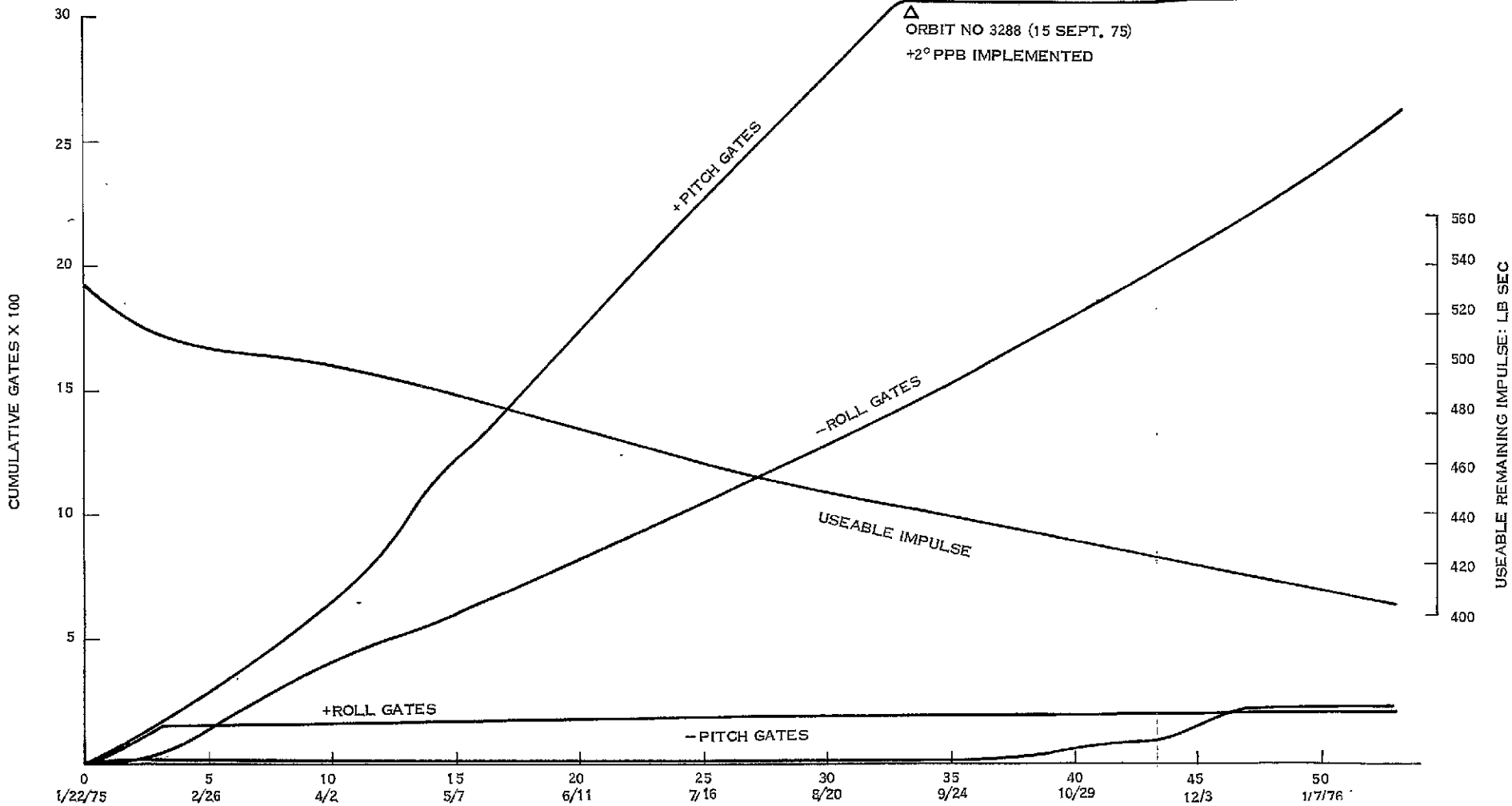

Figure 4-2. Landsat-2 Gating History

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

Function	Units	Orbits						
		29	1253	2532	3810	4241	4670	5102
1084 RMP 1 Gyro Temperature	DGC	19 33(1)	21.15	21 02	22.70	24.26	23.83	22.69
1094 RMP 2 Gyro Temperature	DGC	74.00	74.00	74.00	74 02	74.31	74.34	74.26
1222 SAD RT MTR HSNG Temp.	DGC	19.50	22 24	22.23	23.81	25 16	24.66	22.98
1242 SAD LT MTR HSNG Temp.	DGC	26.87	27 94	27.54	29.36	30.61	30 60	29.79
1223 SAD RT MTR WNDNG Temp.	DGC	21.76	24.31	24.23	25.75	26.83	26 23	24.36
1243 SAD LT MTR WNDNG Temp.	DGC	30.23	30.85	30.32	32 28	33.72	33.74	32.83
1228 SAD RT HSG Pressure	PSI	7.26	7.25	7.25	7.25	7.20	7.22	7.18
1248 SAD LT HSG Pressure	PSI	7.28	7.28	7.27	7.27	7.24	7.24	7.21
1007 FWD Scanner MTR Temp.	DGC	22.07	22.72	22.25	23.82	25.58	25 33	23.80
1016 Rear Scanner MTR Temp.	DGC	24.19	24.18	23.62	24.96	26.31	26.26	25.04
1003 FWD Scanner Pressure	PSI	9.59(2)	2.59	D	D	D	D	D
1012 Rear Scanner Pressure	PSI	6.21	6.19	6.00	5.91	5.82	5.83	5.62
1212 Gas Tank Pressure	PSI	1948.0	1800.29	1672.12	1599.60	1590.78	1559 49	1517.04
1210 Gas Tank Temperature	DGC	20.66	22.66	22.33	24.13	25.38	25 33	24.25
1213 Manifold Pressure	PSI	53.98	54.55	54.83	54.70	56.76	54 68	54.56
1211 Manifold Temperature	DGC	19.18	20 78	20.50	22.45	23.88	23.73	22.59
1059 CLG Power Supply Card Temp	DGC	39.00	40 00	39.52	41.11	42.46	42 41	41.47
1260 TH01 EBP	DGC	24.29	25 31	25.01	26.78	28.01	28.06	27.21
1261 TH02 EBP	DGC	20.29	21 63	21.36	23.04	24.44	24.35	23.25
1262 TH03 EBP	DGC	18.29	20 31	20.05	21.57	23.12	22 84	21.46
1263 TH01 STS	DGC	6.54	-3.03	-6.22	-2.61	1.60	1 76	0.52
1264 TH02 STS	DGC	D	D	D	D	D	D	D
1265 TH03 STS	DGC	8.46	0.79	- 48	4.96	7.47	8.31	8.67
1266 TH04 STS	DGC	-2.78	-9.13	-9 65	-4.95	-2.14	-2.04	-3.26
1267 TH05 STS	DGC	9 62	1 28	-2.64	2.19	6.41	6 59	5.57
1224 SAD R FSST	DGC	35 00	34 56	36 57	38.78	39.98	39.00	35.81
1244 SAD L FSST	DGC	50.00	46.17	46.29	48.55	48.99	49.18	49.13

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

Table 4-3. Landsat-2 ACS Voltages and Currents

Function	Units	Orbit						
		29	1253	2532	3810	4241	4670	5102
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 97	29 94	29 94	29 94	29 93	29 92
1092 RMP 2 MTR Current	Amps	0 10	0 10	0 10	0.10	0.10	0 10	0 10
1090 RMP 2 Supply Volts	VDC	-23 63	-23 62	-23.61	-23 59	-23.58	-23 58	-23 59
1220 SAD RT MTR WNDNG Volts	VDC	-5 47	-4.71	-4.51	-4 85	-4 48	-4 49	-4 47
1240 SAD LT MTR WNDNG Volts	VDC	-5 08	-4.91	-4.70	-4.70	-4 75	-4.72	-4 72
1227 SAD RT -15 VDC Conv	VDC	15 14	15.14	15 15	15 14	15 12	15.12	15 16
1247 SAD LT -15 VDC Conv	VDC	15.23	15 21	15 22	15 23	15 21	15 20	15.21
1056 CLB ± 6 VDC	TMV	2.35	2.35	2.35	2 38	2 37	2 37	2 38
1055 CLB ± 10 VDC	TMV	2 88	2.90	2 90	2.92	2.92	2 92	2 92
1057 CLB Power Supply Volts	TMV	2.97	2.94	2.94	2 96	2 97	2.97	2 96

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

Function	Units	Orbits						
		26	1202	2532	3810	4241	4670	5102
1041 Pitch Fine Error	DEG	-0 15	-0 14	-0 14	-1 23	-1 24	- 77	- 13
1043 Pitch Flywheel Speed	RPM	-156 12	-221.22	-198 41	66 38	125 87	-101 31	-162 97
1038 Pitch Mtr Drvr CCW	PCT	6 64	8 61	7 35	4 33	4 76	6 58	6 05
1039 Pitch Mtr Drvr CW	PCT	2 03	3 64	2 60	6 82	7 39	4 24	1 80
1030 Roll Fine Error	DEG	-0 13	-0 11	-0 09	- 13	- 15	-.13	- 14
1027 Roll Rear Flywheel SPD	RPM	729 30	731 98	739 75	754 14	781 91	763 10	748 56
1026 Roll Fwd Flywheel SPD	RPM	703 02	710 22	725 23	735 32	732 53	747 87	735 81
1022 Roll Rear Mtr Drvr CCW	PCT	0 67	0 86	39	31	55	99	63
1025 Roll Rear Mtr Drvr CW	PCT	7 54	7 11	5 47	6 21	6 97	7 19	6 34
1023 Roll Fwd Mtr Drvr CCW	PCT	0.70	0 79	37	53	63	1 32	.87
1024 Roll Fwd Mtr Drvr CW	PCT	5.46	4 47	4 74	4 06	5 07	5 14	4 01
1035 Yaw Tach	RPM	-95 73	-77 38	-41 57	-98 81	-62 65	-75 84	-38 16
1033 Yaw Mtr Drvr CW	PCT	1 98	2 10	1 77	1 59	1 94	2 35	2 01
1034 Yaw Mtr Drvr CCW	PCT	2 10	2.15	1 72	1 80	2 00	2.74	1 90
1221 SAD Right Tach	D/M	0.00	3 39	3 38	3 37	3 39	3 38	3 38
1241 SAD Left Tach	D/M	3.68	3 64	3 63	3 60	3 57	3 56	3 56

SECTION 5

COMMAND/CLOCK SUBSYSTEM

LANDSAT-2

SECTION 5

COMMAND/CLOCK SUBSYSTEM (CMD)

The CMD Subsystem operated nominally in this report period. On January 1, 1976, during Orbit 4787, the spacecraft clock was moved back by approximately 3 seconds.

Figure 5-1 shows the history of the S/C clock drift since launch. Figure 5-2 shows the cumulative drift since launch (3.1 seconds in 12 months). As can be seen, the clock of Landsat-2 drifts in opposite direction from the clock of Landsat-1. Figure 5-2 also shows the clock drift rate, which is nearly constant at +0.6 milliseconds per orbit.

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

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

Function No	Name	Mode	Units	Orbit						
				35	1253	2462	2964	4241	4670	5091
8005	Pri Power Supply Temp	-	DGC	38 82	39 86	40 43	39 91	39 45	39 50	39 43
8006	Red. Power Supply Temp	-	DGC	36 93	38 03	38 70	38 20	38 02	39 29	38 00
8007	Pri Osc Temp	-	DGC	28 70	28 70	29 35	28 70	28 34	28 63	28 70
8008	Red Osc Temp	-	DGC	27 82	27 93	28 68	27 85	27 10	27 82	27 26
8009	Pri Osc Output	-	TMV	1 06	1 05	1 06	1 06	1 05	1 05	1 05
8010	Red. Osc Output	-	TMV	1 17	1.19	1 20	1 19	1 18	1 20	1 18
8011	100 KHz	Pri - Red	TMV	3 17	3 16	3 16	3 16	3 15	3 15	3 15
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 95	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 01	2 01	2 01	2 00	2 03	2 00
8017	Pri. +6V Power Supply	Pri Clk ON	VDC	NA	2 30	2 30	2 31	2 30	2 30	2 30
8018	Red. +6V Power Supply	Red Clk ON	VDC	NA	2 31	2 31	2 31	2 30	2 33	2 30
8019	Pri - 6V Power Supply	Pri Clk ON	VDC	NA	5 22	5 23	5 23	5 23	5 22	5 23
8020	Red. - 6V Power Supply	Red Clk ON	VDC	NA	5 23	5 23	5 23	5 23	5 25	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 30	5 29	5 29	5 29	5 29
8024	Red - 29V Power Supply	Red Clk ON	VDC	NA	5 29	5 29	5 28	5 29	5 30	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 97	3 95
8103	CIU A - 5V	CIU A ON	VDC	3 93	4 15	4 15	4 14	4 15	4 14	4 15
8104	CIU B - 5V	CIU B ON	VDC	3 90	4 10	4 10	4 10	4 10	4 12	4 10
8105	CIU A Temp	CIU A ON	DGC	26 01	22 09	22 50	21 94	21 34	21 60	21 67
8106	CIU B Temp	CIU B ON	DGC	23 35	19 96	20 38	19 90	19 45	20 33	19 70
8201	Receiver RF-A Temp	-	DGC	NA	29 58	30 02	29 50	28 89	29 03	29 14
8202	Receiver RF-B Temp	-	DGC	29 09	F	F	F	F	F	F
8203	D MOD A Temp	-	DGC	28 95	38 80	39 20	38 72	38 37	38 44	38 56
8204	D MOD B Temp	-	DGC	37 73	27 10	27 56	27, 03	26 49	26 84	26 72
8205	Receiver A AGC	Receiver A ON	DGC	F	-91 00	-92 18	-91 74	-91 32	-90 83	-91 43
8206	Receiver B AGC	Receiver B ON	DBM	-87 83	F	F	F	F	F	F
8207	Amp A Output	Receiver A ON	TMV	F	2 70	2 51	2 52	2 49	2 77	2 54
8208	Amp B Output	Receiver B ON	TMV	2 10	F	F	F	F	F	F
8209	Freq Shift Key A Out	Receiver A ON	TMV	F	1 09	1 08	1 08	1 08	1 09	1 08
8210	Freq Shift Key B Out	Receiver B ON	TMV	1 11	F	F	F	F	F	F
8211	Amp A Output	Receiver A ON	TMV	F	1 13	1 12	1 12	1 13	1 14	1 13
8212	Amp B Output	Receiver B ON	TMV	1 13	F	F	F	F	F	F
8215	D MOD A - 15V	Receiver A ON	TMV	F	4 87	4 87	4 87	4 87	4 87	4 87
8216	D MOD B - 15V	Receiver B ON	TMV	4 77	F	F	F	F	F	F
8217	Regulator A - 10V	Receiver A ON	TMV	F	5 40	5 40	5 40	5 40	5 40	5 40
8218	Regulator B - 10V	Receiver B ON	TMV	5 32	F	F	F	F	F	F
8311	ECAM Mem Tmp	ECAM ON	DGC	NA	17 95	18 03	17 89	18 66	18 66	18 44
8312	ECAM Pwr Spply Temp	ECAM ON	DGC	NA	22 43	23 13	22 34	23 32	23 31	23 13

NA - Not available due to processing problem - MT 710
F - OFF

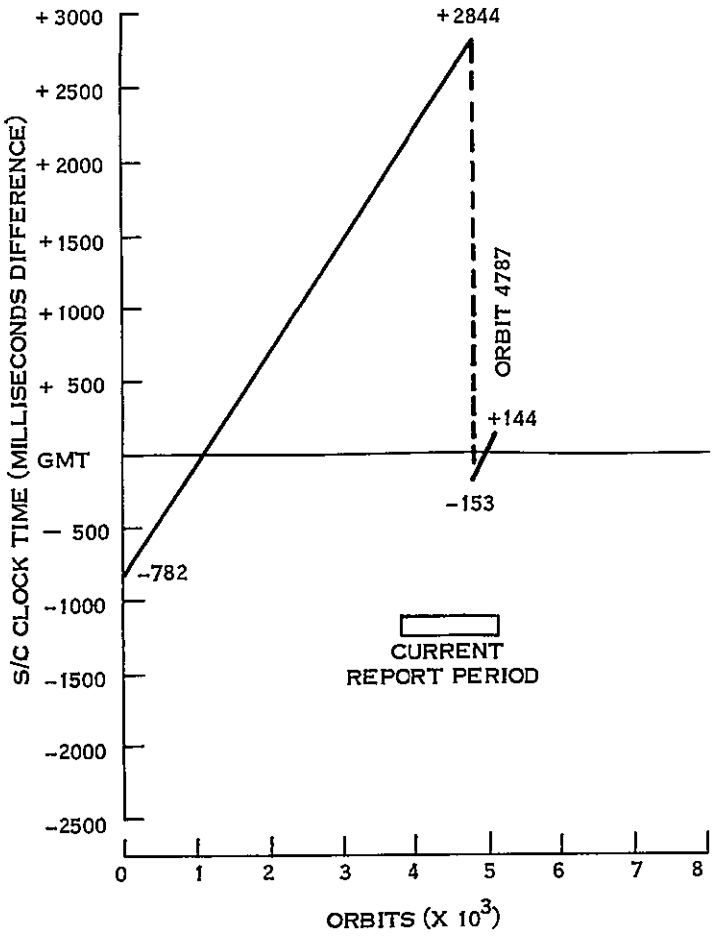

Figure 5-1. Landsat-2 Drift History

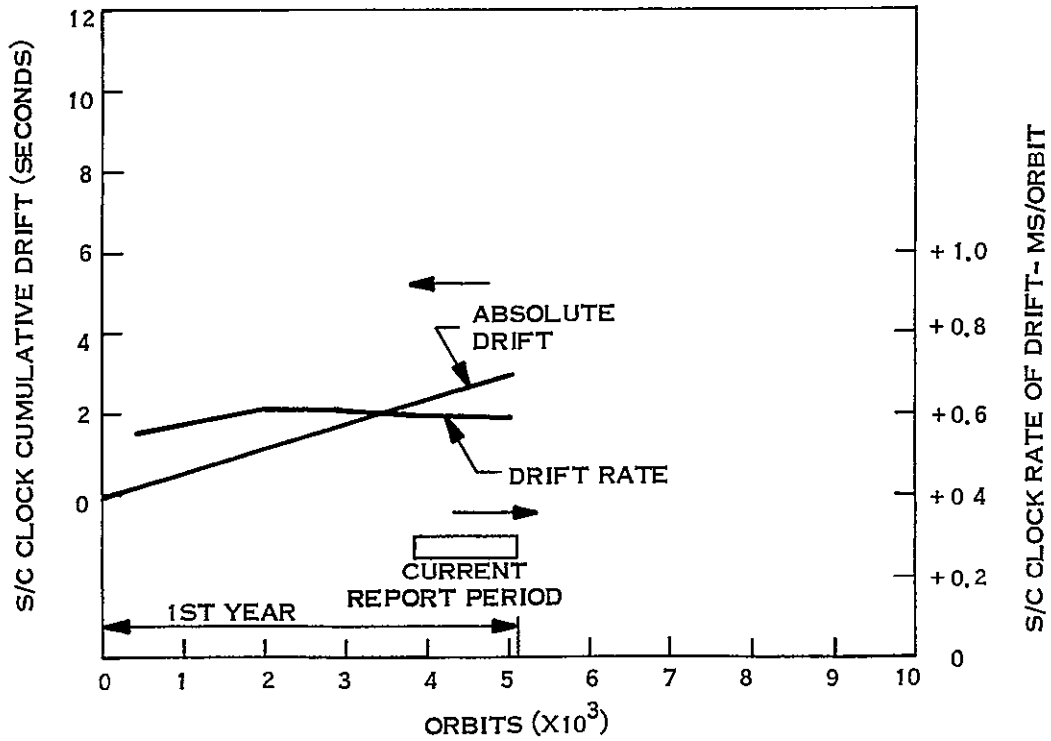

Figure 5-2. Cumulative Drift Since Launch

SECTION 6

TELEMETRY SUBSYSTEM

LANDSAT-2

SECTION 6

TELEMETRY SUBSYSTEM (TLM)

The TLM has operated nominally in this report period.

Table 6-1 shows typical telemetry values since launch. All are nominal except for functions 1264 (Thermal Shield 5 Temperature), 4002 (MMCA Board 2 Temperature), and 13200 (APU 24 Volt Input), which were defective before launch. Verification of these functions is acceptable by adjacent temperature and downstream voltage measurements respectively.

The Memory section of the telemetry matrix remains in the 0, 0 mode.

Table 6-1. Landsat-2 TMP Telemetry Values

Func. No.	Function Name	Unit	Orbit						
			35	1253	2467	3810	4261	4670	5091
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	19.19	20.77	20.65	20.96	21.13	21.37
9004	Formatter A Converter	VDC	4.52	4.51	4.51	4.52	4.52	4.52	4.52
9005	Formater 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	23.23	23.98	24.75	24.93	26.80	27.80
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	4.03	4.03	4.05	4.03
9012	A/D Converter B Voltage	VDC	**	**	**	**	**	**	**
9013	Analog Mux, A/D Conv. Temp	°C	25.00	25.00	24.91	25.41	26.10	27.42	27.33
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	22.24	22.27	22.34	22.49	22.50	24.74
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	16.46	17.33	17.26	17.10	16.86	17.17
9019	Memory B Converter	VDC	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.50	16.78	17.28	17.27	17.41	17.50	17.41
9100	Reflected Power (Xmtr A)	dBm	18.29	13.84	13.68	13.85	13.91	13.99	14.18
9101	Xmtr A-20 VDC	VDC	3.80	3.97	3.98	3.97	3.97	3.97	3.97
9103	Xmtr A Temp	°C	27.73	21.02	20.97	21.79	21.92	23.21	26.40
9104	Xmtr B Temp	°C	*	23.27	22.07	22.87	23.02	24.43	27.74
9105	Xmtr A Power Output	dBm	27.73	26.14	26.19	26.19	26.19	26.19	26.29
9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**

* Not available due software
** Not turned on since Prelaunch

SECTION 7

ORBIT ADJUST SUBSYSTEM

LANDSAT-2

SECTION 7

ORBIT ADJUST SUBSYSTEM (OAS)

The Orbit Adjust Subsystem on Landsat-2 has been fired ten times since launch, 6 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. Three -X firings were for orbit maintenance.

No firing of the OAS was made during this report period (See Section 2 also).

The Subsystem activity since launch is summarized in Table 7-1. A total of 6.87 lbs. of hydrazine has been expended so far from the pre-launch 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. The variations in the thrust chamber temperatures in Table 7-2 are consistent with the variations in sun intensity and sun angle.

Table 7-1. Landsat-2 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 (° 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	468.75	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
2958	10	22 Aug 75 22 11 58.8	22.0	146	110.3	0.07	404.96	73.5	-X

[1] Initial Fuel Capacity - 67 lbs.

Table 7-2. Landsat-2 OAS Telemetry Values

Function No.	Name	Units	Orbit						
			50	1253	2532	3810	4241	4670	5102
2001	Prop. Tank Temp.	°C	23.03	21.97	23.05	23.47	23.05	23.47	23.89
2003	Thrust Chamber No. 1 (-X) Temp.*	°C	24.84	30.28	30.14	29.24	29.13	28.12	25.12
2004	Thrust Chamber No. 2 (+X) Temp.*	°C	37.34	37.63	38.41	39.83	40.20	39.69	38.55
2005	Thrust Chamber No. 3 (-Y) Temp.*	°C	47.22	36.23	34.20	37.92	38.83	42.36	46.35
2006	Line Pressure	psia	545.60	399.69	404.97	410.26	411.10	412.44	413.25

*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

LANDSAT-2

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.

Table 8-1. Landsat-2 MMCA Telemetry Values

Function	Name	Units	Orbit						
			50	1253	2532	3810	4241	4670	5102
4001	A1 Board Temp	°C	20.56	19.84	19.82	19.97	19.44	19.44	19 47
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	3.07	3.07	3.07	3.06	3.07
4005	Pitch Flux Density	TMV	3.15**	2.92**	2.90	2.90	2.90	2.90	2.90
4006	Roll Flux Density	TMV	2.99	2.98	2.98	2.98	2.97	2.97	2.97

*Defective Telemetry Function (Pre-launch)
**Post launch telemetry drift.

SECTION 9

UNIFIED S-BAND/PREMODULATION PROCESSOR

LANDSAT-2

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. All are nominal. 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. The scatter of data points reflect variations in the ground station calibration and readout.

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

				ORBITS								
No.	Function Name	Units	T/V (20°C)	15	50	1253	2462	2964	3810	4241	4670	5091
11001	USB Rcvr AGC	DBM	NA	-112 72	-120.24	-121 7	-128.8	-125 3	-131.5	-130 5	-131 5	-124 29
11002	USB Xmtr Pwr	WTS	1 40	1.36	1 36	1 38	1 43	1 40	1.42	1 39	1 37	1 38
11003	USB Rcvr Error	KHz	NA	-2 15	-4.87	-4 14	-4.64	-6 88	-4.23	-4 15	-4 13	-2 97
11004	USB Xpond Temp	DGC	22 93	25 88	29 12	24 38	24 37	25 20	24.96	24 85	25 32	27 49
11005	USB Xpond Press	PSI	16.99	17.08	17.09	16 94	16 74	16 71	16 61	16 47	16 47	16 49
11007	USB Xmtr A -15V	VDC	2 35	2 36	F	F	F	F	F	F	F	F
11008	USB Xmtr B -15V	VDC	2 39	F	2 40	2 40	2 40	2 40	2 42	2 40	2 43	2 42
11009	USB Range -15V	VDC	2 07	2 07	2 05	2 05	2.07	2.06	2 06	2 05	2 05	2 06
11101	PMP Pwr A Volt	VDC	-15 22	-15 10	F	F	F	F	F	F	F	F
11102	PMP Pwr B Volt	VDC	-15 07	F	-14 96	-14.98	-15.02	-15.00	-15.01	-15 02	-15 04	-14 99
11103	PMP Temp A	DGC	NA	37 30	32 37	28.64	29 12	29.46	29 74	30 11	30 84	34 67
11104	PMP Temp B	DGC	NA	28 34	35.16	30.03	30 57	31.31	31 26	31 53	31 99	36 08

F Unit OFF in this period

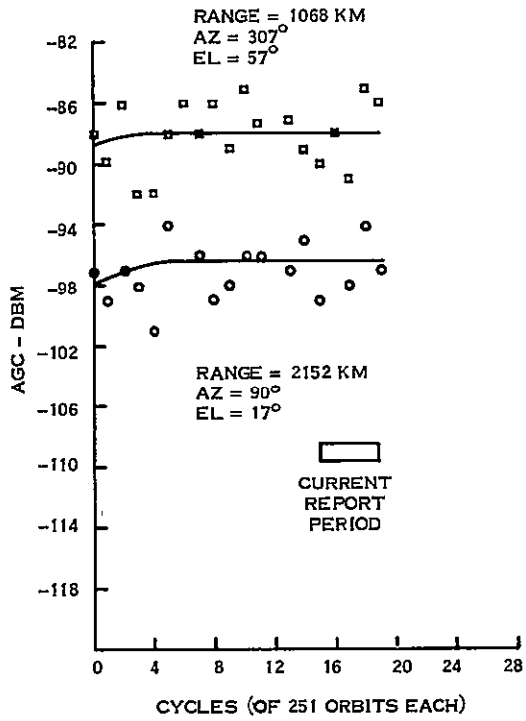

Figure 9-1. USB (Link) AGC Readings at Goldstone with 30' Antenna - Landsat-2

SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM

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.

Table 10-1. Landsat-2 APU Telemetry Functions

Function	Description	Unit	Orbit						
			21	1253	2532	3810	4241	4670	5102
13200	APU, -24.5 VDC	TMV	*	*	*	*	*	*	*
13201	APU, -12 Volts	TMV	2.42	2.44	2.45	2.45	2.45	2.45	2.45
13202	APU Temp	DGC	27.44	26.65	26.60	27.01	26.51	27.03	27.70

*Defective Telemetry (Prelaunch)

The Power Switching Module (PSM) containing the switching relays for power to the OAS, MSS, WBVTR No. 1 and No. 2, RBV and PRM, functioned normally. During this report period, the MSS as well as WBVTR No. 2 power circuits, have been operated on a regular basis. RBV power circuits have been operated during the periodic tests on 10 November 1975 and later for image coverage on 11 and 12 November 1975.

The Interface Switching Module performed all switchings normally during this report period.

SECTION 11

THERMAL SUBSYSTEM

LANDSAT-2

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 twelve months of operation of Landsat-2. Average temperatures of the sensory ring bays are plotted in Figure 11-1.

During this report period the sun intensity increased from 1.012 of the mean value to a peak of 1.034 and then slightly declined to a value of 1.032. This caused a general increase in spacecraft temperatures, noticeably along bays 11 through 18. The temperatures are expected to decrease during the on-coming period of lower sun intensity.

During Orbit 4204, compensation loads 1, 2, 5 and 8 were turned off to assist in power management. However, in Orbit 4372, compensation load 8 was turned on again because of decreasing MSS temperatures. A history of all switchings of compensation loads is given in Table 11-2.

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	1253	2532	3810	4241	4670	5102
7001	THM TH01 STI	DGC	19 40	18 71	19 59	19 90	19 33	19 54	19 97
7002	THM TH02 SBO	DGC	17 18	17 48	18 05	18 22	17 65	17 48	17 47
7003	THM TH03 STI	DGC	18 73	18 38	19 49	19 54	18 38	18 19	18 50
7004	THM TH10 TCB	DGC	19 38	19 08	19 01	19 34	18 67	18 96	19 34
7005	THM TH04 STI	DGC	17 19	17 06	17 92	18 03	16 76	16 45	16 76
7006	THM TH05 SBO	DGC	17 42	17 13	17 46	17 55	16 79	16 63	16 68
7007	OA-X Thruster	DGC	19 66	20 52	20 58	20 61	19 81	19 88	19 65
7008	THM TH06-STO	DGC	14 78	14 50	14 77	14 85	13 94	13 93	13 94
7009	THM TH06 SBI	DGC	19 18	18 82	19 18	19 52	18 34	18 29	18 41
7010	THM TH07 STI	DGC	18 08	18 00	18 26	18 42	17 30	17 41	17 44
7011	THM TH08 STO	DGC	19 34	20 07	20 22	20 27	19 34	19 49	19 23
7012	THM TH09 SBI	DGC	21 44	21 75	21 80	21 99	20 55	20 82	20 93
7013	THM TH10 SBO	DGC	18 58	18 58	18 56	18 80	17 99	18 26	18 39
7014	THM TH11 STI	DGC	21 65	21 11	21 13	21 58	20 70	21 27	21 93
7015	THM TH12 SBO	DGC	23 93	22 28	22 13	22 87	22 47	23 47	24 68
7016	THM TH13 STI	DGC	22 21	20 49	20 51	21 20	20 93	21 82	23 62
7017	RBV Beam Ctr Ln	DGC	20 38	20 32	20 33	20 65	19 07	19 50	19 92
7018	THM TH14 STO	DGC	24 12	21 34	21 29	22 32	22 41	23 54	26 43
7019	NBR Rad Outbd B4	DGC	2 72	3 05	3 26	3 37	2 72	2 73	2 93
7020	THM TH15 SBI	DGC	23 07	20 96	21 13	22 15	21 93	22 95	25 56
7021	THM TH16 STI	DGC	23 26	21 92	22 29	23 11	22 79	23 60	25 46
7022	THM TH17 SBI	DGC	21 77	20 72	21 22	22 11	21 86	22 47	23 74
7023	THM TH18 SBO	DGC	21 67	21 06	21 49	22 42	22 25	22 67	23 36
7030	THM TH03 Bur	DGC	15 50	15 48	16 28	16 29	15 48	15 10	15 14
7033	THM TH12 Bur	DGC	23 05	21 71	21 70	22 41	22 27	23 11	24 59
7035	THM TH18 Bur	DGC	19 53	18 73	19 32	19 77	19 60	19 95	20 39
7040	THM TH01 TCB	DGC	19 42	19 08	19 78	20 11	19 43	19 46	19 72
7041	THM TH02 TCB	DGC	17 55	17 33	18 02	18 14	17 52	17 32	17 39
7042	THM TH03 TCB	DGC	16 85	16 83	18 23	18 29	16 62	15 93	16 32
7043	THM TH04 TCB	DGC	19 90	19 69	20 05	20 20	19 53	19 24	19 33
7044	THM TH05 TCB	DGC	16 42	16 08	16 21	16 45	15 81	15 61	15 75
7045	THM TH07 TCB	DGC	17 76	17 96	18 12	18 23	17 36	17 38	17 33
7046	THM TH09 TCB	DGC	19 30	19 24	19 31	19 51	18 53	18 73	18 81
7048	THM TH11 TCB	DGC	23 27	22 50	22 45	22 98	22 39	23 02	23 74
7049	THM TH12 TCB	DGC	23 04	20 62	20 62	21 24	21 15	22 08	23 94
7050	THM TH13 TCB	DGC	22 89	20 43	20 34	21 17	21 09	22 25	24 67
7051	THM TH14 TCB	DGC	25 07	22 09	22 11	23 19	23 28	24 26	27 69
7052	THM TH16 TCB	DGC	22 22	20 83	21 59	22 56	22 23	22 86	24 29
7053	THM TH17 TCB	DGC	23 52	22 32	22 79	23 71	23 48	23 91	24 86
7054	THM TH18 TCB	DGC	20 01	19 46	20 05	20 89	20 59	20 80	20 99
7060	THM Shutter By 1	DEG	22 54	18 26	24 43	27 61	21 62	22 12	26 65
7061	THM Shutter By 2	DEG	19 34	19 00	24 75	26 64	20 45	21 26	21 13
7062	THM Shutter By 3	DEG	22 75	19 48	31 67	31 71	14 51	7 78	11 99
7063	THM Shutter By 4	DEG	33 89	35 12	36 32	36 34	32 37	32 88	33 00
7064	THM Shutter By 5	DEG	7 50	6 35	8 67	6 40	3 40	2 90	2 90
7065	THM Shutter By 7	DEG	17 06	19 77	22 52	21 87	13 66	14 32	14 11
7067	THM Shutter By 9	DEG	33 75	35 25	38 22	37 09	34 48	34 13	34 12
7068	THM Shutter By 10	DEG	37 46	35 65	34 96	36 62	32 85	35 15	37 09
7069	THM Shutter By 11	DEG	52 25	17 10	10 16	27 12	16 42	16 77	17 39
7070	THM Shutter By 12	DEG	61 38	46 16	46 20	50 05	49 56	55 76	67 46
7071	THM Shutter By 13	DEG	63 60	47 54	45 76	53 45	52 95	61 02	74 14
7072	THM Shutter By 14	DEG	59 44	40 54	40 40	47 92	48 71	54 93	72 14
7073	THM Shutter By 15	DEG	67 79	52 64	53 78	62 33	63 03	69 04	82 12
7074	THM Shutter By 16	DEG	45 20	37 85	43 68	51 34	48 38	51 04	61 13
7075	THM Shutter By 17	DEG	57 88	49 22	52 10	58 35	57 24	60 80	67 62
7076	THM Shutter By 18	DEG	40 49	36 36	39 32	44 47	42 97	44 57	45 84
7080	THM Q1 T Zener V	VDC	4 85	4 85	4 85	4 86	4 85	4 85	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 04	5 05	5 03	5 04	5 05
7083	THM Q1 S Zener V	VDC	4 97	4 96	4 96	4 97	4 95	4 95	4 96
7084	THM Q2 S Zener V	VDC	4 98	4 98	4 98	4 99	4 98	4 98	4 99
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 76	21 05	21 36	20 16	20 80	21 71
7091	THM Ind Attitude	DGC	17 79	17 73	17 86	18 21	16 91	17 16	17 24
7092	THM RBV Radiator	DGC	18 01	18 07	18 06	18 54	14 80	15 65	16 24
7093	THM RBVC Ctr Bm	DGC	20 74	20 82	20 82	21 82	18 12	18 76	19 31
7094	THM WBVTR Root	DGC	13 77	14 24	14 71	15 00	13 99	14 96	15 72
7095	THM WBVTR Rad Ct	DGC	3 64	4 52	4 99	5 19	4 30	5 27	5 55
7096	THM WBVTR Strap	DGC	15 90	16 24	16 95	17 12	16 20	16 94	17 63
7097	THM WB Mt Bay 1	DGC	22 91	16 90	22 60	21 19	21 01	21 87	22 49
7098	THM WB Mat Bay 1	DGC	22 07	16 61	19 25	18 34	18 15	19 23	20 14
7099	THM WBVTR Sep 3	DGC	18 03	17 81	18 76	18 82	17 82	17 73	18 12
7100	THM WBVTR Sep 17	DGC	21 83	20 87	21 55	22 14	21 78	22 35	23 51
7101	THM WBVTR 1 Cent	DGC	22 45	22 20	23 13	23 23	22 59	23 03	23 78
7102	THM WBVTR 2 Bay	DGC	17 34	17 27	17 69	17 89	16 92	17 04	17 29
7103	THM WBVTR 2 By 15	DGC	21 77	20 72	20 99	21 57	21 13	22 04	23 87
7104	THM WBVTR 2 Ctr	DGC	20 74	20 65	21 08	21 17	20 25	21 16	22 34
7105	THM NBTR B Sep 6	DGC	17 82	17 73	17 96	18 36	17 17	17 67	17 86
7106	THM NBTR B Sep 1	DGC	22 11	20 64	20 70	21 33	20 82	21 82	23 85
7107	THM NBTR Bm Ctr	DGC	20 32	20 30	20 44	20 74	19 49	20 18	21 21
7108	THM MSS Mount 14	DGC	20 59	19 33	19 40	20 28	19 57	20 75	22 86
7109	THM OA - Y Thruster	DGC	25 64	22 25	21 99	23 39	23 44	24 79	27 51
7110	THM MSS WBVTR Bm	DGC	16 75	17 15	17 54	17 84	16 52	17 51	18 21
7111	THM OA +X Thruster	DGC	20 33	17 55	19 72	19 39	19 22	19 86	20 43
7130	THM Aux P1 T	DGC	34 18	31 52	6 21	9 49	34 58	30 07	29 67
7131	THM Aux P2 T	DGC	2 90	0 84	2 22	23 50	4 44	6 46	6 97

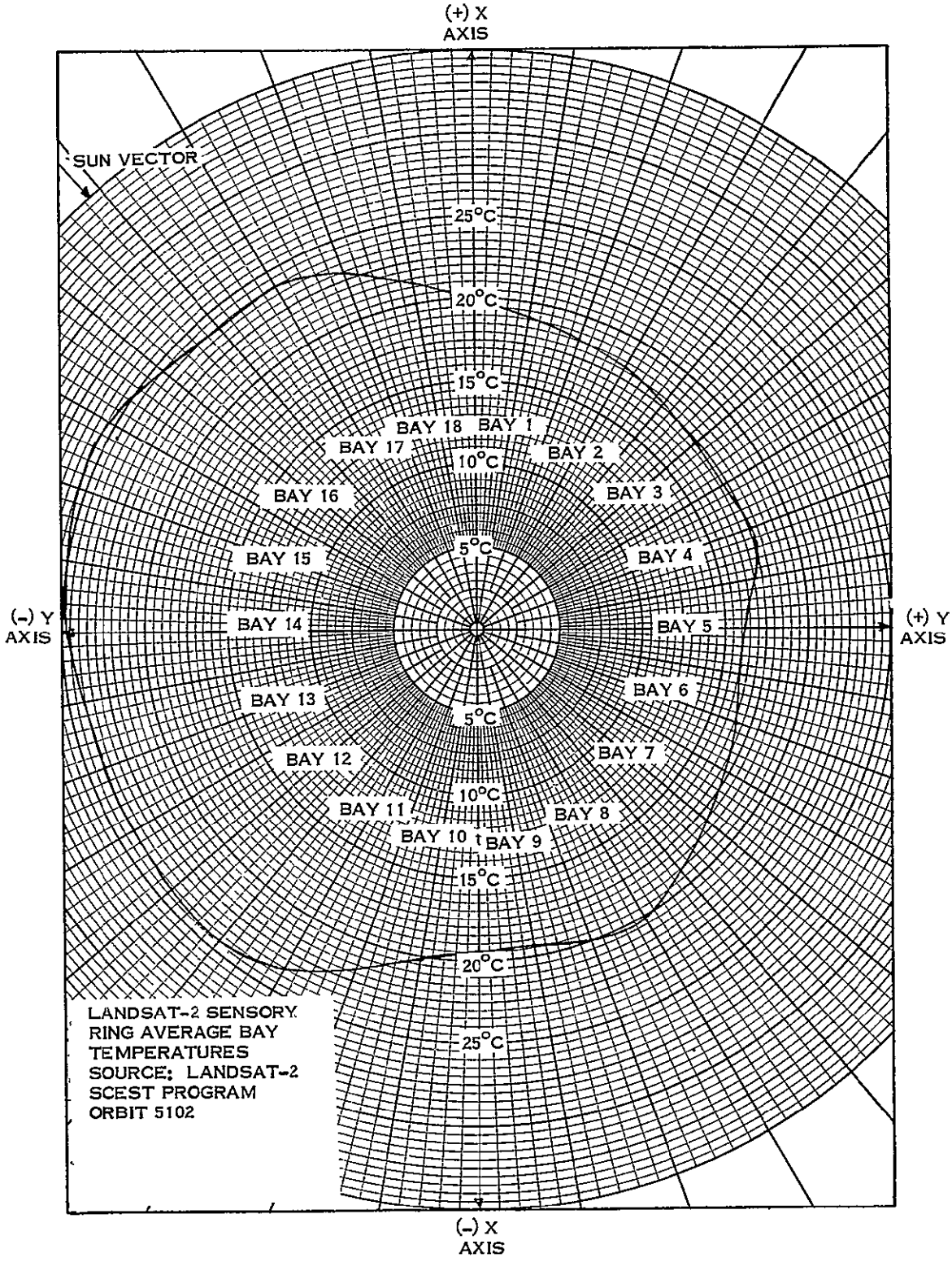

Figure 11-1. Landsat-2 Sensory Rmg Thermal Profile

Table 11-2. Landsat-2 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	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
4202	0	0	X	X	0	0	0	0
4372	0	0	X	X	0	0	0	X

*Note

X = ON
0 = OFF

SECTION 12

NARROWBAND TAPE RECORDERS
LANDSAT-2

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 4591 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	4591	4169	183	4408
B	4591	4169	183	4408

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

Function		Typical Telemetry Values - Orbits				
No.	Name	36/37	437/719	2111/2112	3801/3802	4980/4981
10001	A - Motor Cur. (ma)					
	Record	132.0	140.5	133.3	130.2	130.2
	P/B	108.0	107.8	95.2	95.2	93.7
10101	B - Motor Cur. (ma)					
	Record	148.5	146.33	141.7	140.2	135.7
	P/B	143.6	141.71	138.7	135.7	135.7
10002	A - Pwr Sup. Cur. (ma)					
	Record	170.5	172.4	167.5	165.8	162.5
	P/B	410.0	409.2	399.3	405.9	399.3
10102	B - Pwr Sup. Cur. (ma)					
	Record	260.0	259.8	261.3	261.4	264.5
	P/B	481.0	479.7	479.7	479.7	489.2
10003	A - Rec. Temp (DGC)	26.1	25.0	26.1	24.8	24.2
10103	B - Rec. Temp. (DGC)	27.0	25.4	27.0	26.6	26.2
10004	A - Supply (VDC)	-24.87	-25.10	-25.1	-25.1	-25.1
10104	B - Supply (VDC)	-24.55	-24.68	-24.6	-24.6	-24.6

SECTION 13

WIDEBAND TELEMETRY SUBSYSTEM

LANDSAT-2

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. The scatter of data points reflect variations in the ground station calibration and readout. WBPA-2 has been used more consistently 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	1479	2462	3810	4241	4672	5091
12001	Temp, TWT Coll (DGC)	30 1	33 6	OFF	35 63	35 00	20 74	19 30	19 31	19 45
12101		27 9	31 2	31 43	35 71	37 14	30 00	16 92	18 14	18 17
12002	Cur, Helix (MA)	3 30	3 85	OFF	4 30	4 51	OFF	F	F	F
12102		4 03	4 56	4.53	4 43	4 48	4 52	4 61	4 57	4 59
12003	Cur, TWT Cath (MA)	33 20	46 10	OFF	43 60	45 12	OFF	F	F	F
12103		34 09	46 78	45 37	45 26	45 24	44 39	46 00	46 00	46 00
12004	Fwd Power (DBM) (3)	40 61	42 68	OFF	42 60	42 77	OFF	F	F	F
12104		40 93	43 71	43 65	43 66	43 69	43 56	43 60	43 63	43 61
12005	Refl Power (DBM) (3)	22 34	27 0	OFF	25 61	26 10	OFF	F	F	F
12105		34 55	36 45	36 36	37 15	37 14	36 91	37 27	37 12	37 08
12227	Con Volt, Loop Stress (MHz) (4)	1.54		OFF	1 42	1 12	1 32	1 86	1 64	-14 00
12228		2 53		0 32	0 24	-0 01	-0 30	0 05	-0 39	-0 22
12229	Temp Mod (DGC)	19 5		17 16	19 93	20 88	19 22	16 21	16 94	17 97
12232	+15 VDC Pwr	2 65		2 65	2 65	2 65	2 65	2 65	2 65	2 65
12234	+15 VDC Pwr Sup (TMV) (5)	4 07		4 08	4 01	3 94	4 10	4 19	4 10	4 04
12236	+5 VDC Pwr Sup (TMV) (5)	3 55		3 50	3 53	3 54	3 47	3 55	3 52	3 51
12238	-5 VDC Pwr Sup (TMV) (5)	4 08		4 07	4 03	4 01	4 09	4 11	4 08	4 07
12240	-24 VDC Unreg Pwr (TMV) (5)	5 86		5 90	5 80	5 66	5 91	6 05	5 92	5 90
12242	Temp, Inv (DGC)	23 7		21 68	23 21	23 79	22 93	22 01	22 21	22 53

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

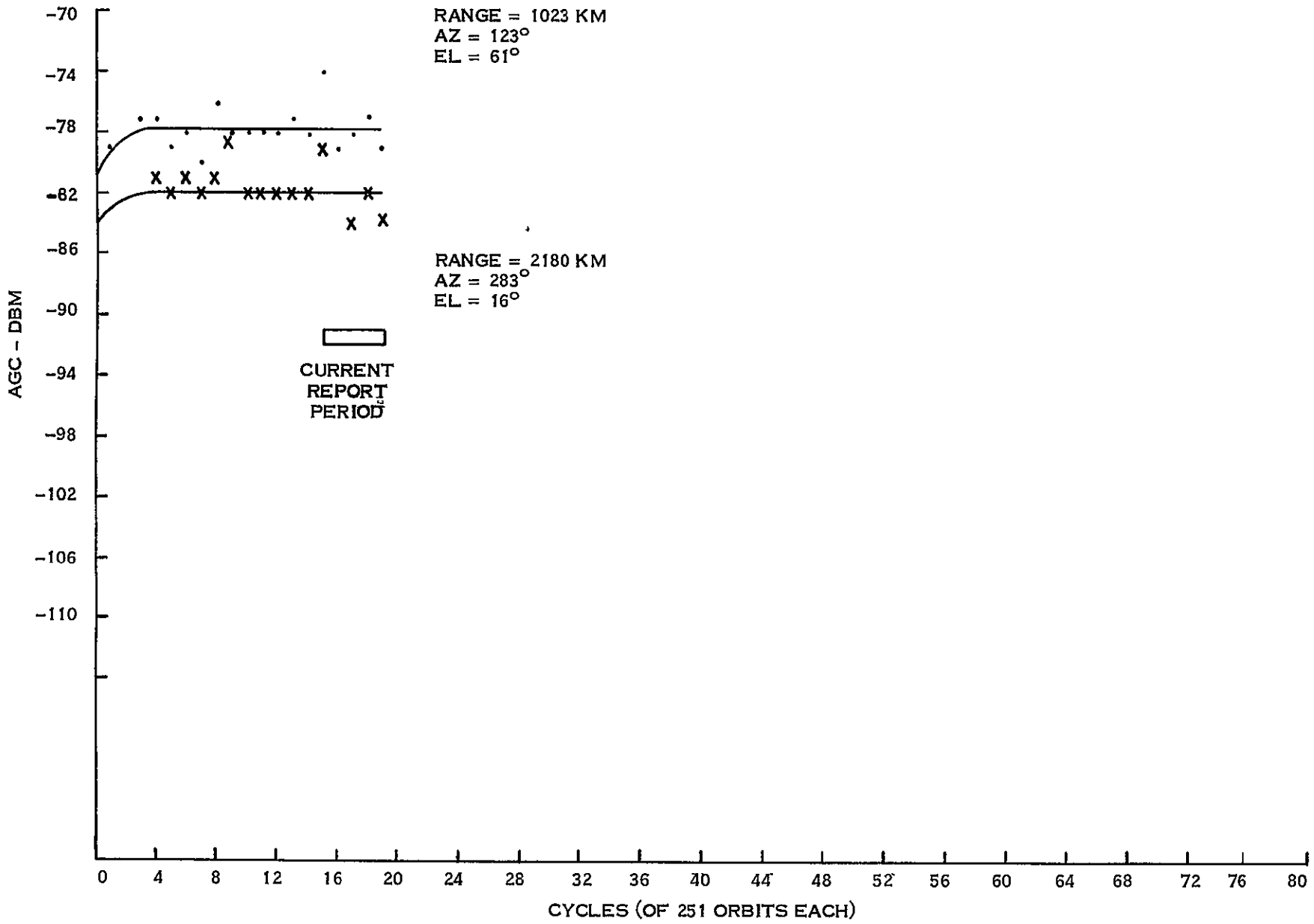

Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30" Antenna Landsat 2

SECTION 14

ATTITUDE MEASUREMENT SENSOR (AMS)

LANDSAT-2

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 Orbit 6, and has been performing normally since then.

Table 14-1. Landsat-2 AMS Temperature Telemetry

Function		Units	50	1253	2532	3810	4241	4670	5102
3004	Case - Temp 1	DGC	19.00	19.05	19.02	19.39	18.18	18.67	18.68
3005	Assembly - Temp - 2	DGC	18.70	18.69	18.71	18.93	17.87	18.30	18.30

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS

LANDSAT-2

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

On January 6, 7, and 8, 1976 tests were performed on WBVTR-1 in an attempt to restore it to normal service. These tests, performed in Orbits 4865, 4878, 4879, 4892, and 4893, failed to effect any change to the Recorder. Thus, WBVTR-1 still remains inactive.

WBVTR-2 has functioned normally throughout this period except for a dropout from Rewind mode in Orbit 3854 (26 October), similar to a prior anomalous dropout in Orbit 1919 (9 June).

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

Figure 15-1 shows tape usage for WBVTR-2.

Table 15-1. WBVTR Telemetry Values

WBVTR-1 Functions		Telemetry Values In Orbits						
Number	Name	45/46	996	2642	3812	4261	4680	4879(ET)
13022	Pressure Trans	16 52	16.51	16 51	16 39	16.39	16 39	16 39
13023	Temp Trans	20.74	20 05	20 62	19 00	18 77	19 00	20 12
13024	Temp Elec	25 00	18 59	24 57	19 67	20.07	20 00	21 68
13032	Limiter Volt	1 48	1 49	1.51	*	*	*	1 41
13034	+5 6 VDC Conv	5 70	5.48	5.54	*	*	*	5 67
13201	+2 VDC APU	2 44	2.45	2.45	2.45	2 45	2 45	2 45
13202	Temp APU	29 06	26.76	26.76	27 03	26 58	27 04	27 29

WVVTR-2 Functions		Telemetry Values In Orbits						
Number	Name	45/46	966	2642	3812	4261	4680	5071
13122	Pressure Trans	16.12	16 12	15 81	15 49	15 46	15 34	15 33
13123	Temp Trans	21 50	18 48	20 00	20.99	21 21	22 32	23 08
13124	Temp Elec	23 50	14.49	18.31	19 48	21 85	22 10	22 72
13132	Limiter Volt	1 30	NA	1 32	1 33	1.34	1 30	1 28
13134	+5.6 VDC Conv	5 71	6 32	5.69	5 74	5 67	5 71	5 85
13201	-12 VDC APU	2 44	2 45	2 45	2.45	2 45	2 45	2.45
13202	Temp APU	29 06	26.76	26.76	27.03	26.58	27 04	27 63

(ET) - Engineering Test of WBVTR-1
NA - Data not available
* - No data WBVTR-1 out of service

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

WBVTR-1 Function/Description	Orbit				
	T/V	718	1734	2642	4878(ET)
13029 - Input P/B Voltage					
Record	0.0	0.0	0 0	0 0	0 0
Playback	0 33	0 30	0.32	0.32	0 30
Rewind	0 0	0.0	0 0	0.0	0 0
Standby	0.0	0 0	0 0	0.0	0.0
13028 - Capstan Motor Current					
Record	0.32	0.27	0 36	0.33	0.31
Playback	0.29	0.30	0.30	0 31	0 30
Rewind	0 23	0 21	0 27	0 23	0.28
Standby	0.0	0.0	0 0	0.0	0 0
13030 - Headwheel Motor Current					
Record	0.50	0.51	0.50	0 50	0 53
Playback	0 495	0.49	0 49	0 49	0.53
Rewind	0.41	0.44	0 44	0 44	0.47
Standby	0.41	0.44	0 43	0.45	0.46
13031 - Recorder Input Current					
Record	3.58	3 61	3 62	3 69	3 62
Playback	3 92	3 86	3 93	3.86	3 86
Rewind	2 18	2 16	2 30	2 19	2 23
Standby	1 79	1 90	1 80	1 95	1 95
13033 - Servo Voltage					
Record	0.0	0.0	0 0	0 0	0 0
Playback	49 99	50.04	50.37	50 08	50.37
Rewind	0.0	0 0	0 0	0 0	0 0
Standby	0 0	0.0	0 0	0 0	0 0
13026 - Capstan Motor Speed					
Record	89 77	88 03	88 03	88.03	85.13
Playback	89 37	87.45	86 29	86 87	85.13
Rewind	100 12	99 06	97 32	98 48	96.73
Standby	0 0	0 0	0.0	0.0	0 0
13027 - Headwheel Motor Speed					
Record	97.5	96 18	95 07	95.07	93 96
Playback	96.86	95.07	94.52	94.52	92.86
Rewind	98 96	97 28	95.62	96 73	96 73
Standby	99.12	97 28	93 96	95 62	95 07

(ET) - Engineering Test of WBVTR-1

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

WBVTR-2 Function/Description	Orbit				
	T/V	437	1734	2642	4878
13129 - Input P/B Voltage					
Record	0.0	0.0	0.0	0.0	0 0
Playback	0 37	0 36	0.34	0.33	0.34
Rewind	0 0	0 0	0 0	0.0	0 0
Standby	0 0	0.0	0 0	0.0	0 0
13128 - Capstan Motor Current					
Record	0.33	0.33	0.32	0 37	0.38
Playback	0 34	0.35	0 35	0.34	0.35
Rewind	0 16	0.20	0 19	0.18	0.15
Standby	0.0	0.0	0 0	0.0	0 0
13130 - Headwheel Motor Current					
Record	0 47	0.47	0 47	0.47	0.48
Playback	0 46	0.46	0 47	0.47	0 48
Rewind	0.43	0 42	0 43	0 42	0 41
Standby	0.45	0.42	0.43	0 43	0.41
13131 - Recorder Input Current					
Record	2 88	2 90	2 90	2 90	2.90
Playback	3 11	3.02	3 08	3.08	3.11
Rewind	1 79	1 79	1 80	1.80	1 80
Standby	1 18	1.58	1 60	1 48	1 62
13133 - Servo Voltage					
Record	0 0	0 0	0.0	0.0	0 0
Playback	48.92	49 04	49 33	49 52	49 43
Rewind	0 0	0.0	0 0	0 0	0 0
Standby	0 0	0.0	0 0	0.0	0 0
13126 - Capstan Motor Speed					
Record	108.66	106.70	106 02	105 33	105 33
Playback	108 38	106 70	106.02	105.33	103.96
Rewind	130.09	117.68	117 0	116 31	117 68
Standby	0.0	0.0	0 0	0.0	0.0
13127 - Headwheel Motor Speed					
Record	98.41	96 52	96.00	96 52	95 48
Playback	98.11	96.00	95 48	94.44	94 44
Rewind	99 95	97 04	96 00	95.48	96 52
Standby	101 72	97 04	96 52	94.96	96.00

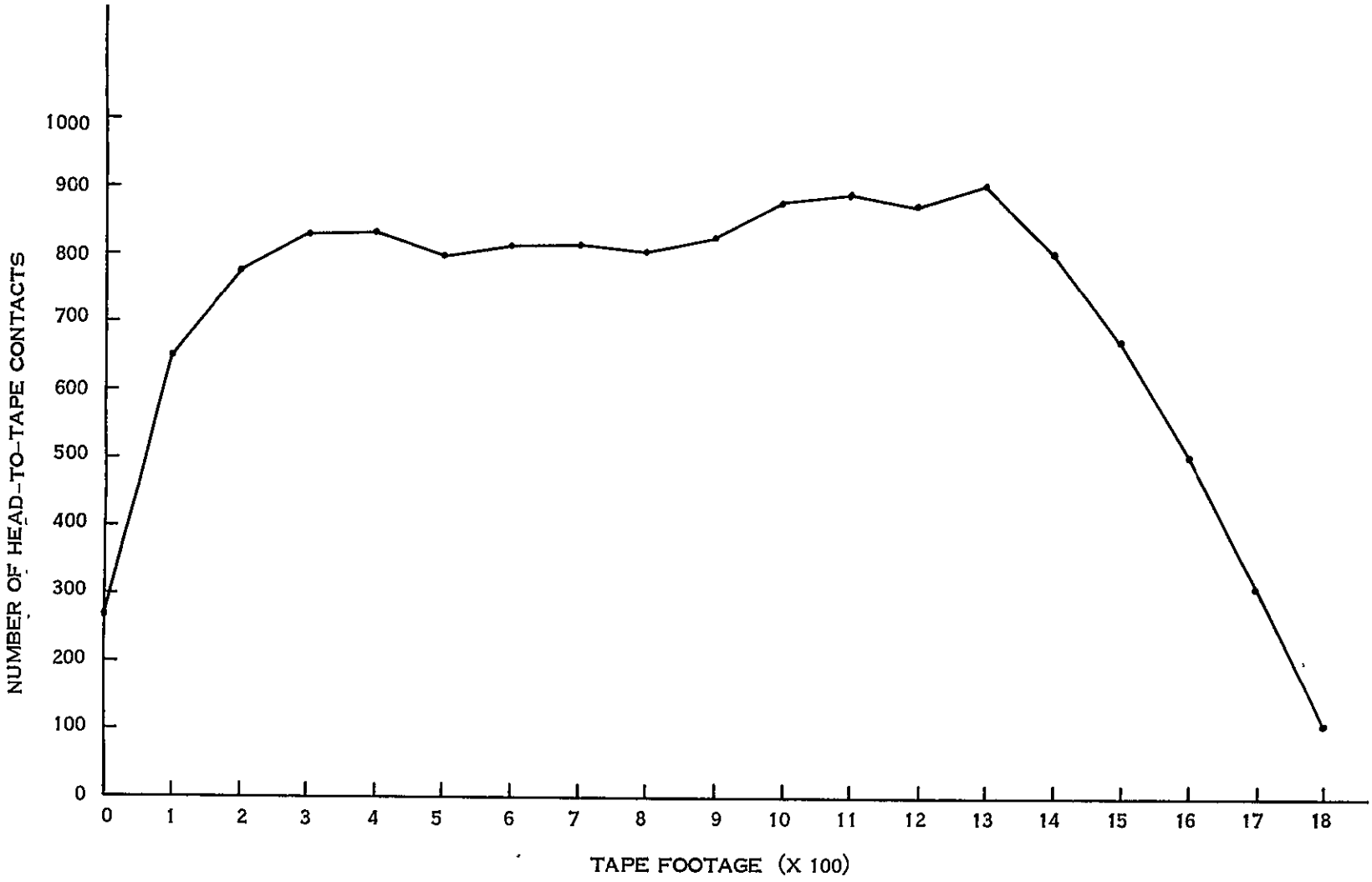

Figure 15-1. Tape Usage Thru Orbit 5096 WBVTR-2

SECTION 16

RETURN BEAM VIDICON

LANDSAT-2

SECTION 16

RETURN BEAM VIDICON (RBV)

The second periodic test of the RBV Subsystem was performed on 10 November 1975. In Orbit 4068 the downlink filters were configured, and all RBV modes were set up. RBV operational tests were started in Orbit 4070 and continued through Orbit 4072. MSS imagery was transmitted simultaneously for comparison and evaluation. All operations were normal with no discernible effect on other spacecraft subsystems.

During Orbits 4082 and 4083 (11 November), and Orbits 4096 and 4097 (12 November) the RBV was operated over Brazil for use by that station. Again, all operations were normal.

Table 16-1 gives typical telemetry values for the RBV Subsystem during the test operations. Tables 16-2, 16-3, and 16-4 give telemetry values for Prepare, Hold, and Read modes of the three RBV cameras.

Table 16-1. RBV Telemetry Values

Function		Orbits							
No.	Name	T/V Value	41	54	151	209	2371	3052	4072
14001	CCC Board Temp. (DgC)	N/A	19.939	19.65	19.72	20 58	20 27	19.41	20.12
14002	CCC Pwr. Sup Temp (DgC)	N/A	21.047	20.52	20.65	21.90	21 46	20 61	21.12
14003	15 VDC Sup. (TMV)	N/A	3.950	3.92	3.75	3.89	3 92	3 92	3.95
14004	+6V, -5.25 VDC Sup (TMV)	N/A	3.075	2.92	2.92	3.00	3 07	3.05	3.05
14100		0.98	NA	NA	NA	NA	0.70	0.70	0.70
14200 *	VID Output V (TMV)	0.93	NA	1.05	1 16	1.30	1 23	F	1.11
14300		1.06	NA	1.03	1.10	1 24	1 27	F	1.25
14102		3.75-4.02	3.950	3.85	3.85	3.86	3 81	3.83	3.74
14202 *	Comb Align Cur. (TMV)	3.87-4 10	3.875	3.91	3.91	3 92	3 92	F	3.78
14302		3.80-4.05	3.850	3.90	3.72	3.85	3.80	F	3.72
14103		N/A	24.363	24.24	24.10	26.08	24 49	22 87	24.02
14203 *	Elec Temp. (DgC)	N/A	20.387	19.84	19.97	22.16	22 40	20 01	20.91
14303		N/A	25.363	25.05	25.35	28.20	24 15	22.22	23.55
14104		N/A	23.363	23.44	23.55	25 68	24 13	22 16	23.69
14204 *	LV Pwr Sup T. (DgC)	N/A	18.834	18 14	18.29	20 61	20 87	18 20	19.34
14304		N/A	26.023	25.36	25.66	28 28	24 12	22 30	23.62
14105		3.92-4.07	3.950	4.00	3.82	3.95	3 94	3.98	3.69
14205 *	Defl. Pwr. Sup. +10 VDC (TMV)	3.95-4.10	3 950	3.97	3.80	3.93	3 92	F	3.85
14305		3.95-4.07	4.000	4.00	4.00	4.00	3 95	F	4.00
14106		3.65-3.80	3.700	3.67	3.52	3.64	3 59	3.67	3.40
14206 *	L V P.S. +6V, -6.3 VDC (TMV)	3.67-3.80	3.650	3.65	3.49	3.61	3 61	F	3.42
14306		3.65-3.77	3.725	3.70	3.70	3.71	3 66	F	3.70
14107		2.53	2.650	2.61	2.49	2.54	2 54	2 59	2.39
14207 *	Ther. Elec. Cur. (TMV)	2.43	2.500	2.49	2.37	2 42	2 44	F	2.31
14307		2.52	2.575	2 57	2.46	2.49	2 52	F	2.54
14108		1.80-3.50	2.550	2.43	2.44	2 49	2 48	2 55	2.36
14208 *	Vid. Fil. Cur. (TMV)	2.55-2.75	2.400	2.40	2.30	2 37	2 34	F	2.25
14308		2.50-2.80	2.575	2.58	2.46	2.54	2 54	F	2.46
14110		2.95-3.20	3.025	2.98	2.98	2.98	2 95	2 95	2.90
14210 *	Vid. Tgt. Volt (TMV)	3 15-3 45	3.050	2.86	2.86	2 93	2 93	F	2.81
14310		2.55-2.80	3.225	2.63	2.51	2.60	2 56	F	2.51
14113		2.86	4.050	2.92	2.87	2 84	2 79	2 98	2.70
14213 *	Vert Def V (TMV)	3.09	4.275	3.15	3.12	3.08	2 99	F	3 18
14313		3.91	4.275	3.59	3 45	3.51	3 48	F	3.56
14114		21 99	21.997	19.87	20 18	21 18	20 67	19 92	20.53
14214 *	Vid FPT (DgC)	21.00	21 059	20.55	20.64	21 56	21 14	20 60	21.03
14314		22.66	22.398	20 65	20.85	21 89	21 12	20 37	20.96
14115		24.17	20.940	21.04	21.47	23 23	22 41	20 98	21.95
14215 *	Foc Coil T (DgC)	23 82	20.387	20.67	21 00	22 83	22 22	20 63	21.55
14315		24.47	21.940	22.25	22.66	24.53	23 08	21.72	22.67

* 141XX refers to Camera 1
142XX refers to Camera 2
143XX refers to Camera 3
NA - Data not Available
F - Cameras 2 and 3 off Camera 1 only was operated

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

Function No.	Function Name	Mode	Orbit						
			T/V Value	054	151	209	2371	3052	4072
14101	Focus I	Hold	0.66	0.65	0.65	0.67	0.70	0.63	0.68
		Prep	1 71	1.68	1.68	1.74	1.75	1.67	1.73
		Read	2.83	2.80	2.85	2.85	2.90	*	2.85
14109	Grid V	Prep	0.79	0.80	0.75	0.75	0.80	0.77	0.79
		Read	2.43	2.42	2.43	2.42	2.44	2.42	2.41
		Hold	4.00	3.95	3.95	3.95	4.00	3.96	3.99
14111	Cath I	Hold	0.38	0.38	0.38	0.38	0.40	0.35	0.37
		Read	0.84	0.83	0.83	0.83	0.85	0.82	0.83
		Prep	3.03	3.05	3.00	3.04	3.10	3.01	3.02
14112	Hor Def	Hold	0.01	0.00	0.00	0.00	0.00	0.00	0.00
		Prep	1 79	1.75	1.75	1.75	1.80	1.76	1.77
		Read	3 23	3.25	3.25	3 25	3.30	3.20	3.25
14120	+500 V	Prep	0.92	0.85	0.85	0 88	0.90	0.90	0.90
		Read	4.05	4.05	4.05	4.05	4.10	4.03	4.05

*No Data due to slow TLM sample rate

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

Function No.	Function Name	Mode	Orbit					
			T/V Value	054	151	209	2371	4072
14201	Focus I	Hold	0.58	0.54	0.49	0.54	0.60	0.56
		Prep	1.60	1.56	1.57	1.54	1.60	1.56
		Read	2.71	2.65	2.65	2.65	2.70	2.67
14209	Grid V	Prep	0.83	0.75	0.82	0.81	0.85	0.79
		Read	2.25	2.25	2.25	2.25	2.30	2.20
		Hold	4.13	4.05	4.05	4.09	4.10	4.12
14211	Cath I	Hold	0.37	0.37	0.33	0.34	0.35	0.35
		Read	0.95	0.95	0.95	0.95	1.00	0.95
		Prep	3.05	3.05	3.05	3.05	3.10	3.05
14212	Hor Def	Hold	0.01	0.00	0.00	0.00	0.00	0.00
		Prep	1.87	1.85	1.88	1.85	1.90	1.87
		Read	3.32	3.25	3.25	3.25	3.30	3.31
14220	+500 V	Prep	1.14	1.15	1.15	1.15	1.20	1.14
		Read	4.29	4.25	4.25	4.25	4.30	4.27

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

Function No.	Function Name	Mode	Orbit 054	151	209	2371	4072
14301	Focus I	Hold	0.65	0.65	0.71	0.70	0.70
		Prep	1.79	1.85	1.84	1.83	1.83
		Read	2.85	2.85	2.92	2.90	2.91
14309	Grid V	Prep	0.75	0.75	0.75	0.80	0.76
		Read	2.65	2.65	2.65	2.70	2.67
		Hold	4.08	4.10	4.13	4.18	4.13
14311	Cath I	Hold	0.39	0.39	0.39	0.40	0.40
		Read	0.54	0.54	0.54	0.55	0.55
		Prep	3.25	3.25	3.25	3.30	3.22
14312	Hor Def	Hold	0.00	0.00	0.00	0.00	0.00
		Prep	2.05	2.05	2.05	2.10	2.06
		Read	3.35	3.35	3.41	3.45	3.41
14320	+500 V	Prep	1.15	1.15	1.15	1.20	1.15
		Read	4.25	4.25	4.25	4.30	4.27

SECTION 17

MULTISPECTRAL SCANNER SUBSYSTEM

LANDSAT-2

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.

In these maps, only those scenes received by U.S. ground stations are shown. Scenes transmitted to Canada, Brazil and Italy (32% of total) are not shown.

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. Each sensor is sampled at 5 radiance levels and all show essentially the same trends. Only one of these levels (the second highest) is listed in Table 17-2. Line length history is also shown in Table 17-2 and is nominal.

Recent processing of MSS film from earlier recordings show occasional unscheduled insertions of a single or double group of 4 black and 4 white words in all sensor data. Sometimes these anomalous inserts are mistaken for a Line Start Code and result in displacement of the video in an entire mirror sweep (6 lines on the processed image). A study of a sample of the known anomalies concludes that the data loss is random; is a very small percentage of the received data (e.g., 17 pixels out of every million); and is limited to the region of the South Atlantic magnetic anomaly. Similar effects are seen in retrospective examinations of early Landsat-1 MSS processed film. This effect is, therefore, not considered to be a problem at this time.

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

Table 17-1. MSS Telemetry - Landsat-2

Function	Name	*T.V. Norm	Orbit						
			27	1254	2500	3400	4241	4670	5091
15040	MUX -6 VDC (TMV)	3.92	4.05	4.07	4.04	4.07	4.05	4.07	4.07
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	2.30	.2.39	2.17	1.86	2.04	1.95
43	FIBER OPTICS PLATE 1 TEMP (DGC)	22.30	18.13	18.4	20.41	21.23	18.60	20.67	21.75
44	FIBER OPTICS PLATE 2 TEMP (DGC)	22.30	17.87	18.1	18.86	19.75	16.73	19.11	20.20
45	MUX TEMP (DGC)	25.59	23.38	25.6	20.57	22.76	21.03	21.68	23.63
46	ELEC COVER TEMP (DGC)	23.09	20.25	21.3	21.40	22.44	18.19	21.71	22.96
47	PWR. SUP. TEMP. (DGC)	23.85	19.45	21.0	19.83	21.19	18.16	20.11	21.62
48	SCAN MIR REG. TEMP (DG)	23.44	18.30	18.0	18.29	20.18	17.33	19.26	21.13
49	SCAN MIR DRIVE ELEC. TEMP. (DGC)	24.34	18.96	19.6	18.49	20.53	17.43	19.36	21.42
15050	SCAN MIR DRIVE COVER TEMP. (DGC)	22.50	17.26	19.4	18.28	20.20	17.37	19.41	21.21
51	SCAN MIR TEMP (DGC)	21.87	17.26	17.9	18.09	19.71	17.26	19.08	20.89
52	ROT. SHUT HOUSING TEMP (DGC)	22.58	23.26	18.4	18.91	19.80	16.72	19.14	20.28
53	SCAN MIR REG VOLT (TMV)	4.56	4.7	4.57	4.57	4.59	4.62	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	4.97	4.97	4.97	4.97	4.97	4.97
56	BAND 2 15 VDC (TMV)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
57	BAND 3 15 VDC (TMV)	4.88	4.95	4.95	4.95	4.95	4.95	4.97	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	5.02	5.02	5.02	5.02	5.02	5.02
61	LOGIC +5 VDC (TMV)	4.86	4.81	4.80	4.80	4.82	4.81	4.90	4.83
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	4.75
67	BAND 2 HVB (TMV)	4.70	OFF	OFF	OFF	OFF	F	F	F
68	BAND 3 HV A (TMV)	4.75	4.72	4.75	4.76	4.75	4.75	4.75	4.73
69	BAND 3 HVB (TMV)	4.65	OFF	OFF	OFF	OFF	F	F	F
15070	SHUT MOT. CONTR. INTEG (TMV)	2.49	2.60	2.57	2.60	2.60	2.60	2.60	2.60
15071	SCAN MIRROR DRIVE CLOCK (TMV)	1.93	2.0	2.00	2.00	2.00	2.01	2.00	2.00

* Thermal Vacuum Test Data at 20°C

Table 17-2. MSS Response History - Landsat-2

Quantum Level for Selected Word
(0 = Black; 63 = White)

Band	Sensor	Launch	1, 2 & 3 Quarter	This Quarter	% Change Since Launch
1	1	43	41	40	-8
	2	41	40	39	-7
	3	46	43	43	-7
	4	46	45	44	-4
	5	44	41	40	-9
	6	46	43	43	-7
2	7	47	46	45	-4
	8	44	41	41	-7
	9	48	47	46	-4
	10	50	48	48	-4
	11	48	48	47	-2
	12	47	44	44	-6
3	13	42	41	40	-5
	14	44	43	42	-5
	15	47	46	47	0
	16	47	45	46	-2
	17	48	46	46	-4
	18	46	44	45	-2
4	19	25	25	25	0
	20	26	27	27	+4
	21	32	32	32	0
	22	29	30	30	+3
	23	32	33	33	+3
	24	28	28	28	0
	Line Length	3250	3249	3248	0.06

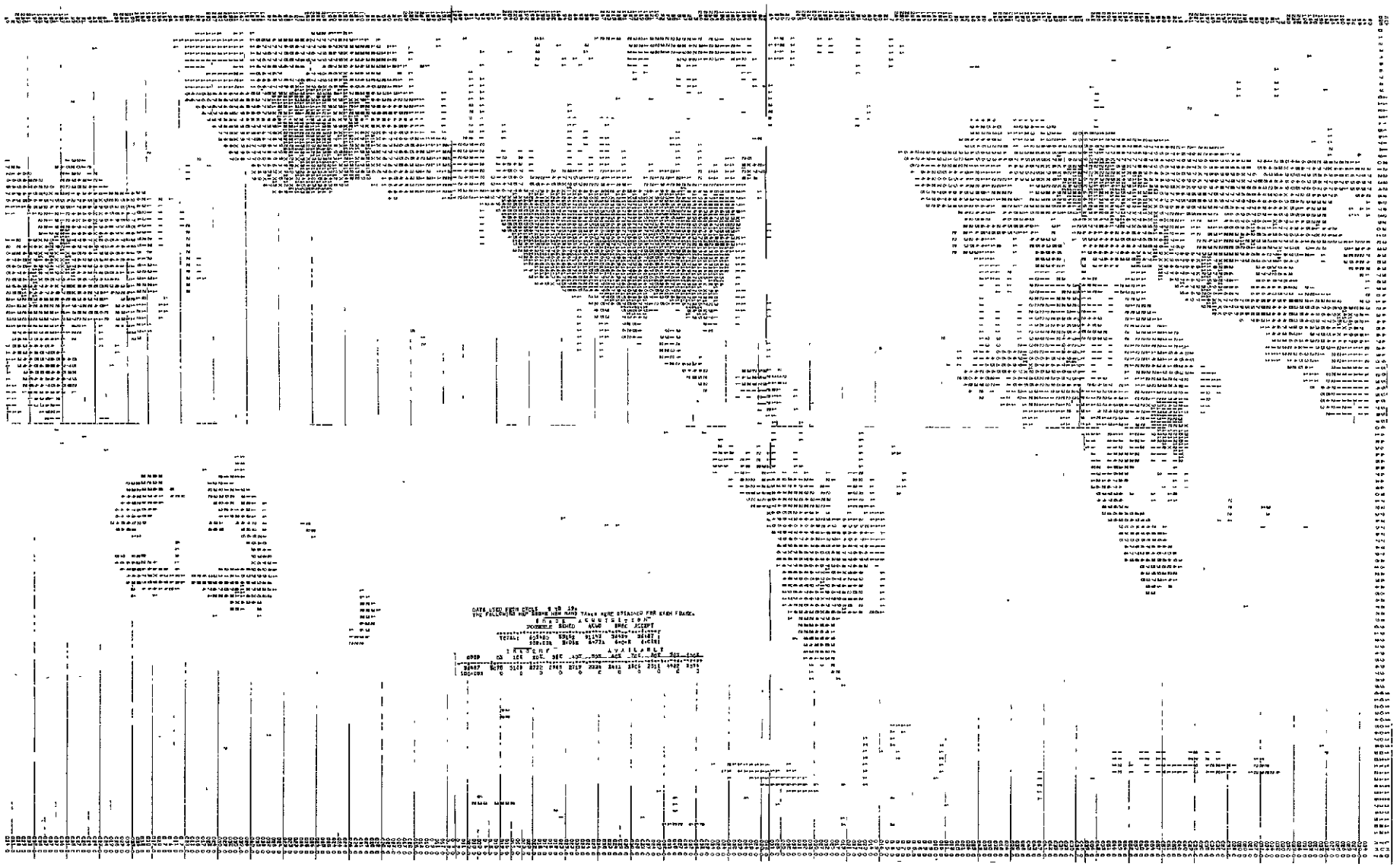

Figure 17-2. Computer Map of MSS Scenes Since Launch Landsat-2

FOLDOUT FRAME

LS-2

FOLDOUT FRAME 2

SECTION 18

DATA COLLECTION SUBSYSTEM

LANDSAT-2

SECTION 18

DATA COLLECTION SYSTEM (DCS)

The DCS Subsystem performed nominally during this report period, continuing message collection at substantially the same rate.

The Alaska ground station commenced receiving DCS messages during this quarter, joining Greenbelt and Goldstone. During Orbit 4393 on 3 December 1975, the first messages were received at Alaska. No more messages were received until 8 December, when during Orbit 4457, regular reception was commenced. DCS messages are now being collected on 12 orbits of the 14-orbit day, rather than the previous 8-orbit cycle. This increased the number of messages received in the quarter by 26%, but severely reduced the statistic of messages per active orbit. Because of the geographical location of Alaska with respect to the present locations of DCP's, Alaska up to now receives only about 20% of the number of messages received by Greenbelt or Goldstone, while increasing the number of active orbits by 50%. Hence, the number for "Average messages per active Orbit" listed in Table 1-1 is reduced substantially. (Thus, in the prior three quarters, the average number of messages per orbit was 164; in this quarter, it was 139). The maximum number of platforms received in one day of this quarter was 110 on 14 January. The maximum number of messages received per orbit was 464 on Orbit 5005 on 16 January 1976.

There are 46 users in the data base, 246 DCP's have been shipped, with 231 in the data base.

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

Table 18-1. DCS Telemetry Values

Func. No.	Name	Orbits						
		5	1253	2462	3410	4241	4670	5091
16001	Receiver 1 Sig Strength (DBM)*	-123.34	-122.79	-124.81	-124.00	-122.66	-123.87	-122.02
16002	Receiver 1 Temp (DGC)	22.54	24.13	24.20	24.39	23.55	23.98	24.37
16003	Rec-1 Pwr Input Volt (VDC)	2.35	2.37	2.36	2.37	2.35	2.36	2.36
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. Also shown is percentage of good messages for each cycle.

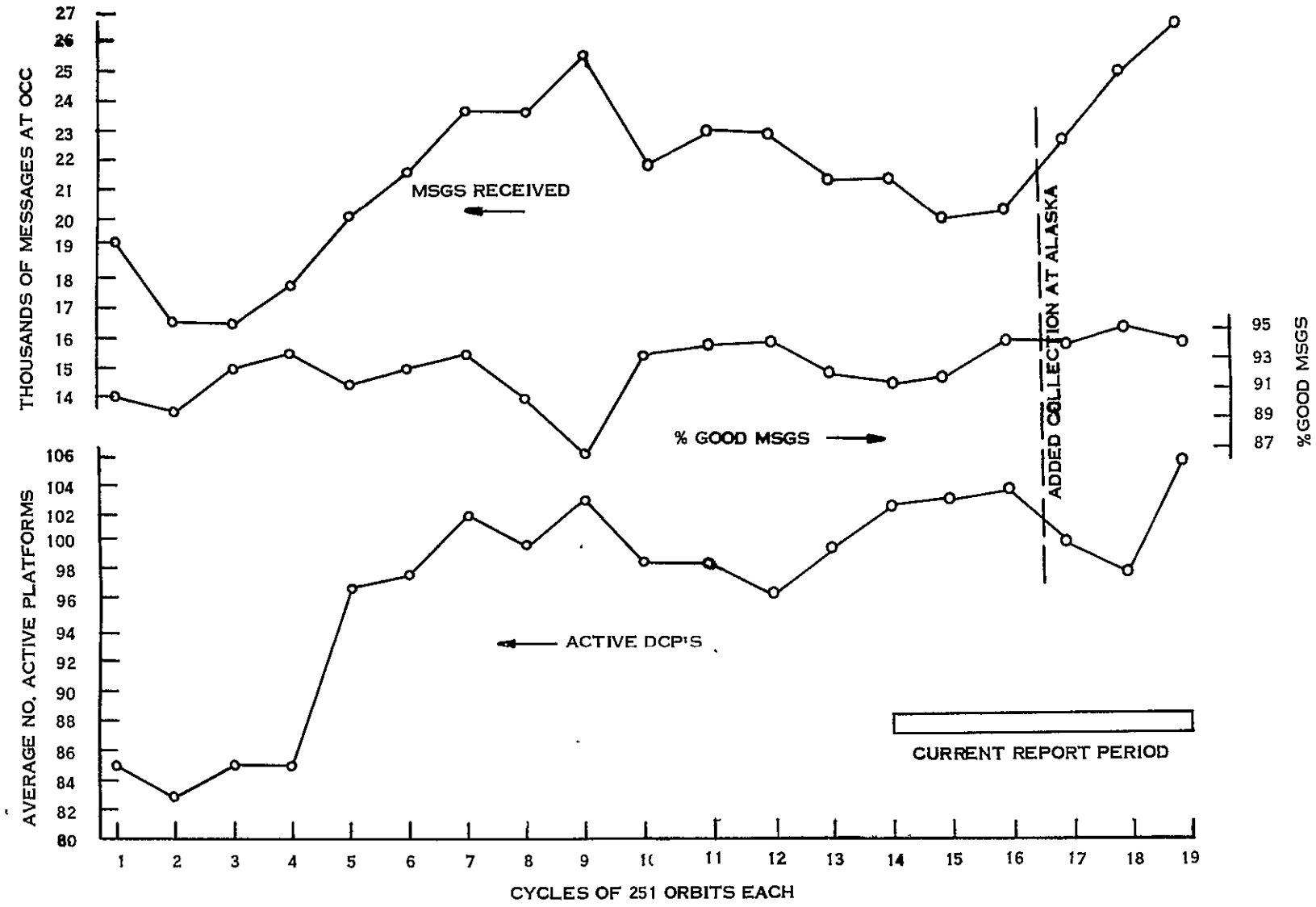

Figure 18-1. DCS Message History

APPENDIX A

LANDSAT-2 ANOMALY LIST

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, 2605, 3164.
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.
8/3/75	WBVTR-1 data did not provide sync to ground station	On-Line	One WBVTR-1 head circuit failed to operate. 25% of data lost in data stream. Operation discontinued. Investigation committee formed.

APPENDIX B

LANDSAT-2 SPACECRAFT ORBIT REFERENCE TABLES

LANDSAT -2

SPACECRAFT ORBIT REFERENCE TABLES

FROM JULY, 1975 THROUGH DECEMBER, 1976

ORBITS 2221 THROUGH 9890

FLIGHT DAY 160 THROUGH 709

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

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AUG, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	213	191	2654- 2667	75- 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
20	242	220	3058- 3071	238-251	18	11
31	243	221	3072- 3085	1- 14	1	12

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SEP, 1975

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	244	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

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OCT, 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

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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

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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

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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

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FEB.1976

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

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MAR, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	61	404	5824- 5837	43- 56	4	22
2	62	405	5838- 5851	57- 70	5	22
3	63	406	5852- 5865	71- 84	6	22
4	64	407	5866- 5879	85- 98	7	22
5	65	408	5880- 5893	99-112	8	22
6	66	409	5894- 5907	113-126	9	22
7	67	410	5908- 5920	127-139	10	22
8	68	411	5921- 5934	140-153	11	22
9	69	412	5935- 5948	154-167	12	22
10	70	413	5949- 5962	168-181	13	22
11	71	414	5963- 5976	182-195	14	22
12	72	415	5977- 5990	196-209	15	22
13	73	416	5991- 6004	210-223	16	22
14	74	417	6005- 6018	224-237	17	22
15	75	418	6019- 6032	238-251	18	22
16	76	419	6033- 6046	1- 14	1	23
17	77	420	6047- 6060	15- 28	2	23
18	78	421	6061- 6074	29- 42	3	23
19	79	422	6075- 6088	43- 56	4	23
20	80	423	6089- 6102	57- 70	5	23
21	81	424	6103- 6116	71- 84	6	23
22	82	425	6117- 6130	85- 98	7	23
23	83	426	6131- 6144	99-112	8	23
24	84	427	6145- 6158	113-126	9	23
25	85	428	6159- 6171	127-139	10	23
26	86	429	6172- 6185	140-153	11	23
27	87	430	6186- 6199	154-167	12	23
28	88	431	6200- 6213	168-181	13	23
29	89	432	6214- 6227	182-195	14	23
30	90	433	6228- 6241	196-209	15	23
31	91	434	6242- 6255	210-223	16	23

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APR. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	92	435	6056- 6069	224-237	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

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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

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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

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JUL, 1976

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

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AUG. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	214	557	7757- 7770	168-181	13	30
2	215	558	7771- 7784	182-195	14	30
3	216	559	7785- 7798	196-209	15	30
4	217	560	7799- 7812	210-223	16	30
5	218	561	7813- 7826	224-237	17	30
6	219	562	7827- 7840	238-251	18	30
7	220	563	7841- 7854	1- 14	1	31
8	221	564	7855- 7868	15- 28	2	31
9	222	565	7869- 7882	29- 42	3	31
10	223	566	7883- 7896	43- 56	4	31
11	224	567	7897- 7910	57- 70	5	31
12	225	568	7911- 7924	71- 84	6	31
13	226	569	7925- 7938	85- 98	7	31
14	227	570	7939- 7952	99-112	8	31
15	228	571	7953- 7966	113-126	9	31
16	229	572	7967- 7979	127-139	10	31
17	230	573	7980- 7993	140-153	11	31
18	231	574	7994- 8007	154-167	12	31
19	232	575	8008- 8021	168-181	13	31
20	233	576	8022- 8035	182-195	14	31
21	234	577	8036- 8049	196-209	15	31
22	235	578	8050- 8063	210-223	16	31
23	236	579	8064- 8077	224-237	17	31
24	237	580	8078- 8091	238-251	18	31
25	238	581	8092- 8105	1- 14	1	32
26	239	582	8106- 8119	15- 28	2	32
27	240	583	8120- 8133	29- 42	3	32
28	241	584	8134- 8147	43- 56	4	32
29	242	585	8148- 8161	57- 70	5	32
30	243	586	8162- 8175	71- 84	6	32
31	244	587	8176- 8189	85- 98	7	32

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SEP. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	245	588	A190- A203	99-112	8	32
2	246	589	A204- A217	113-126	9	32
3	247	590	A218- A230	127-139	10	32
4	248	591	A231- A244	140-153	11	32
5	249	592	A245- A258	154-167	12	32
6	250	593	A259- A272	168-181	13	32
7	251	594	A273- A286	182-195	14	32
8	252	595	A287- A300	196-209	15	32
9	253	596	A301- A314	210-223	16	32
10	254	597	A315- A328	224-237	17	32
11	255	598	A329- A342	238-251	18	32
12	256	599	A343- A356	1- 14	1	33
13	257	600	A357- A370	15- 28	2	33
14	258	601	A371- A384	29- 42	3	33
15	259	602	A385- A398	43- 56	4	33
16	260	603	A399- A412	57- 70	5	33
17	261	604	A413- A426	71- 84	6	33
18	262	605	A427- A440	85- 98	7	33
19	263	606	A441- A454	99-112	8	33
20	264	607	A455- A468	113-126	9	33
21	265	608	A469- A481	127-139	10	33
22	266	609	A482- A495	140-153	11	33
23	267	610	A496- A509	154-167	12	33
24	268	611	A510- A523	168-181	13	33
25	269	612	A524- A537	182-195	14	33
26	270	613	A538- A551	196-209	15	33
27	271	614	A552- A565	210-223	16	33
28	272	615	A566- A579	224-237	17	33
29	273	616	A580- A593	238-251	18	33
30	274	617	A594- A607	1- 14	1	34

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OCT, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	275	618	8608- 8621	15- 28	2	34
2	276	619	8622- 8635	29- 42	3	34
3	277	620	8636- 8649	43- 56	4	34
4	278	621	8650- 8663	57- 70	5	34
5	279	622	8664- 8677	71- 84	6	34
6	280	623	8678- 8691	85- 98	7	34
7	281	624	8692- 8705	99-112	8	34
8	282	625	8706- 8719	113-126	9	34
9	283	626	8720- 8732	127-139	10	34
10	284	627	8733- 8746	140-153	11	34
11	285	628	8747- 8760	154-167	12	34
12	286	629	8761- 8774	168-181	13	34
13	287	630	8775- 8788	182-195	14	34
14	288	631	8789- 8802	196-209	15	34
15	289	632	8803- 8816	210-223	16	34
16	290	633	8817- 8830	224-237	17	34
17	291	634	8831- 8844	238-251	18	34
18	292	635	8845- 8858	1- 14	1	35
19	293	636	8859- 8872	15- 28	2	35
20	294	637	8873- 8886	29- 42	3	35
21	295	638	8887- 8900	43- 56	4	35
22	296	639	8901- 8914	57- 70	5	35
23	297	640	8915- 8928	71- 84	6	35
24	298	641	8929- 8942	85- 98	7	35
25	299	642	8943- 8956	99-112	8	35
26	300	643	8957- 8970	113-126	9	35
27	301	644	8971- 8983	127-139	10	35
28	302	645	8984- 8997	140-153	11	35
29	303	646	8998- 9011	154-167	12	35
30	304	647	9012- 9025	168-181	13	35
31	305	648	9026- 9039	182-195	14	35

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NOV. 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	306	649	9040- 9053	196-209	15	35
2	307	650	9054- 9067	210-223	16	35
3	308	651	9068- 9081	224-237	17	35
4	309	652	9082- 9095	238-251	18	35
5	310	653	9096- 9109	1- 14	1	36
6	311	654	9110- 9123	15- 28	2	36
7	312	655	9124- 9137	29- 42	3	36
8	313	656	9138- 9151	43- 56	4	36
9	314	657	9152- 9165	57- 70	5	36
10	315	658	9166- 9179	71- 84	6	36
11	316	659	9180- 9193	85- 98	7	36
12	317	660	9194- 9207	99-112	8	36
13	318	661	9208- 9221	113-126	9	36
14	319	662	9222- 9234	127-139	10	36
15	320	663	9235- 9248	140-153	11	36
16	321	664	9249- 9262	154-167	12	36
17	322	665	9263- 9276	168-181	13	36
18	323	666	9277- 9290	182-195	14	36
19	324	667	9291- 9304	196-209	15	36
20	325	668	9305- 9318	210-223	16	36
21	326	669	9319- 9332	224-237	17	36
22	327	670	9333- 9346	238-251	18	36
23	328	671	9347- 9360	1- 14	1	37
24	329	672	9361- 9374	15- 28	2	37
25	330	673	9375- 9388	29- 42	3	37
26	331	674	9389- 9402	43- 56	4	37
27	332	675	9403- 9416	57- 70	5	37
28	333	676	9417- 9430	71- 84	6	37
29	334	677	9431- 9444	85- 98	7	37
30	335	678	9445- 9458	99-112	8	37

LANDSAT-2

DEC, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	336	679	9459- 9472	114-126	9	37
2	337	680	9473- 9485	127-139	10	37
3	338	681	9486- 9499	140-153	11	37
4	339	682	9500- 9513	154-167	12	37
5	340	683	9514- 9527	168-181	13	37
6	341	684	9528- 9541	182-195	14	37
7	342	685	9542- 9555	196-209	15	37
8	343	686	9556- 9569	210-223	16	37
9	344	687	9570- 9583	224-237	17	37
10	345	688	9584- 9597	238-251	18	37
11	346	689	9598- 9611	1- 14	1	38
12	347	690	9612- 9625	15- 28	2	38
13	348	691	9626- 9639	29- 42	3	38
14	349	692	9640- 9653	43- 56	4	38
15	350	693	9654- 9667	57- 70	5	38
16	351	694	9668- 9681	71- 84	6	38
17	352	695	9682- 9695	85- 98	7	38
18	353	696	9696- 9709	99-112	8	38
19	354	697	9710- 9723	113-126	9	38
20	355	698	9724- 9736	127-139	10	38
21	356	699	9737- 9750	140-153	11	38
22	357	700	9751- 9764	154-167	12	38
23	358	701	9765- 9778	168-181	13	38
24	359	702	9779- 9792	182-195	14	38
25	360	703	9793- 9806	196-209	15	38
26	361	704	9807- 9820	210-223	16	38
27	362	705	9821- 9834	224-237	17	38
28	363	706	9835- 9848	238-251	18	38
29	364	707	9849- 9862	1- 14	1	39
20	365	708	9863- 9876	15- 28	2	39
21	366	709	9877- 9890	29- 42	3	39

APPENDIX C

LANDSAT-2 DOCUMENTS ISSUED THIS REPORT PERIOD

APPENDIX C

LANDSAT-2 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title and Date
1	1N23-ERTS-165	WBVTR-2 of Landsat-2; Second Rewind Dropout Anomaly, dated 10/28/75
2	1N23-ERTS-166	Second Periodic Test of RBV in Landsat-2, dated 11/12/75
3	1N23-ERTS-167	Probable Incipient Malfunction of MSS on Landsat-2, dated 11/18/75
4	1N23-ERTS-168	WBVTR-1 in Landsat-2; Attempt to Dislodge Possible Particle in K-1 Relay, dated 1/9/76
5	1N23-ERTS-169	Landsat-2 MSS Line Start Anomaly Investigation; Reference GSFC Malfunction Report #D04940, dated 1/19/76

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