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LANDSAT-1 AND LANDSAT-2 FLIGHT EVALUATION REPORT

23 APRIL 1977 TO 23 JULY 1977

Prepared By

GE LANDSAT OPERATIONS CONTROL CENTER

For

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

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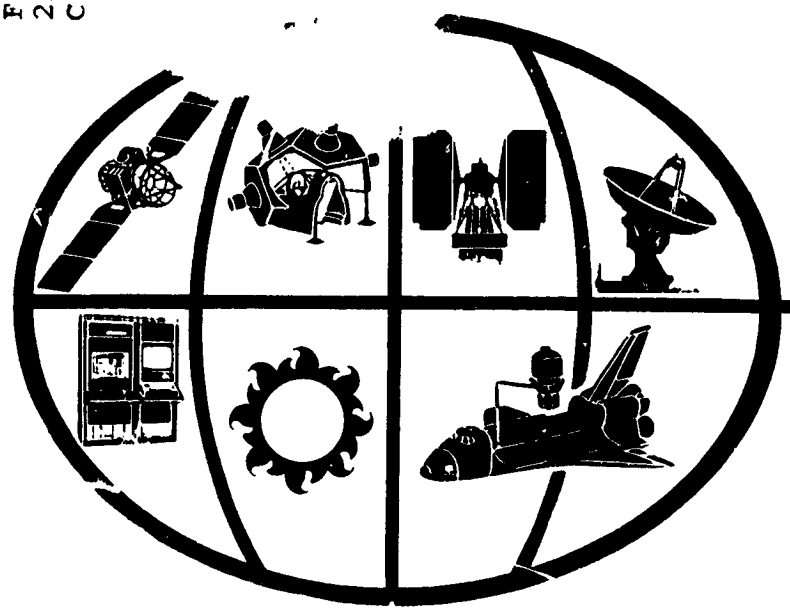

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INTRODUCTION

This is the 21st report in a continuing series of documents issued at launch, and quarterly, thereafter to present flight performance analyses 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
76SDS4207	Landsat-1 and Landsat-2 Flight Evaluation Report 23 October 1975 to 23 January 1976	29 February 1976

76SDS4248	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1976 to 23 April 1976	14 July 1976
76SDS4263	Landsat-1 and Landsat-2 Flight Evaluation Report 23 April 1976 to 23 July 1976	15 October 1976
76SDS4278	Landsat-1 and Landsat-2 Flight Evaluation Report 23 July 1976 to 23 October 1976	30 November 1976
77SDS4204	Landsat-1 and Landsat-2 Flight Evaluation Report 23 October 1976 to 23 January 1977	22 February 1977
77SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1977 to 23 April 1977	23 May 1977

This report contains analyses of performance for Orbits 24193 to 25464.

SECTION 1

SUMMARY

LANDSAT-1 OPERATIONS

SECTION 1

SUMMARY LANDSAT-1 OPERATIONS

Landsat-1 continues to perform its mission nominally, and has completed 5 years of successful operation.

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 until Orbit 147, 3 August 1972, when an internal short circuit disabled one of the Wideband Video Tape Recorders (WBVTR-2).

In Orbit 196, 6 August 1972, 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 (WBVTR-1) 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, 3 June 1973, an integrated circuit chip in the TMP failed, disabling four TLM functions.

COMSTOR "B" has an intermittent problem with cell 12, and 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 15 July 1974, because of excessive decline of transmitter power.

The pitch flywheel stopped for 2 minutes in Orbit 8040, 20 February 1974; and for 8 hours, 2 minutes in Orbits 11125 to 11130, 29 September 1974. 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, 8 October 1974, as a precautionary measure after RMP B began showing current variations.

The DCS subsystem was turned off after Orbit 12690, 19 January 1975, and the function assumed by DCS in Landsat-2.

Narrow Band Recorder 2 became noisy and was turned off in Orbit 13015, 12 February 1975. Operation of NBR 2 resumed in Orbit 14116, 2 May 1975, until failure in Orbit 15253, 22 July 1975, when its operation was terminated.

Battery 6 was turned off from Orbits 13346, 7 March 1975, to 14100, 30 April 1975, due to electrical characteristics causing high temperatures. Between Orbits 14780, 18 June 1975 and 15467, 6 August 1975, Battery 6 was turned off again due to high temperature. Because high current transient occurred at Battery 6 turn-on in Orbit 15467, 6 August 1975, the battery turn-on command is temporarily suspended from use. Seven batteries remain on-line.

The pitch flywheel stopped again for 45 minutes in Orbit 15309, 26 July 1975, and 3 minutes in Orbit 15312, 26 July 1975. Pitch flywheel motor driver duty cycle remained high from Orbit 15191, 18 July 1975 to Orbit 15393, 1 August 1975, when it returned to normal. MSS operation was suspended during the pitch flywheel anomaly between Orbit 15309, 26 July 1975, and 15393, 1 August 1975.

Battery 8 was turned off in Orbit 15588, 15 August 1975, due to electrical characteristics causing high temperature and will not be returned to service because of the battery "ON" command problem. Six batteries remain on-line.

The rear ACS scanner had intermittent electrical failures beginning in Orbit 19078, 21 April 1976, and it failed in Orbit 19086, 22 April 1976. The spacecraft was switched to single scanner mode (forward scanner) in Orbit 19089, 22 April 1976, and normal ACS operation was resumed.

A series of Orbit Adjust firings from October 20 to November 9, 1976; and from January 7 to January 28, 1977 were performed to adjust time phasing between Landsat-1 and Landsat-2. This also changed the repeat cycle pattern coverage of Landsat-1 and Landsat-2 from a 9 day/9 day to a 12 day/6 day coverage. Landsat-1 was designated non-operational from October 20, 1976 to January 28, 1977 while the orbit adjust sequence was in progress.

Battery 5 turned off in Orbit 22605, 31 December 1976, due to electrical characteristics causing high temperature and will not be returned to service because of the battery "On" command problem. Five batteries remain on line.

The position of the sun with respect to the Landsat 1 orbit after five years, cycles in and out of the sun-sensor detector response angle. The solar panels have tracked the sun with periodic offset errors and the resulting sun position and panel tracking offset errors have reduced the solar array output. The solar array, however, has supplied sufficient power for the spacecraft operation.

Sensors 1 through 6 (Band 1) of the MSS were turned off because of a power supply failure during Orbit 23480 on 3 March 1977. The MSS is now operating with only 3 of its 4 spectral bands.

See Table 1-1 for a summary of payload in-orbit operation.

Table 1-1. In-Orbit Payload System Performance Launch Thru Orbit 25515 (7/27/77) Landsat-1

RBV	Total Scenes Imaged	1,690
	Avg. Scenes/Day	139
	Total Area Imaged (millions of sq. n.mi.)	14.7
	ON TIME (hr.)	14.0
	ON/OFF Cycles	91
	% Real Time Images	57
	% Recorded Images	43
MSS	Total Scenes Images	262,773
	Avg. Scenes/Day	163
	Total Area Imaged (millions of sq. n.mi.)	2,290
	ON TIME (hr.)	2,713
	ON/OFF Cycles	18,552
	% Real Time Images	82
	% Recorded Images	18
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.)	32.2
	ON/OFF Cycles	314
WPA-2	% Real Time Mode	79
	% P/B Mode	21
	ON TIME (hr.)	2,617
	ON/OFF Cycles	16,304
WBVTR-1	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	Minor Frame Sync Error Count in P/B (Failed Orbit 9,881)	
	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 Orbit 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

The initial orbit of Landsat-1 required some correction during Orbits 38, 44, and 59 to achieve the desired 18-day repeat cycle.

During Orbits 938, 2416, 6390 and 7826 it was necessary to fire the -X thruster of the orbit adjust system to maintain the ground trace in the desired 18-day repeat pattern of ± 10 nm.

On 29 September 1974, the ACS control system fired gas during a spacecraft emergency (pitch flywheel stoppage) which resulted in an unplan ed orbit change similar to firing the -X thruster.

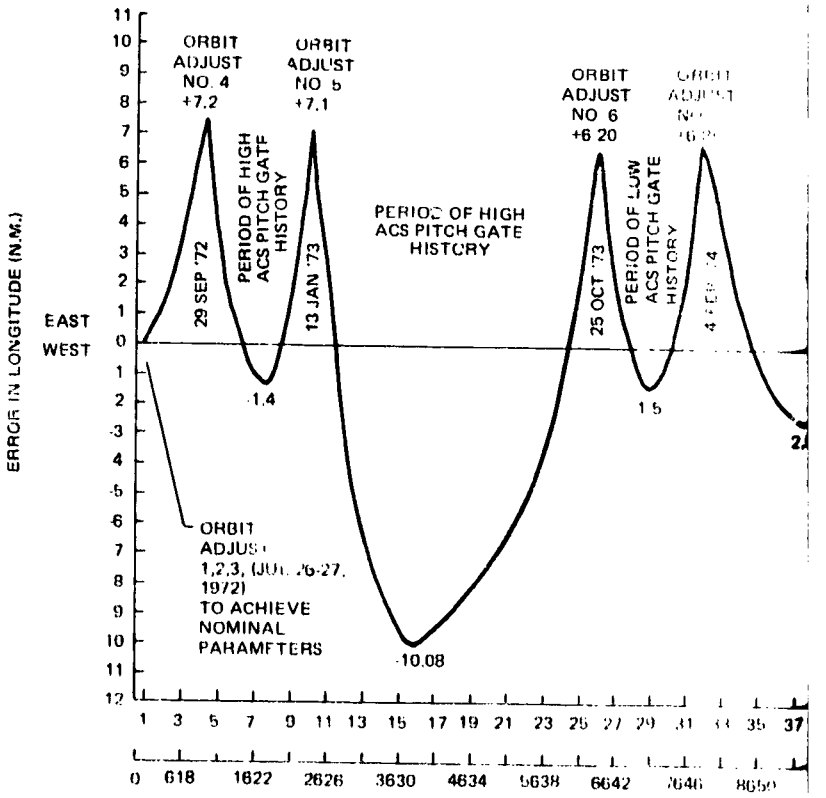
The +X thruster was fired during Orbits 11367, 11464, 13611, 19747 and 19871 in order to maintain the 18-day repeat cycle ground trace within ± 10 nm.

A 101 day orbit adjust program commenced in Orbit 21613 (20 October 1976) and lasted through Orbit 23007 (28 January 1977). This program increased the time separation between the Landsat spacecrafts by 12.17 minutes to remain within the operational time limits for ground station turn-around time to track the spacecrafts in successive passes. Another consequence of the 101-day orbit-adjust program was the change of the Landsat-1 - Landsat-2 combined earth coverage repeat cycle from a nine day - nine day schedule to a twelve day - six day schedule; i.e., Landsat-2 will pass over a point on earth twelve days after Landsat-1's passage. Six days after Landsat-2 crosses this point, Landsat-1 will pass over it again.

Current 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 errors have been maintained within ± 10 nm in the east-west direction at the equator as planned. Figure 2-2 shows mean local time at the descending node. Figure 2-3 shows predicted mean time of descending node. Appendix B gives the ground trace repeat cycle predictions.

FOLDOUT FRAME 1



FOLDOUT FRAME 2

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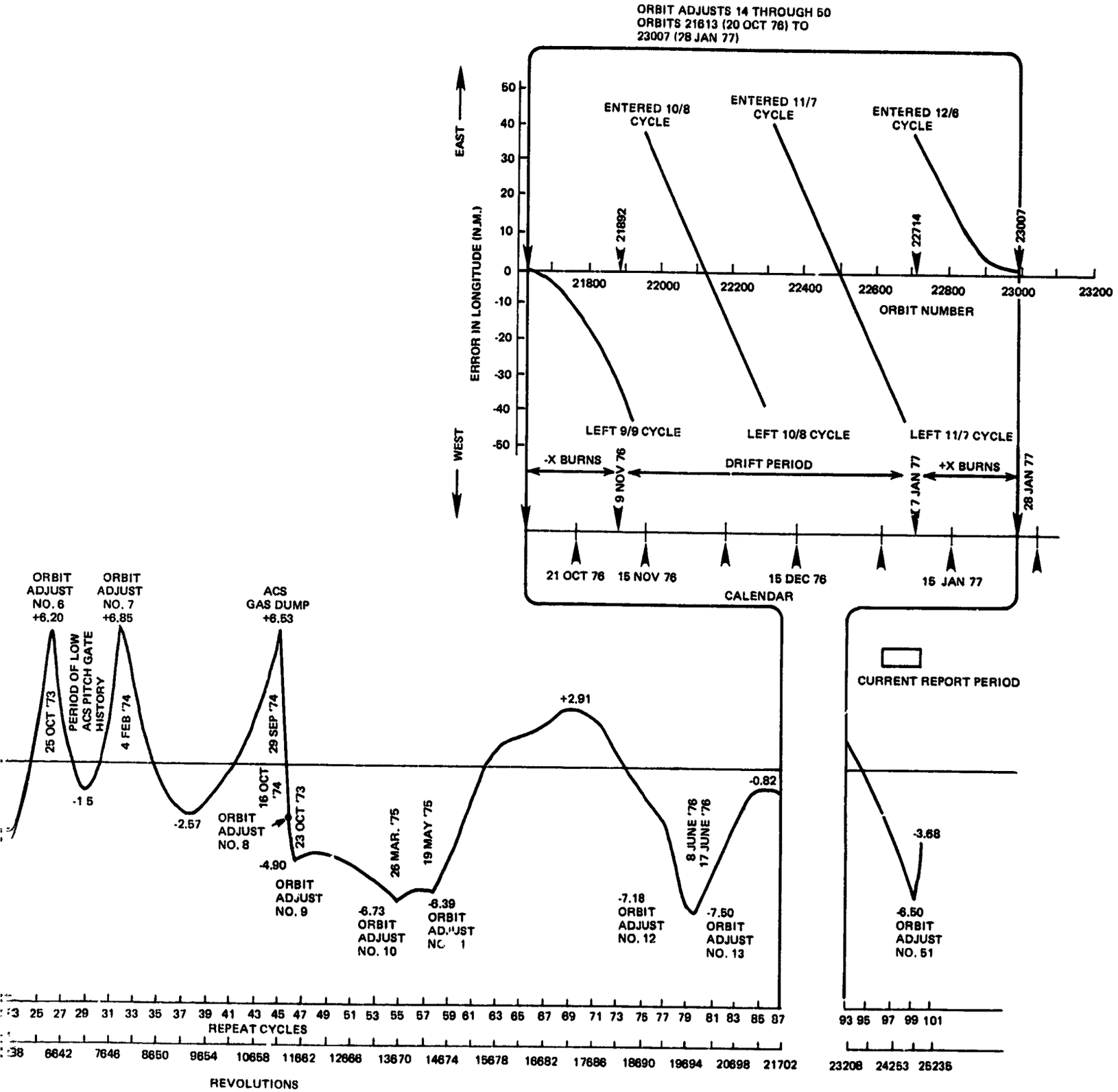

Figure 2-1. Effect of Orbit Adjusts on Landsat-1's Ground Track

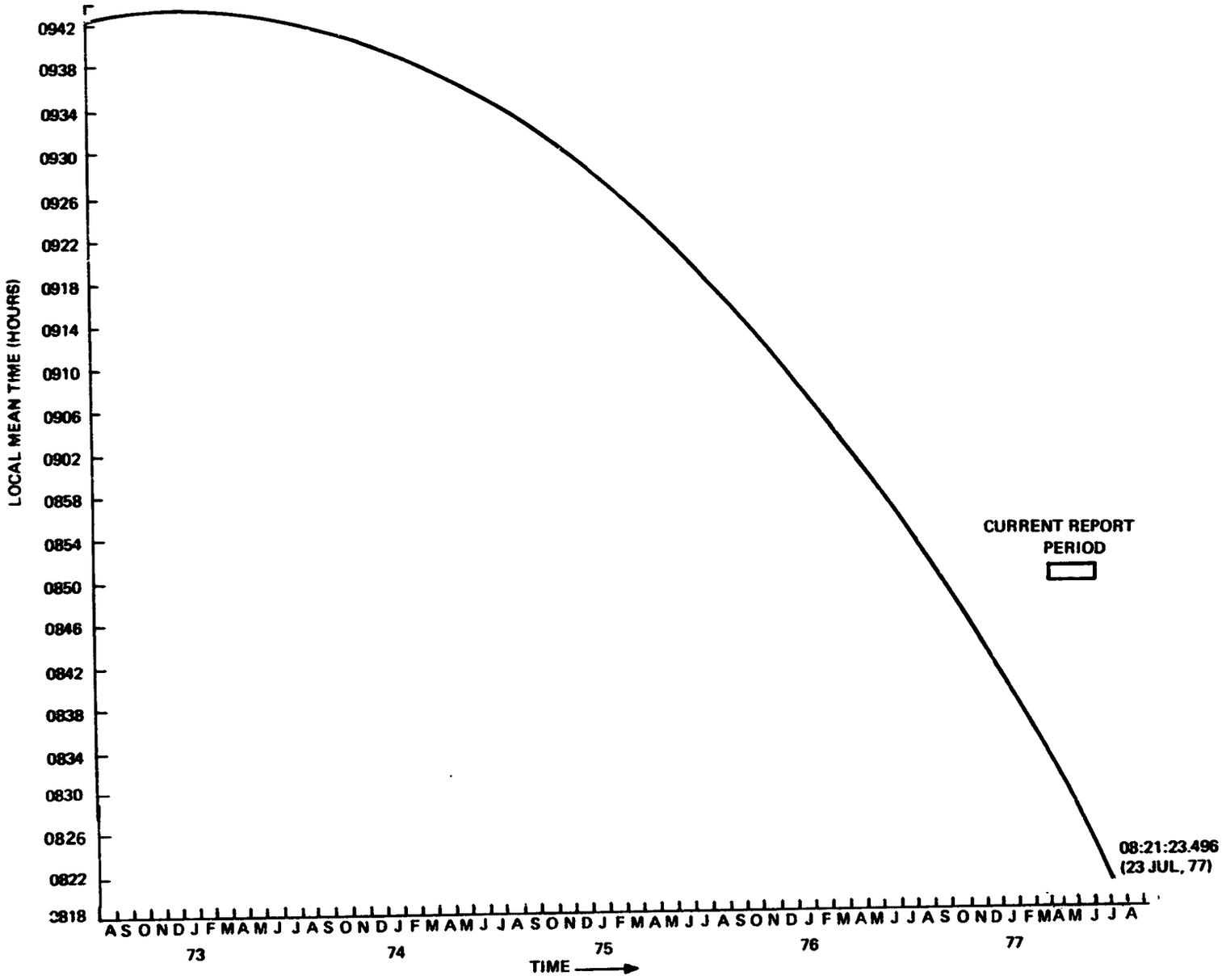

Figure 2-2. Local Mean Time of Descending Node

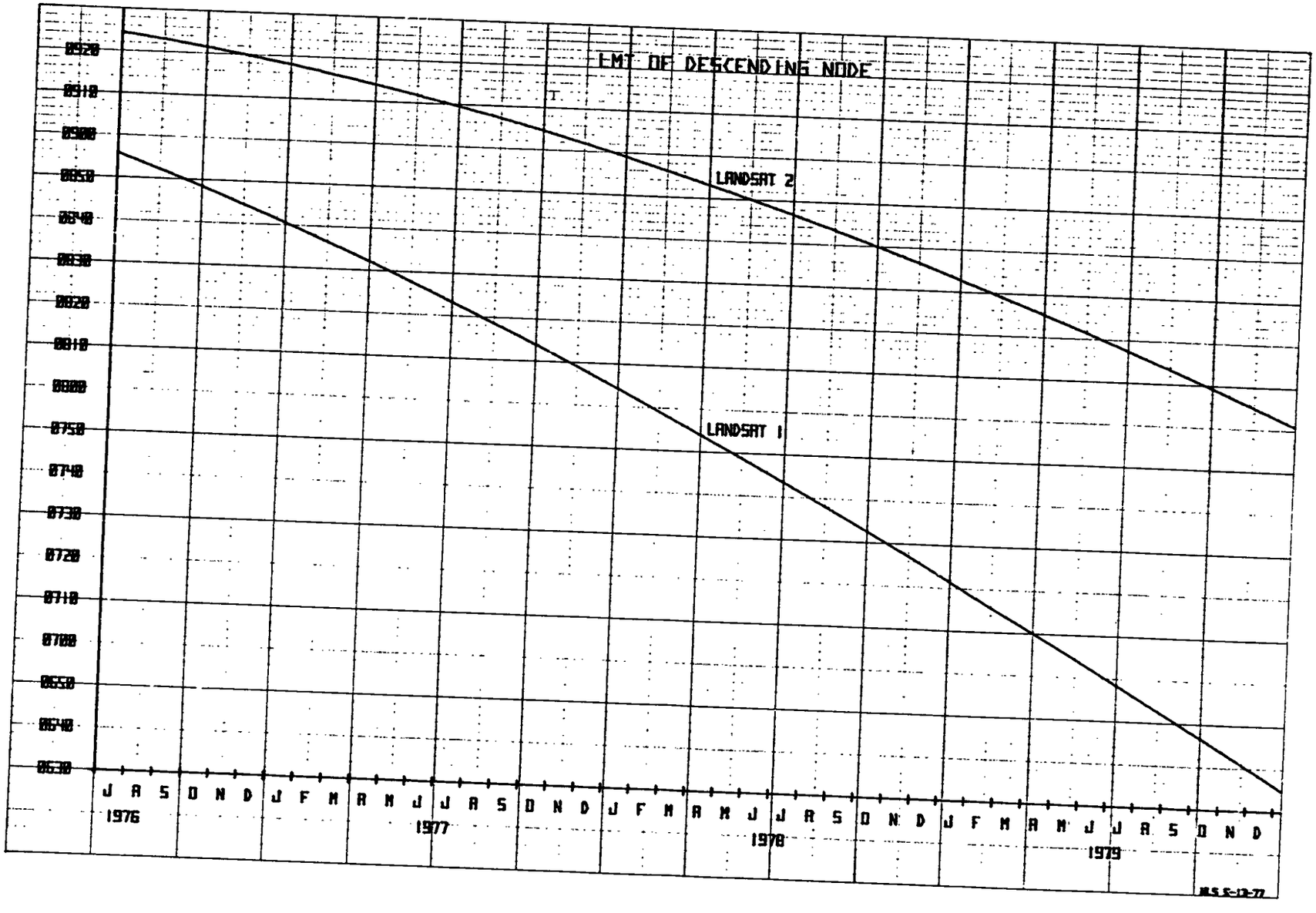

Figure 2-3. Predicted Local Mean Time of Descending Node for LS1 and LS2, 1976, 1977, 1978, 1979

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

Date \ Element	Apogee (km)	Perigee (km)	Inclination (Deg.)	Semi Major Axis (km)	Eccentricity	Anomalistic 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
23 Apr 1976	912.28	899.41	98.919	7285.511	0.001089	103.145	103.261	110.622	167.275	69.142
22 Jul 1976	914.24	900.35	98.911	7285.464	0.000953	104.144	103.260	218.207	254.289	321.741
23 Oct 1976	914.33	900.42	98.894	7285.543	0.000955	103.145	103.262	332.337	343.897	207.595
28 Jan 1977	913.57	900.95	98.878	7285.427	0.000867	103.143	103.254	60.280	77.333	119.515
24 Apr 1977	913.35	901.18	98.865	7285.432	0.000835	103.143	103.260	180.132	158.417	359.749
24 July 1977	912.53	901.92	98.858	7285.391	0.000729	103.142	103.259	295.005	246.843	244.951

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. Auxiliary loads dissipated the excess power above the battery and load requirements using Landsat-1 power management procedures. The power subsystem is predicted to have adequate power through 1977 for the present Landsat-1 payload usage schedule. No compensation loads were used.

Midday solar array current is shown in Figure 3-1. Figure 3-2 shows actual and predicted midday solar array degradation. Solar array degradation was 35.9% at the end of 60 months in orbit. Figure 3-3 shows actual sun angles to the spacecraft and solar panels. Figure 3-4 is a prediction of sun angle through 1977 for Landsat-1 and 2.

Since August 30, 1975, the batteries have been kept slightly undercharged to avert the possible recurrence of a run-away condition. Batteries 5, 6, and 8 were turned off as previously reported. These batteries will remain off because of the "All Battery On" command restriction resulting from the anomaly reported previously. Five batteries are now supporting operations and are adequate for the current limited payload operations. Temperatures ranged from 15.4 to 31.3°C and battery packs averaged a typical 8.2% Depth of Discharge (DOD) at the beginning of the report period and 10.3% (DOD) at the end of this report period. Table 3-3 is a history of Landsat-1 Battery restoration cycles and turn-off.

The power system electronics performed well in this report period with all voltages stable. Table 3-1 shows major subsystem parameters and Table 3-2 shows power subsystem telemetry for selected orbits. Some parameters in Table 3-2 may differ slightly 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.

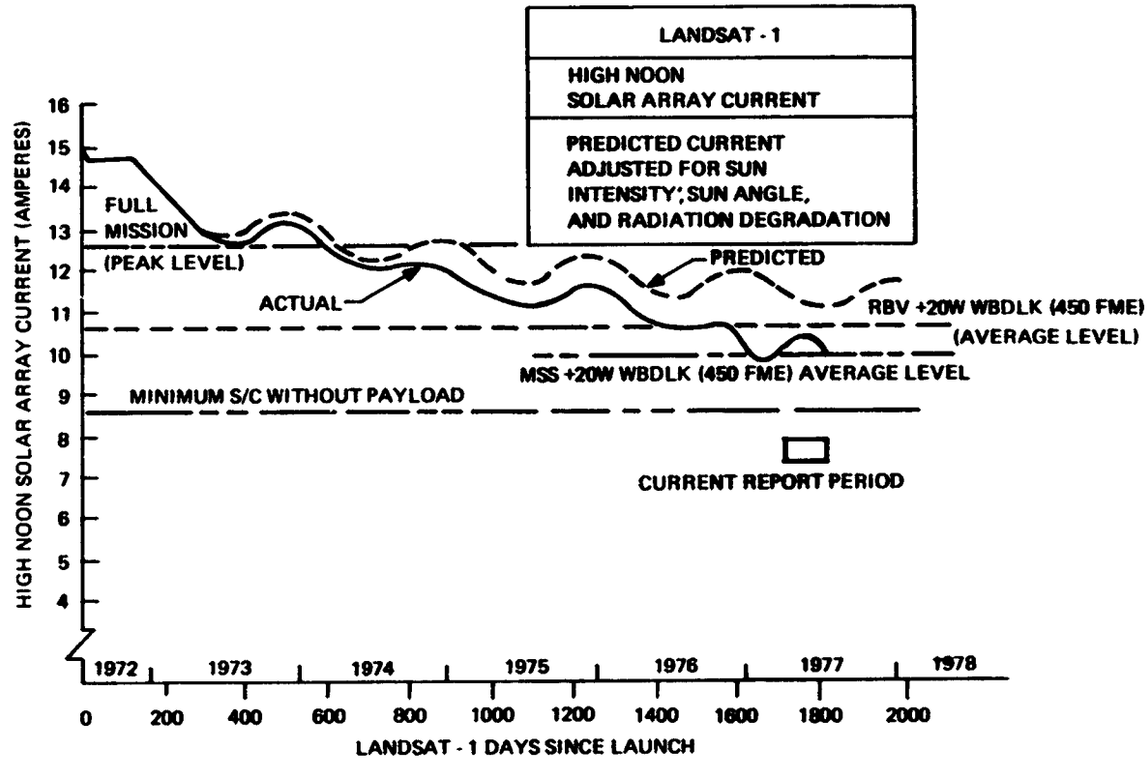

Figure 3-1. Midday Solar Array Current

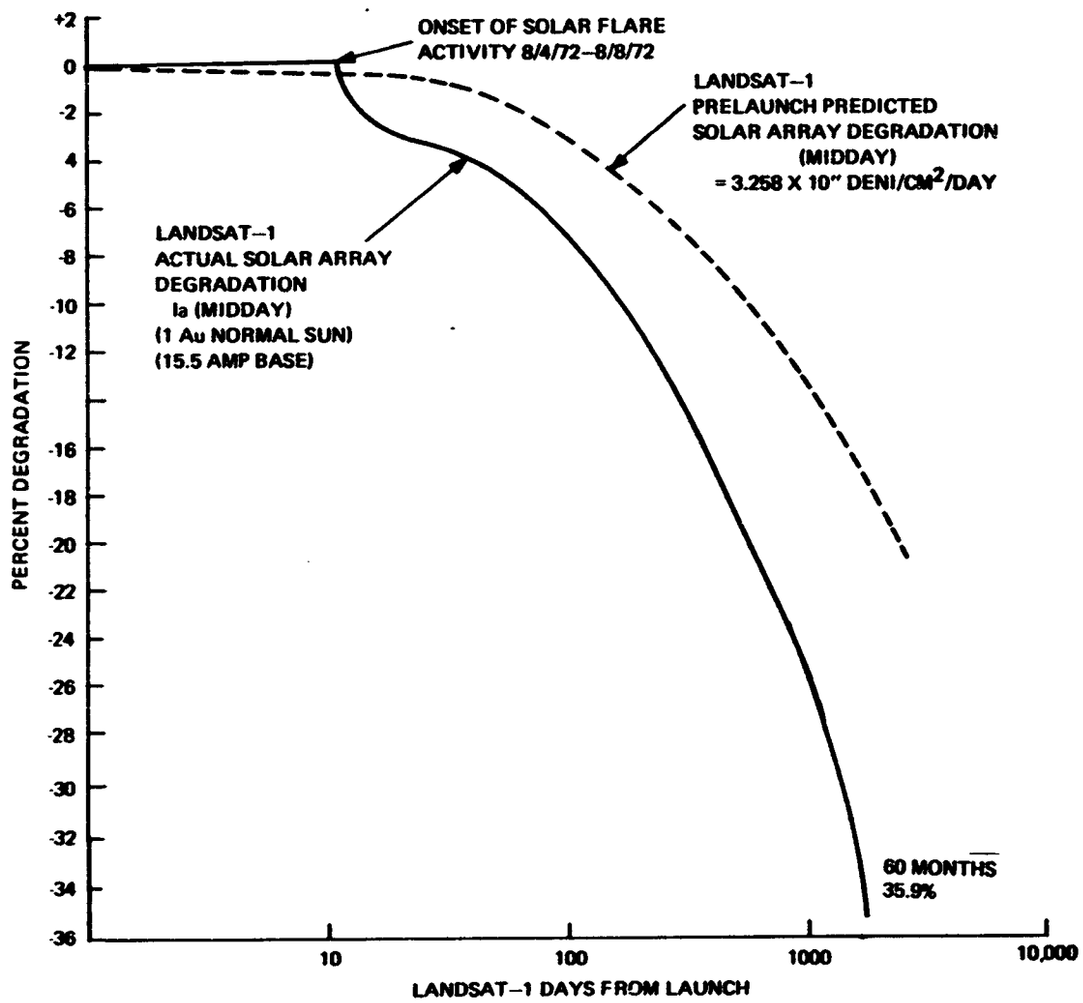

Figure 3-2. I_A (Midday) Degradation vs. Days

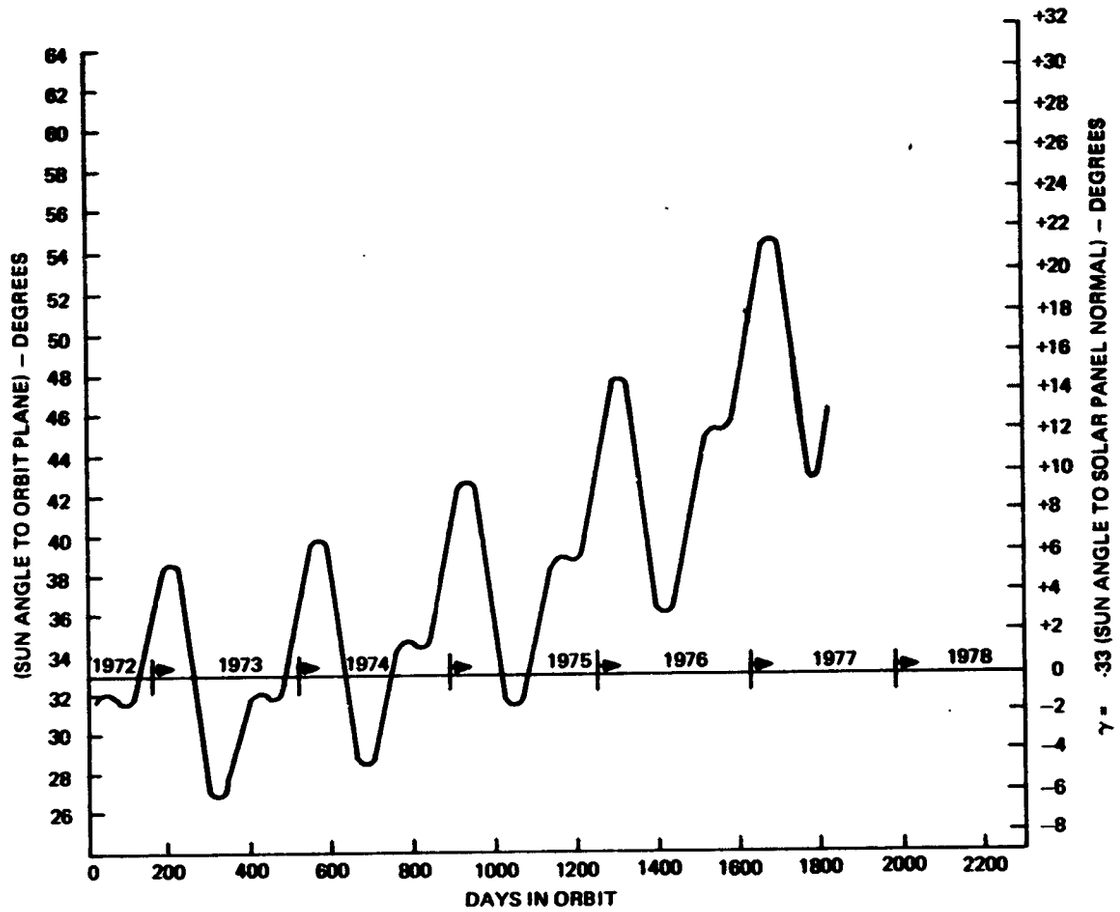

Figure 3-3. Actual β and α (Paddle) Sun Angles, Landsat-1

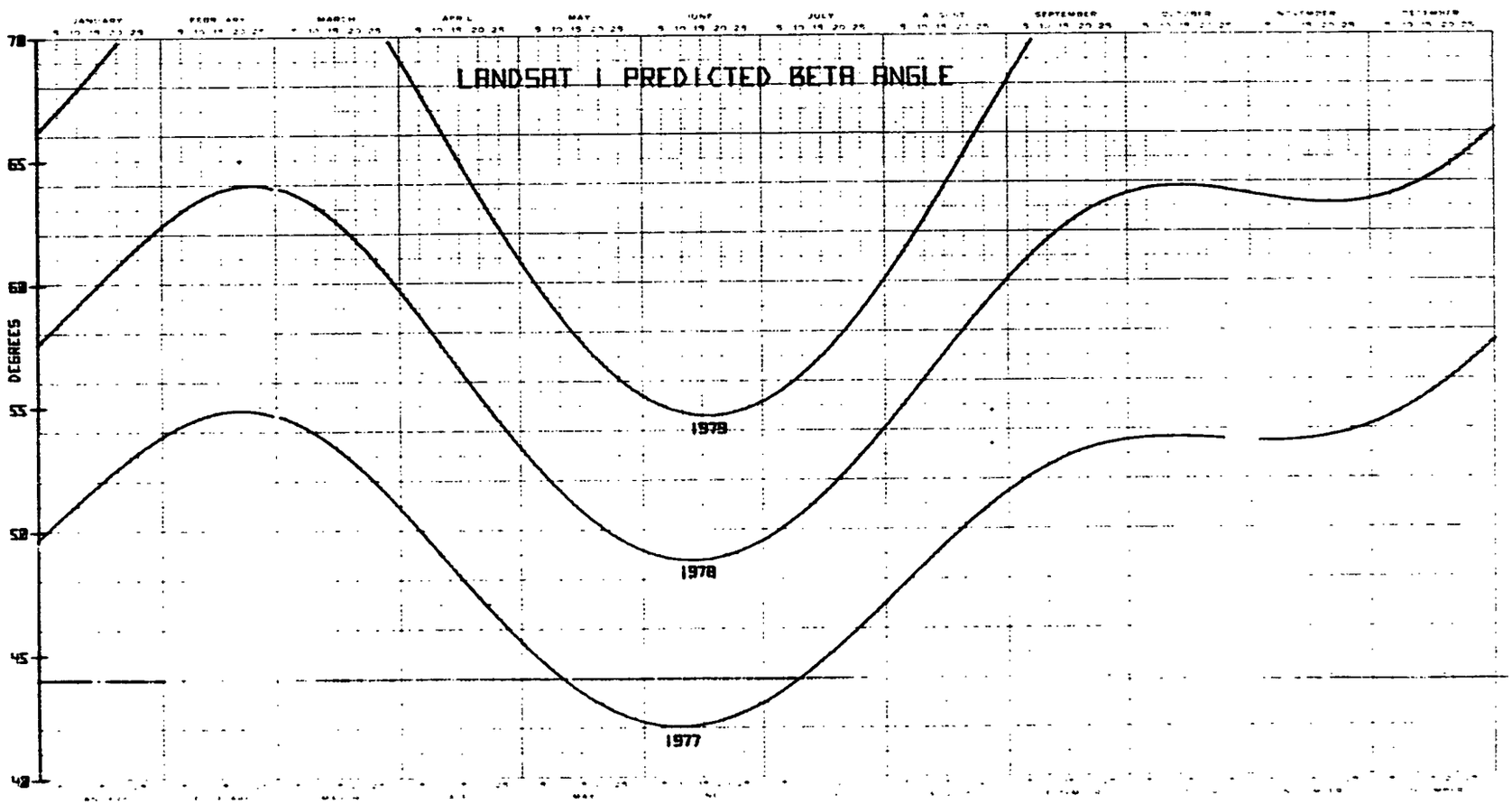

Figure 3-4. Landsat-1 Predicted Beta Angle, 1977, 1978, 1979

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

ORBIT NO.	26	5098	10178	15254	20363	22011	21018	25004	2[illegible]
BATT 1 MAX	32.48	32.91	33.25	33.16	32.48	32.22	32.31	32.73	32.99
2 CHGE	32.48	32.91	33.16	33.16	32.48	32.22	32.31	32.73	32.99
3 VOLTS	32.48	32.99	33.25	33.16	32.48	32.31	32.31	32.73	33.08
4	32.48	32.99	33.25	33.16	31.48	32.31	32.19	32.73	33.08
5	32.48	32.99	33.33	33.25	31.57	****	****	****	****
6	32.31	32.91	33.25	**	32.48	32.31	**	**	**
7	32.22	32.91	33.25	33.16	32.48	32.31	32.39	32.73	33.08
8	33.14	32.91	33.25	33.16	***	***	***	***	***
AVERAGE-	32.38	32.92	33.25	33.17	32.49	32.28	32.37	[illegible]	33.04
BATT 1 END	28.81	28.30	28.98	29.15	29.23	28.98	28.48	28.48	29.1[illegible]
2 OF	28.81	28.30	28.98	29.15	29.23	28.9[illegible]	28.47	28.47	29.1[illegible]
3 NIGHT	28.81	28.30	28.98	29.15	29.23	28.98	28.38	28.38	29.15
4 -VOLTS	28.80	28.38	28.98	29.15	29.32	29.06	28.47	28.47	29.15
5	28.80	28.38	29.06	29.23	29.32	****	****	****	****
6	28.81	28.30	28.98	**	29.23	28.98	**	**	**
7	28.81	28.30	28.98	29.15	29.23	29.06	28.47	28.38	29.15
8	28.81	28.30	28.98	29.15	***	***	***	***	***
AVERAGE	28.84	28.32	28.99	29.16	29.26	29.01	28.43	28.41	29.15
BATT 1	13.11	13.58	13.96	15.27	14.45	16.48	20.32	20.46	20.73
2* SHARE	12.93	13.58	13.96	15.27	15.06	17.29	20.95	20.97	21.32
3 (%)	11.38	11.38	11.95	13.59	13.26	14.75	19.04	19.04	17.97
4	12.30	11.95	12.28	14.06	14.19	15.55	19.76	19.86	19.18
5	12.32	11.85	11.93	13.63	14.32	****	****	****	****
6	12.80	12.35	11.79	**	14.59	18.52	**	**	**
7	12.62	12.42	12.13	13.59	14.11	17.42	19.94	19.67	20.81
8	12.4[illegible]	12.10	11.98	14.54	***	***	***	***	***
BATT 1 LOAD	12.71	12.44	12.55	14.67	14.32	17.13	20.22	20.08	20.15
2 SHARE	12.90	13.62	13.70	15.88	14.89	17.48	21.22	21.03	21.27
3 (%)	11.43	11.91	12.23	13.85	13.54	16.20	19.55	19.18	19.62
4	12.77	13.01	13.12	14.91	14.81	17.35	20.57	20.55	21.0[illegible]
5	12.54	12.42	12.60	14.02	14.31	****	****	****	****
6	12.53	12.21	11.30	**	13.73	14.74	**	**	**
7	12.80	12.41	12.50	13.77	14.36	17.09	18.34	18.76	17.87
8	12.32	11.98	11.97	12.88	***	***	***	***	***
BATT 1 TEMP	21.11	24.65	24.76	23.12	21.47	25.34	21.24	21.17	23.37
2 IN	18.74	2[illegible].42	20.89	19.32	17.8[illegible]	19.28	16.84	16.90	17.86
3 (°C)	18.77	20.29	20.16	18.77	17.25	18.25	16.04	16.07	16.97
4	21.57	23.17	23.32	22.71	21.64	23.50	20.46	20.34	21.27
5	21.82	23.85	24.09	23.63	24.40	37.63	25.48	25.25	28.49
6	21.21	24.37	24.78	22.10	23.52	35.95	24.28	21.02	27.21
7	21.41	25.01	24.96	23.75	23.23	33.09	24.63	24.32	27.92
8	21.82	25.14	25.24	24.59	22.15	28.33	22.70	22.53	24.66
AVERAGE	20.81	23.49	23.53	22.26	21.43	27.72	21.46	21.32	23.47
S/C REG BUS PWR (W)	176.8	153.4	165.0	137.9	123.49	113.6	113.4	107.1	106.0
COMP LOAD PWR (W) (P/O S/C REG BUS PWR)	49.0	34.8	41.9	29.4	17.4	6.62	0	0	0
P/L REG BUS PWR (W)	16.2	13.7	8.9	8.9	9.13	9.14	9.2	9.2	8.9
C/D RATIO	1.06	1.13	1.21	1.18	1.01	1.16	1.01	1.19	1.14
TOTAL CHARGE (A-M)	309.2	290.21	258.3	229.29	172.42	140.46	119.07	176.57	158.69
TOTAL DISCHARGE (A-M)	290.9	256.28	214.2	194.13	168.31	121.[illegible]	118.60	118.05	138.72
SOLAR ARRAY (A-M)	1044.0	908.0	832.0	876.0	754	816	729	727	718
S.A. PEAK I (AMP)	15.8	13.68	12.41	11.60	10.88	11.12	10.40	10.40	10.08
MIDDAY ARRAY I (AMP)	15.01	12.80	S A	11.01	10.56	10.80	10.08	10.00	9.70
SUN ANGLE (DEG)	-3.33	-3.54	-1.82	1.49	6.4	-15.5	-9.9	-9.9	13.9
MAX R PAD TEMP (°C)	+62.00	+68.00	63.20	62.0	58.40	58.40	58.40	58.40	55.12
MIN R PAD TEMP (°C)	-62.00	-59.00	-42.70	-42.18	-38.54	-29.44	-37.94	-37.32	-35.50
MAX L PAD TEMP (°C)	+57.80	+60.50	56.00	56.00	55.12	60.80	56.00	55.12	55.12
MIN L PAD TEMP (°C)	-67.00	-64.00	-47.00	-46.25	-42.18	-26.47	-40.96	40.96	-37.32

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

**Battery 6 was turned off in Orbit 21832 and remained off through this report period

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

****Battery 5 was turned off in Orbit 22605 and remained off through this report period

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

Function	Description	Unit	Orbits								
			26	5089	10182	15254	20364	22928	24618	25050	25455
6001	BATT 1 DISC	AMP	0.94	0.81	0.81	0.91	0.81	0.86	1.04	1.01	0.99
6002	2		0.95	*	*	*	*	*	1.10	1.06	1.02
6003	3		0.84	0.79	0.80	0.86	0.75	0.82	1.02	0.99	0.94
6004	4		0.93	0.86	0.86	0.92	0.84	0.89	1.07	1.05	1.03
6005	5		0.92	0.82	0.82	0.87	0.79	OFF	OFF	OFF	OFF
6006	6		0.91	0.78	0.72	—	0.75	0.71	OFF	OFF	OFF
6007	7		0.94	0.82	0.80	0.85	0.80	0.84	0.97	0.96	0.89
6008	8		0.91	0.77	0.78	0.80	OFF	OFF	OFF	OFF	OFF
6011	BATT 1 CHG	AMP	0.58	0.58	0.69	0.52	0.35	0.37	0.45	0.46	0.46
6012	2		0.57	*	*	*	*	*	0.46	0.47	0.47
6013	3		0.50	0.48	0.60	0.46	0.33	0.34	0.41	0.43	0.40
6014	4		0.54	0.51	0.60	0.48	0.35	0.36	0.43	0.44	0.42
6015	5		0.54	0.50	0.58	0.46	0.35	OFF	OFF	OFF	OFF
6016	6		0.57	0.52	0.56	—	0.35	0.42	OFF	OFF	OFF
6017	7		0.55	0.53	0.60	0.46	0.35	0.39	0.44	0.45	0.46
6018	8		0.55	0.52	0.58	0.49	OFF	OFF	OFF	OFF	OFF
6021	BATT 1 VOLT	VDC	30.87	31.24	31.64	31.62	31.20	31.40	30.75	30.92	31.53
6022	2		30.87	31.25	31.66	31.62	31.19	31.39	30.74	30.91	31.52
6023	3		30.87	31.25	31.66	31.62	31.18	31.39	30.74	30.91	31.52
6024	4		30.90	31.28	31.70	31.65	31.22	31.42	30.77	30.94	31.55
6025	5		30.95	31.33	31.75	31.71	31.28	OFF	OFF	OFF	OFF
6026	6		30.86	31.24	31.65	—	31.18	31.37	OFF	OFF	OFF
6027	7		30.89	31.27	31.68	31.64	31.21	31.41	30.76	30.94	31.53
6028	8		30.89	31.27	31.68	31.63	OFF	OFF	OFF	OFF	OFF
6031	BATT 1 TEMP	DGC	21.17	24.48	26.09	23.02	21.43	25.44	21.33	21.21	23.30
6032	2		18.80	21.29	22.81	19.28	17.80	19.34	16.85	16.90	17.54
6033	3		18.76	20.17	21.26	18.76	17.21	18.13	16.04	16.09	16.95
6034	4		21.57	23.04	23.83	22.69	21.60	23.53	20.44	20.36	21.25
6035	5		21.84	23.77	24.78	23.64	24.36	37.15	25.59	25.26	28.49
6036	6		21.24	24.27	25.78	22.08	23.51	36.22	24.41	24.07	27.21
6037	7		21.43	24.88	26.09	23.67	23.18	33.09	24.71	24.36	27.57
6038	8		21.86	25.02	26.21	24.51	22.14	28.64	22.78	22.57	24.64
6040	RT PAD TEMP	DGC	25.82	27.22	27.16	27.29	28.24	33.04	28.12	29.00	29.93
6041	R PAD V N	VDC	33.40	33.85	34.36	34.18	33.06	30.47	31.89	32.45	32.50
[illegible]	R PAD V M	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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FOLDOUT FRAME 1

6034	4		21.31	23.04	23.85	22.09	21.09	23.33	20.44	20.30	21.23
6035	5		21.84	23.77	24.78	23.64	24.36	37.15	25.59	25.26	28.49
6036	6		21.24	24.27	25.78	22.08	23.51	36.22	24.41	24.07	27.21
6037	7		21.43	24.88	26.09	23.67	23.18	33.09	24.71	24.36	27.57
6038	8		21.86	25.02	26.21	24.51	22.14	28.64	22.78	22.57	24.64
6040	RT PAD TEMP	DGC	25.82	27.22	27.16	27.29	26.24	33.04	28.12	29.09	29.03
6041	R PAD V N	VDC	33.40	33.85	34.36	34.18	33.06	30.47	31.89	32.45	32.59
6042	R PAD V M	VDC	33.29	33.50	33.60	32.92	31.75	30.95	31.05	31.44	31.57
6044	LT PAD TEMP	DGC	14.14	16.61	19.11	19.84	22.62	33.90	23.22	23.81	24.81
6045	L PAD V F	VDC	33.69	34.16	34.67	34.63	33.84	33.95	33.49	33.69	34.23
6046	L PAD V G	VDC	33.68	34.19	34.72	34.68	33.88	33.98	33.52	33.72	34.27
6050	S/C UR BUS V	VDC	31.24	31.68	32.60	32.07	31.61	31.85	31.10	31.38	31.39
6051	S/C RG BUS V	VDC	24.54	24.55	24.55	24.54	24.55	24.54	24.54	24.54	24.54
6052	AUX REG A V	VDC	23.41	23.48	23.47	23.49	23.49	23.48	23.50	23.50	23.50
6053	AUX REG B V	VDC	23.50	23.50	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	10.17	9.69	9.69	9.71	9.36
6055+	S/C RF BUS I	AMP	7.11	6.27	6.80	5.63	5.04	4.61	4.64	4.38	4.34
6056+	S/C RG BUS I	AMP	7.11	6.27	6.79	5.62	5.02	4.61	4.63	4.37	4.33
6058	PC MOD T 1	DGC	21.82	22.23	23.22	20.63	19.54	19.92	18.24	18.16	18.67
6059	PC MOD T 2	DGC	21.68	22.53	23.00	21.17	20.14	20.73	18.91	18.95	19.38
6070	P/L RG BUS V	VDC	24.66	24.68	24.68	24.68	24.67	24.68	24.66	24.66	24.68
6071	P/L UR BUS V	VDC	31.08	31.53	31.92	31.92	31.45	31.66	30.95	31.22	31.83
6072+	P/L RG BUS I	AMP	0.57	0.56	0.36	0.36	0.37	0.36	0.38	0.37	0.37
6073	P AUX A V	VDC	23.51	23.51	23.50	23.50	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	23.50	22.50
6075	PR MOD T 1	DGC	21.50	22.13	23.62	21.44	20.69	21.66	19.78	19.82	20.20
6076	PR MOD T 2	DGC	20.34	21.45	21.84	19.88	19.35	20.26	18.56	18.56	[illegible]
6079	FUSE BLOW V	VDC	24.56	24.57	24.60	24.59	24.58	24.58	24.57	24.57	24.58
6080	SHUNT 1 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6081	SHUNT 2 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6082	SHUNT 3 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6083	SHUNT 4 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6084	SHUNT 5 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6085	SHUNT 6 I	AMP	0.01	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6086	SHUNT 7 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6087	SHUNT 8 I	AMP	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
6100	P/L RG BUS I	AMP	0.58	0.56	0.36	0.36	0.37	0.36	0.38	0.37	0.36
Total No.	MAJOR FRAMES	FRM	764.0	389.0	384.0	785	788	724	707	802	795

* Function 6002, 6012; missing data.

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

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

FOLDOUT FRAME 2

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Table 3-3. Landsat-1 Battery Restoration Cycles

			1	2	3
Batt 5	Off	Orbit	22605		
		Date	12-30-76		
	On	Orbit	*		
		Date	-		
Batt 6	Off	Orbit	13346	14780	23832
		Date	3-7-75	6-18-75	3-28-77
	On	Orbit	14100	15467*	*
		Date	4-30-75	8-6-75	
Batt 8	Off	Orbit	15588		
		Date	8-15-75		
	On	Orbit	*		
		Date			

*Since "All Battery On" high current transient anomaly in Orbit 15467 on 8-6-75 the "All Battery On" command is restricted. Batteries turned off after that date will remain off

SECTION 4

ATTITUDE CONTROL SUBSYSTEM (ACS)
LANDSAT-1

SECTION 4

ATTITUDE CONTROL SYSTEM (ACS)

During this report period, Landsat-1's ACS system performed normally in the Forward Single Scanner Mode.

Due to the large Beta angle, Landsat-1's sun sensors are sometimes unable to maintain solar array attitude for maximum sun illumination. Landsat-1's orbit has regressed with time and Beta angle (the angle between the orbit plane and the sun) has increased to a level that sometimes exceeds the sun sensors' fields of view. Figure 3-4 shows Beta angle plotted as a function of time. Tracking errors commenced when Beta was approximately 46.5°. Historically, solar array tracking errors first appeared in mid-January 1976 and lasted through March 1976. They reappeared in December 1976 and continued through April 1977. The Right Solar Array Drive (RSAD) sun sensors were particularly affected.

During this report period, Pitch flywheel duty cycle was stable and averaged approximately 5% in both the clockwise and counter clockwise directions.

With pneumatics disabled, no gating occurred. The remaining freon and gating status curves are unchanged. See Figures 4-1, 4-2 and 4-3.

RMP 1 functioned normally.

The Forward Scanner pressure continues its slow decrease.

Pressure/temperature ratios have all been satisfactory.

Tables 4-1, 4-2 and 4-3 are summaries of telemetry values for Landsat-1's Attitude Control Subsystem.

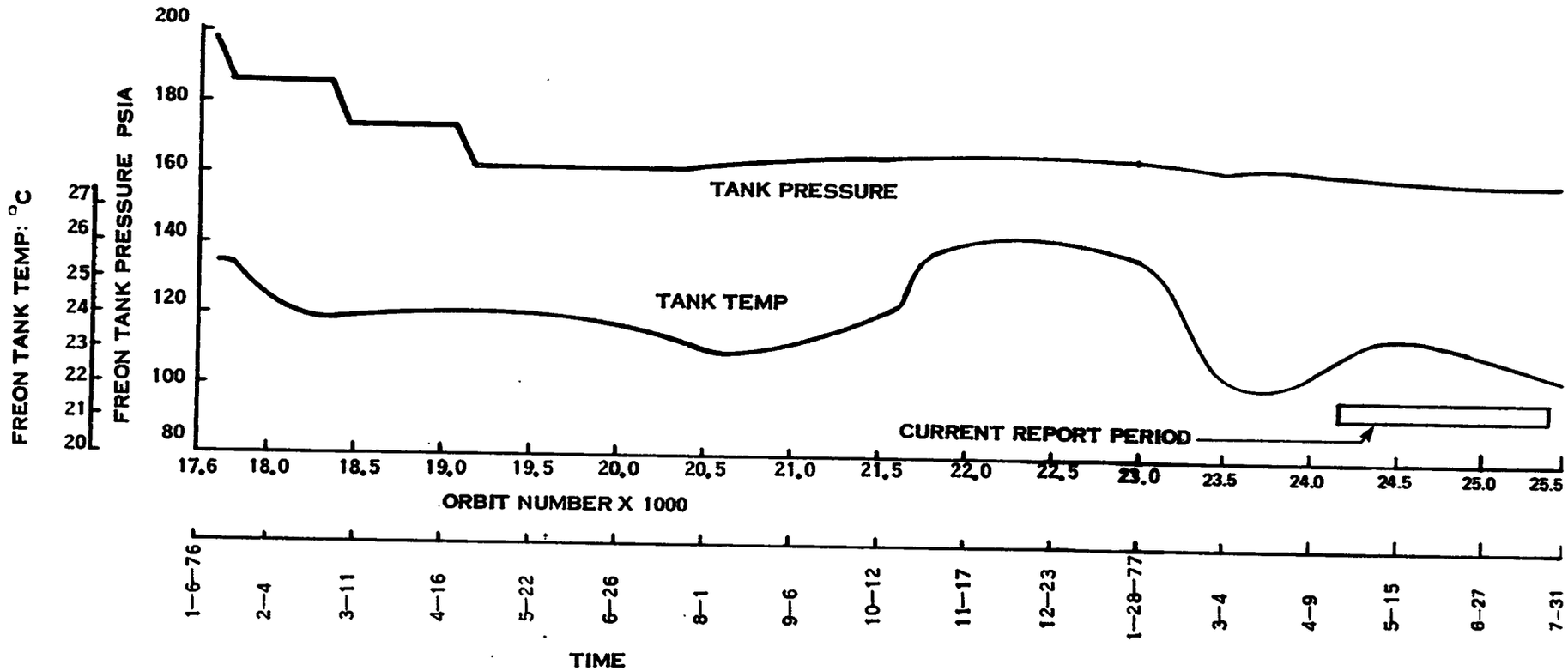
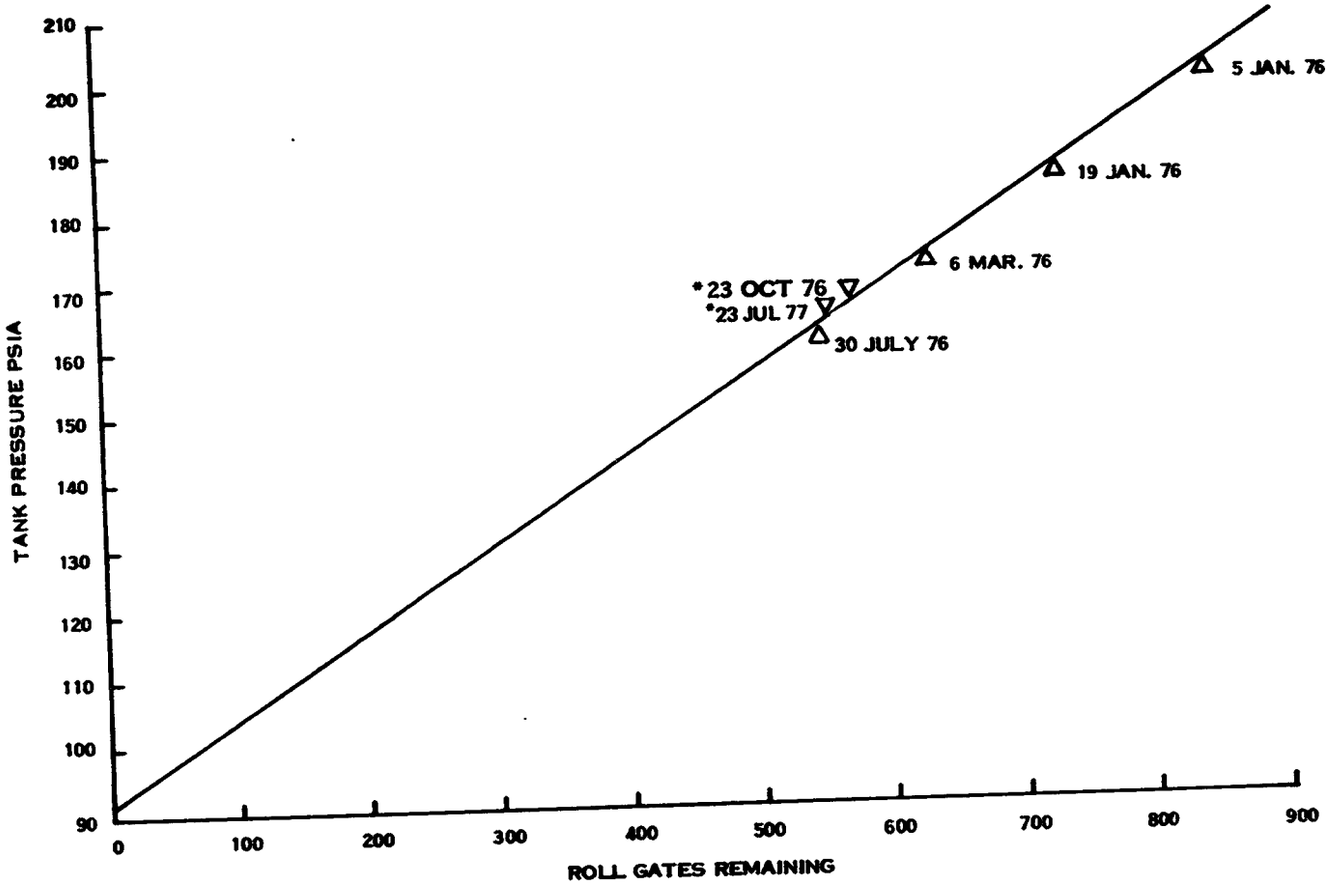


Figure 4-1. Landsat-1 Freon History (Telemetry Values)



*PRESSURE SHOWN IS GREATER THAN 30 JULY 76 DATA DUE TO SEASONAL TEMPERATURE EFFECTS AND TELEMETRY GRANULARITY

Figure 4-2. Landsat-1 Pressure - Roll Gate Prediction

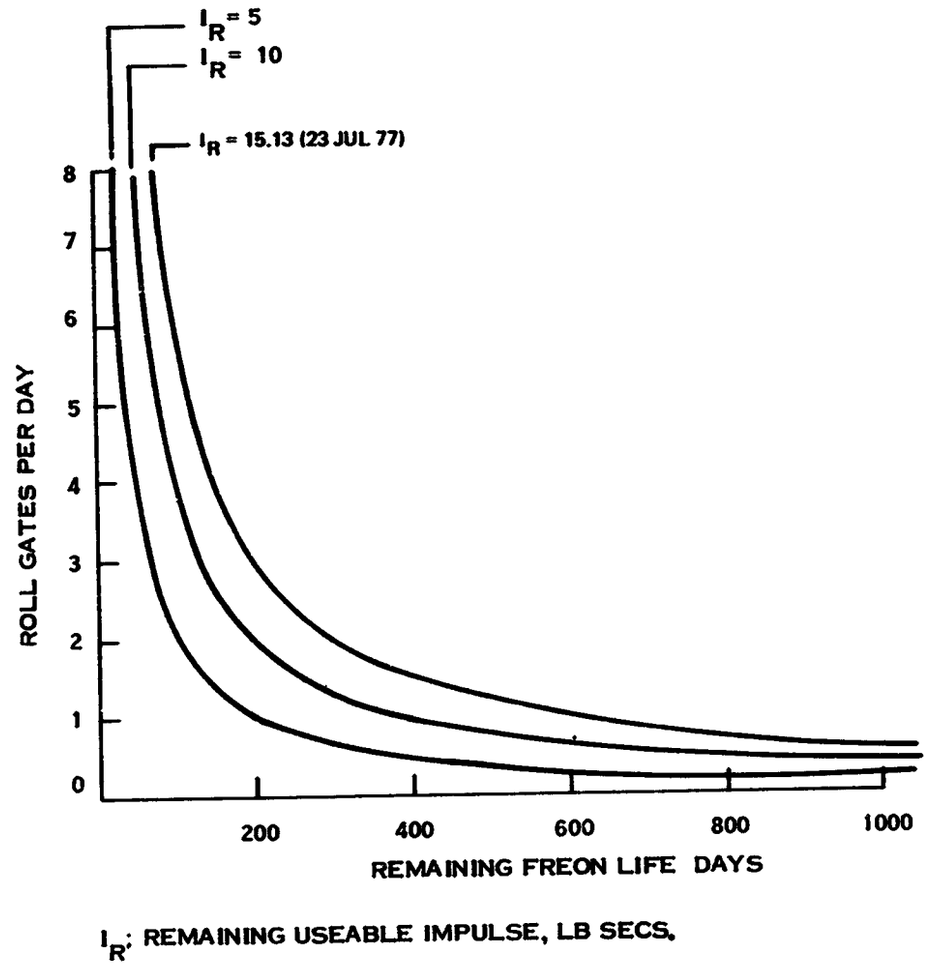


Figure 4-3. Landsat-1 Remaining Freon Life vs Gating Frequency

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

Function	Units	Orbit								
		31	5099	10182	15254	20364	22928	24618	25050	25455
1084 RMP 1 Gyro Temperature	DGC	44.5	23.06	21.22	12.40	41.47	43.35	41.77	41.66	40.71
1094 RMP 2 Gyro Temperature	DGC	74.3	75.10	43.45	24.05	23.49	26.44	24.13	23.77	23.15
1222 SAD RT MTR HSING Temp	DGC	21.1	22.00	20.55	22.89	21.70	22.97	21.96	21.59	20.73
1242 SAD LT MTR HSING Temp	DGC	27.0	30.38	28.18	29.53	28.88	31.92	29.51	29.04	28.32
1223 SAD RT MTR WNDNG Temp	DGC	25.3	26.54	24.63	27.06	25.74	26.15	25.71	25.33	24.15
1243 SAD LT MTR WNDNG Temp	DGC	28.7	32.92	30.32	31.98	31.40	34.71	32.05	31.49	30.72
1228 SAD RT HSG Pressure	PSI	7.6	7.35	7.12	6.88	6.70	6.53	6.53	6.50	6.45
1248 SAD LT HSG Pressure	PSI	7.0	6.86	6.47	6.18	5.90	5.79	5.67	5.63	5.64
1007 FWD Scanner MTR Temp	DGC	19.8	19.88	18.46	20.36	19.16	20.68	19.27	18.94	18.20
1016 Rear Scanner MTR Temp	DGC	20.5	19.83	17.86	19.24	18.87	20.48	18.99	18.63	17.94
1003 FWD Scanner Pressure	PSI	4.6	4.02	3.50	3.00	2.60	2.20	2.21	2.20	2.00
1012 Rear Scanner Pressure	PSI	7.8	7.87	7.44	6.97	6.74	6.51	6.32	6.29	6.28
1212 Gas Tank Pressure	PSI	1988.0	1702.34	1454.19	235.44	162.92	165.64	162.41	161.64	163.20
1210 Gas Tank Temperature	DGC	22.6	24.30	22.56	24.36	23.22	25.53	23.73	23.22	22.56
1213 Manifold Pressure	PSI	56.7	57.44	58.73	61.67	61.66	62.23	61.99	61.78	61.66
1211 Manifold Temperature	DGC	21.9	23.62	21.77	23.82	22.69	25.21	23.15	22.70	21.83
1059 CLB Power Supply Card Temp	DGC	37.1	40.54	38.83	40.58	39.55	42.22	40.21	39.89	38.99
1260 ACS Baseplate 1	DGC	25.4	27.93	25.36	26.54	26.01	29.31	26.72	26.23	25.61
1261 ACS Baseplate 2	DGC	22.9	24.73	23.00	25.05	24.21	26.98	24.78	24.31	23.58
1262 ACS Baseplate 3	DGC	23.4	23.69	21.97	24.95	23.89	25.91	24.33	23.88	23.01
1263 THO1 STS	DGC	-6.8	-0.97	-3.41	1.22	1.86	6.71	3.04	2.37	1.57
1264 THO2 STS	DGC	-14.6	-9.42	-8.27	-4.50	-3.17	1.33	-1.27	-2.72	-2.93
1265 THO3 STS	DGC	-3.1	9.31	7.58	12.92	15.02	20.25	15.58	16.31	16.80
1266 THO4 STS	DGC	-13.9	2.85	-1.85	2.40	3.05	6.47	1.81	3.84	3.15
1267 THO5 STS	DGC	-8.9	-1.16	-5.17	2.92	4.80	13.08	5.93	5.69	4.61
1224 SAD R FSST	DGC	39.5	60.21	63.25	64.74	62.86	41.29	60.94	60.51	56.55
1244 SAD L FSST	DGC	27.1	51.11	53.21	54.69	53.22	58.83	54.50	53.42	52.90

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

Function	Units	Orbit								
		31	5099	10182	15254	20364	22928	24618	25050	25455
1057 CLB Power Supply Volts	TMV	2.8	2.78	2.78	2.78	2.77	2.78	2.77	2.77	2.77
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	-30.11	-30.14	-30.14	-30.14	-30.14	-30.11
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	.11	0.11	0.11	0.11	0.11	0.11
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	-23.78	-23.79	-23.77	-23.78	23.78	-23.80
1091 RMP 2 MTR Volts	VDC	-29.7	-29.63	-29.63	OFF	OFF	OFF	OFF	OFF	OFF
1092 RMP 2 MTR Current	Amps	0.10	0.10	0.11	OFF	OFF	OFF	OFF	OFF	OFF
1090 RMP 2 Supply Volts	VDC	-23.4	-23.41	-23.50	OFF	OFF	OFF	OFF	OFF	OFF
1320 SAD RT MTR WNDNG Volts	VDC	-4.8	-4.25	-3.89	-3.85	-4.20	- 3.70	- 3.68	- 3.68	- 3.68
1240 SAD LT MTR WNDNG Volts	VDC	-4.8	-4.09	-3.36	-3.13	-3.65	- 3.57	- 3.52	- 3.37	- 3.35
1227 SAD RT -15 VDC Conv.	VDC	14.9	14.88	14.89	14.87	14.87	14.85	14.88	14.87	14.87
1247 SAD LT -15 VDC Conv.	VDC	15.2	15.13	15.14	15.06	15.11	15.08	15.09	15.08	15.10
1056 CLB ± 6 VDC	TMV	2.4	2.35	2.35	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	2.73	2.74	2.73	2.73	2.73

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

Function	Units	Orbits								
		13198	13569	14001	15254	20364	22928	24618	25050	25455
1141 Pitch Fine-Error *	DEG	- 0.40	- 0.08	- 0.02	- 2.13	-.11	- 0.78	- 0.06	- 0.08	- 0.06
1143 Pitch Flywheel Speed	RPM	- 10.49	- 26.86	- 1.21	12.92	-76.17	-36.64	-51.85	-68.76	-58.01
1038 Pitch MTR DRVR CCW	PCT	4.96	5.81	4.55	3.28	2.69	1.10	2.45	2.78	1.73
1039 Pitch MTR DRVR CW	PCT	2.29	2.17	5.10	19.65	1.04	0.35	0.29	0.12	0.26
1030 Roll Fine Error **	DEG	- 2.35	- 0.20	- 0.20	- 2.52	-2.70	- 2.47	- 1.48	- 2.71	- 2.68
1127 Roll Rear Flywheel Speed	RPM	715.78	756.92	782.08	714.05	720.25	734.76	726.82	719.42	718.42
1126 Roll Fwd Flywheel Speed	RPM	641.82	674.47	693.31	641.32	640.80	650.05	648.01	640.21	640.29
1022 Roll Rear MTR DRVR CCW	PCT	0.01	0.68	0.90	.13	.96	0.00	0.08	0.00	0.00
1025 Roll Rear MTR DRVR CW	PCT	4.26	5.22	5.52	4.17	5.61	4.84	5.04	4.99	4.83
1023 Roll Fwd MTR DRVR CCW	PCT	0.01	0.66	0.72	.08	.99	0.00	0.04	0.01	0.02
1024 Roll Fwd MTR DRVR CW	PCT	4.15	4.94	5.35	4.24	5.16	4.09	4.27	4.24	4.32
1035 Yaw Tach	RPM	-206.08	-116.50	- 93.72	-169.52	-200.01	- 191.10	-140.75	-217.28	-225.26
1033 Yaw MTR DRVR CW	PCT	0.04	1.53	1.84	.09	.05	0.11	0.40	0.00	0.00
1034 Yaw MTR DRVR CCW	PCT	0.07	1.60	1.76	.68	.67	0.64	0.79	0.66	0.73
1221 SAD Right Tach	DEG/MIN	3.37	3.37	2.81	3.37	3.40	4.30	3.41	3.42	3.46
1241 SAD Left Tach	DEG MIN	2.80	2.81	2.81	2.79	2.79	2.74	2.77	2.78	2.82

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

* Pitch Fine Error is high due to use of Pitch Position Bias (PPB) to control Pitch wheel speed on some orbits which raise the average error above that of normal attitude without PPB.

** Roll Fine Error is high due to use of High Gain Roll Differential Tachometer mode to control Roll wheel speed which raises the average error above that of normal attitude in Normal Gain Roll Differential Tachometer mode.

SECTION 5

COMMAND CLOCK SUBSYSTEM (CMD)

LANDSAT-1

SECTION 5

COMMAND/CLOCK SUBSYSTEM (CMD)

The Command Clock Subsystem operated nominally in this report period. Figure 5-1 shows the history of the S/C clock drift since launch. Figure 5-2 shows the cumulative clock drift, 16.964 seconds slower in 60 months, and Figure 5-3 gives the drift rate of the S/C clock, an average of 0.666 msec slow per orbit. In this period, the drift rate is at the average rate of 0.094 msec slow per orbit. The clock in Landsat-1 drifts in opposite direction from the clock of Landsat-2.

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

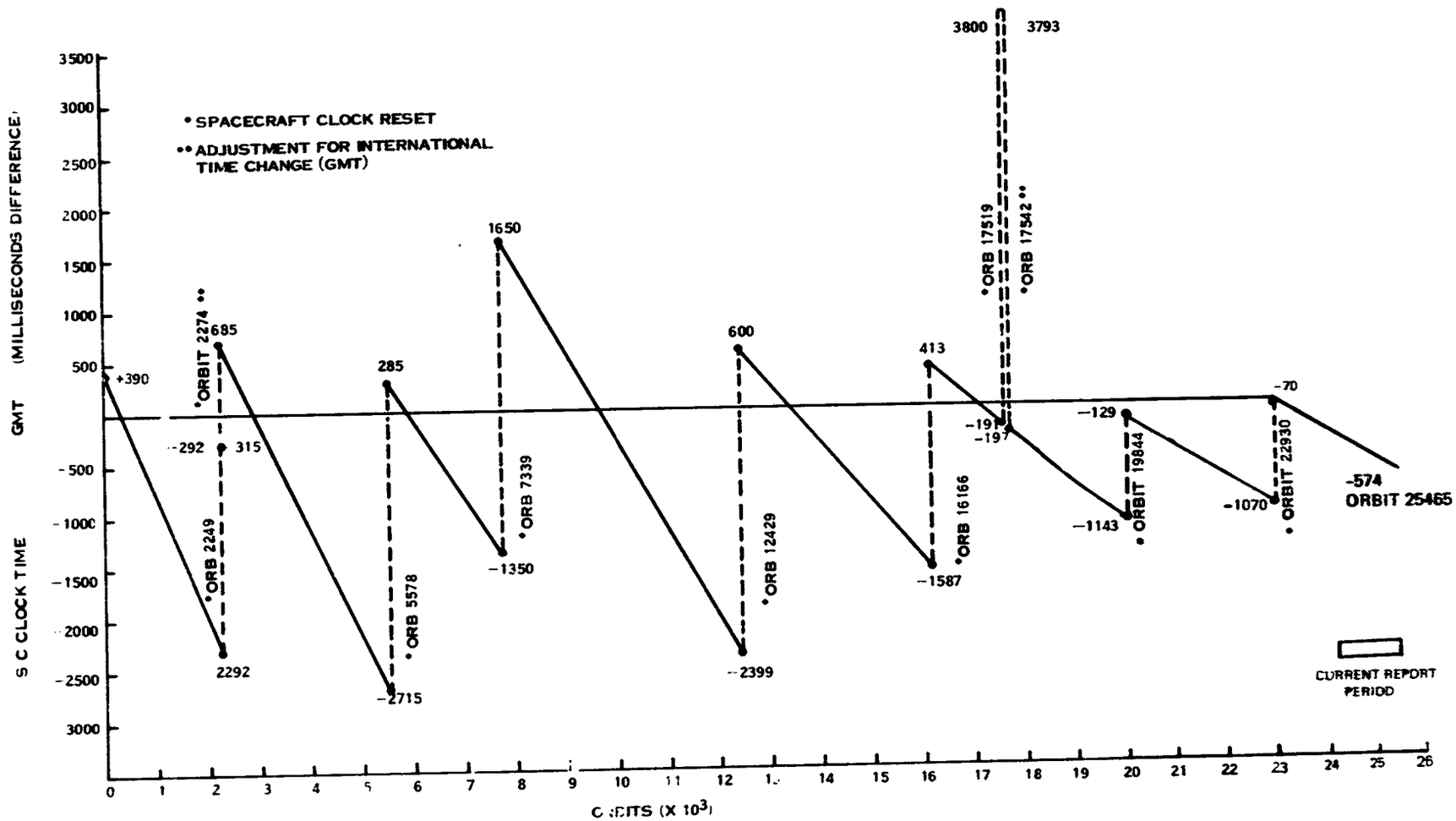

Figure 5-1. Landsat-1 Spacecraft Clock Drift History

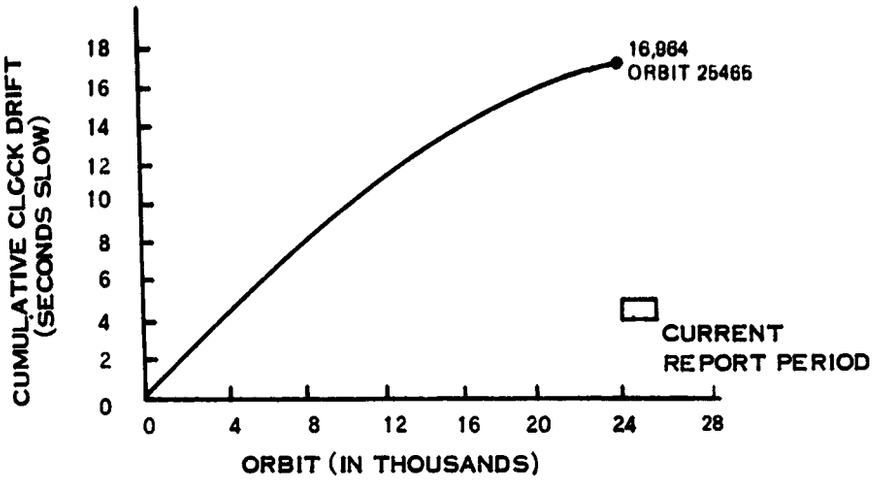

Figure 5-2. Cumulative Clock Drift

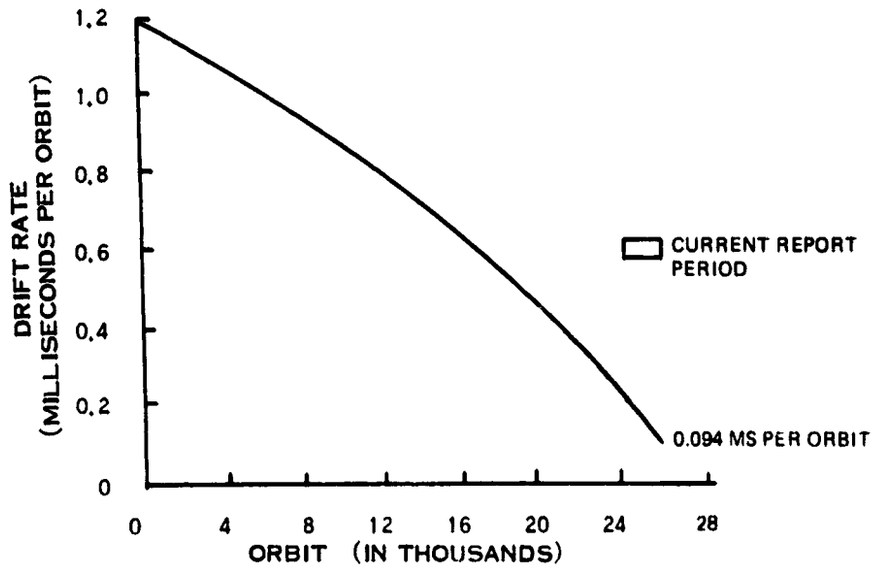

Figure 5-3. Drift Rate of Spacecraft Clock

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

Function No.	Name	Mode	Units	Orbit								
				35	5099	10162	15233	20364	22928	24618	25050	25455
8005	Pri. Power Supply Temp	-	°C	37.31	39.37	39.50	38.26	38.00	38.08	36.96	36.93	36.96
8006	Red. Power Supply Temp		°C	35.73	38.08	38.48	37.06	37.33	37.16	36.04	36.02	36.05
8007	Pri. Osc. Temp		°C	31.14	31.98	32.11	31.44	31.04	31.38	29.41	29.40	29.61
8008	Red. Osc. Temp		°C	30.47	31.19	31.32	30.48	30.18	30.59	28.61	28.61	28.70
8009	Pri. Osc. Output		TMV	0.95	0.96	0.97	0.97	0.95	0.96	0.95	0.95	0.95
8010	Red. Osc. Output	-	TMV	**	**	**	**	**	**	**	**	**
8011	100 kHz	Pri.-Red.	TMV	3.11	3.10	3.11	3.12	3.11	3.10	3.10	3.10	3.10
8012	10 kHz	Pri.-Red.	TMV	3.10	3.07	3.08	3.08	3.08	3.07	3.07	3.07	3.07
8013	2.5 kHz	Pri. Red.	TMV	2.95	2.95	2.95	2.96	2.95	2.95	2.95	2.95	2.95
8014	400 Hz	Pri.-Red.	TMV	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
8015	Pri. +4 V Power Supply	Pri. Clk ON	VDC	4.10	4.10	4.10	4.10	4.08	4.08	4.07	4.07	4.06
8016	Red. +4 V Power Supply	Red. Clk ON	VDC	3.95	3.95	3.95	3.95	3.92	3.91	3.91	3.91	3.91
8017	Pri. +6 V Power Supply	Pri. Clk ON	VDC	6.06	6.07	6.07	6.11	6.06	6.06	6.07	6.06	6.06
8018	Red. +6 V Power Supply	Red. Clk ON	VDC	6.00	5.94	5.94	5.97	5.93	5.93	5.93	5.93	5.93
8019	Pri. -6 V Power Supply	Pri. Clk On	VDC	-6.02	-6.02	-6.03	-6.04	-6.02	-6.02	-6.02	-6.02	-6.02
8020	Red. -6 V Power Supply	Red. Clk ON	VDC	-5.99	-6.00	-6.000	-6.01	-5.99	-5.99	-5.99	-5.99	-5.99
8021	Pri. -23 V Power Supply	Pri. Clk ON	VDC	-22.88	-22.89	-22.89	-22.95	-22.88	-22.88	-22.89	-22.88	-22.88
8022	Red. -23 V Power Supply	Red. Clk ON	VDC	-22.98	-23.00	-23.01	-23.06	-22.99	-22.99	-22.99	-22.98	-22.98
8023	Pri. -29 V Power Supply	Pri. Clk ON	VDC	-29.13	-29.16	-29.15	-29.15	-29.16	-29.15	-29.14	-29.14	-29.15
8024	Red. -29 V Power Supply	Red. Clk ON	VDC	-29.07	-29.21	-29.21	-29.21	-29.21	-29.21	-29.21	-29.21	-29.21
8101	CIU A -12 V	CIU A ON	VDC	-12.33	-12.33	-12.34	-12.35	-12.34	-12.31	-12.34	-12.34	-12.34
8102	CIU B -12 V	CIU B ON	VDC	-12.26	-12.23	-12.25	-12.20	-12.24	-12.25	-12.24	-12.24	-12.24
8103	CIU A -5 V	CIU A ON	VDC	-5.32	-5.34	-5.34	-5.31	-5.34	-5.34	-5.34	-5.34	-5.34
8104	CIU B -5 V	CIU B ON	VDC	55.31	-5.31	-5.31	-5.31	-5.31	-5.31	-5.30	-5.30	-5.31
8105	CIU A Temp	CIU A ON	°C	24.47	34.77	25.04	24.09	24.11	25.10	23.48	23.42	23.73
8106	CIU B Temp	CIU B ON	°C	24.96	25.31	25.45	24.48	24.44	25.73	23.79	23.74	24.01
8201	Receiver RF-A Temp	-	°C	**	**	28.67	27.53	26.88	27.45	25.58	25.57	25.89
8202	Receiver RF-B Temp	-	°C	27.98	28.22	**	**	17.47	18.31	15.79	15.82	16.22
8203	D MOD A Temp	-	°C	25.41	25.73	37.98	37.31	36.40	37.12	35.22	35.25	35.62
8204	D MOD B Temp	-	°C	35.03	35.61	26.12	25.27	24.10	25.11	22.34	22.39	22.83
8205	Receiver A AGC	Receiver A ON	DBM	**	**	-96.77	-85.62	-95.73	-93.44	-93.91	-95.19	-92.33
8206	Receiver B AGC	Receiver B ON	DMB	-94.74	-84.67	**	**	**	**	**	**	**
8207	Amp. A Output	Receiver A ON	TMV	**	**	2.31	2.94	2.46	2.47	2.52	2.49	2.66
8208	Amp. B Output	Receiver B ON	TMV	2.81	3.22	**	**	**	**	**	**	**
8209	Freq. Shift Key A Out	Receiver A ON	TMV	**	**	1.10	1.11	1.10	1.11	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	1.10	1.10	1.10	1.11	1.11	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	4.99	5.00	4.98	4.98	4.98
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	5.38	5.40	5.37	5.37	5.38
8218	Regulator B -10 V	Receiver B ON	TMV	5.50	5.50	**	**	**	**	**	**	**

**Units not in use

SECTION 6

TELEMETRY SUBSYSTEM (TLM)
LANDSAT-1

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SECTION 6

TELEMETRY SUBSYSTEM (TLM)

The Telemetry Subsystem has performed nominally during this report period.

Landsat-1 used Memory Section 0, 0 until Orbit 12,565, 10 January 1975, after which it was reprogrammed to Memory Section 1, 1 to be compatible with Landsat-2 telemetry matrix. Memory Section 1, 1 continues to be used in the telemetry matrix.

Table 6-1 shows typical telemetry values since launch.

Table 6-1. TLM Telemetry Summary

Function No.	Function Name	Unit	Orbit							
			35	5099	10592	15233	22928	24618	25050	25155
9001	Memory Sequencer A Converter	VDC	6.35	6.33	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	24.09	20.82	20.90	21.60
9004	Formatter A Converter	VDC	5.99	5.99	5.99	5.99	6.02	5.99	5.99	6.00
9005	Format B Converter	VDC	**	**	**	**	**	**	**	**
9006	Dig. Mux A Converter	VDC	10.01	10.04	10.07	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	37.50	27.31	26.98	29.96
9009	Analog Mux A Converter	VDC	26.01	21.18	26.20	26.32	26.35	26.35	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	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	32.50	27.38	27.47	28.49
9014	Preregulator A Voltage	VDC	19.93	19.95	19.94	19.98	20.00	19.89	19.89	19.93
9015	Preregulator B Voltage	VDC	**	**	**	**	**	**	**	**
9016	Reprogrammer Temp	°C	22.00	22.50	22.53	22.50	32.48	23.61	23.11	25.93
9017	Memory A Converter	VDC	6.00	5.99	6.00	5.97	6.00	5.97	5.97	5.97
9018	Memory A Temp	°C	17.51	17.50	17.50	17.50	19.92	16.83	16.69	17.50
9019	Memory B Converter	VDC	**	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.68	17.63	17.51	17.50	20.61	17.05	16.97	17.51
9100	Reflected Power (Xmtr A)	dBm	11.95	12.32	12.38	11.37	13.86	12.13	11.78	12.50
9101	Xmtr B -20 VDC	VDC	-19.75	-19.76	-19.75	-19.84	19.75	-19.76	-19.75	-19.75
9102	Xmtr B -20 VDC	VDC	**	**	**	**	**	**	**	**
9103	Xmtr A Temp	°C	20.95	21.14	22.01	21.98	41.98	25.92	25.17	29.58
9104	Xmtr B Temp	°C	21.69	21.95	22.76	22.91	43.10	27.11	26.35	30.88
9105	Xmtr A Power Output	dBm	25.12	25.35	25.24	25.00	25.10	24.71	24.55	24.62
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 51 times, 26 times using the -X thruster and 25 times using the +X thruster.

The subsystem pressure/temperature parameters continue to be normal. There are 64.43 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.

Table 7-1. Landsat-1 Orbit Adjust Summary

Orbit	Orbit Adjust No.	Ignition Epoch	Burn Duration (Seconds)	+ Δ a (Meters)	Engine Performance Efficiency	Fuel[1] Used (Lbs)	Tank Pressure (PSIA)	Tank Temperature (°F)	Axis Thruster
38	1	26 Jul 72 11:25:0.0	4.8	12	30%		540	75	-X
44	2	26 Jul 72 21:44:46	250.0	1975	103.4%	2.15	U[2]	U[2]	-X
59	3	27 Jul 72 23:34:45	318.0	2391	101.5%		516	73.9	-X
938	4	29 Sep 72 00:30:00	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
19717	12	8 June 76 19:56:00.4	2.4	-19.3	102.1%	0.01	490.59	70.1	+X
19871	13	17 June 76 17:22:00.4	2.4	-19.9	105.8%	0.01	486.84	69.4	+X
21613	14*	20 Oct 76 15:28:01.2	2.4	-16.2	85.3	0.01	494.34	73.2	+X
21616	15*	20 Oct 76 20:34:01.2	2.4	15.3	86.0%	0.01	494.34	73.2	-X
21627	16	21 Oct 76 15:33:01.2	5.2	39.2	103.2%	0.02	494.34	73.2	-X
21641	17	22 Oct 76 15:48:01.2	5.2	39.9	105.0	0.02	494.34	72.4	-X
21655	18	23 Oct 76 15:47:01.2	5.2	40.0	105.3	0.02	494.34	72.4	-X
21669	19	24 Oct. 76 15:50:01.2	5.2	39.6	103.4	.02	490.59	72.4	-X
21683	20	25 Oct. 76 15:57:01.2	5.2	39.1	103.7	.02	490.59	72.4	-X
21697	21	26 Oct. 76 16:06:01.2	5.2	37.8	100.3	.02	490.59	72.4	-X
21710	22	27 Oct. 76 14:21:01	5.2	42.1	112.5	.02	490.59	72.4	-X
21724	23	28 Oct. 76 14:30:01.2	5.2	39.6	105.0	.02	490.59	72.4	-X
21738	24	29 Oct. 76 14:36:01.2	5.2	40.5	107.4	.02	490.59	72.4	-X
21752	25	30 Oct. 76 [illegible]	5.2	40.7	108.0	.02	490.59	72.4	-X
21766	26	31 Oct. 76 14:47:01.2	5.2	36.5	96.8	.02	490.59	72.4	-X
21780	27	1 Nov. 76	5.2	42.4	113.1	.02	486.84	73.2	-X

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21710	22	27 Oct. 76 14:24:01	5.2	42.4	112.5	.02	490.59	72.4	-X
21724	23	28 Oct. 76 14:30:01.2	5.2	39.6	105.0	.02	490.59	72.4	-X
21738	24	29 Oct. 76 14:36:01.2	5.2	40.5	107.4	.02	490.59	72.4	-X
21752	25	30 Oct. 76 14:44:01.2	5.2	40.7	108.0	.02	490.59	72.4	-X
21766	26	31 Oct. 76 14:47:01.2	5.2	36.5	96.8	.02	490.59	72.4	-X
21780	27	1 Nov. 76 14:52:01.2	5.2	42.4	113.1	.02	486.84	73.2	-X
21794	28	2 Nov. 76 14:59:01.2	5.2	42.0	112.0	.02	486.84	73.2	-X
21808	29	3 Nov. 76 15:07:01.2	5.2	35.6	96.8	.02	486.84	73.2	-X
21822	30	4 Nov. 76 15:10:01.2	5.2	38.0	101.3	.02	486.84	73.2	-X
21836	31	5 Nov. 76 15:16:01.2	5.2	40.3	107.5	.02	486.84	73.2	-X
21878	32	8 Nov. 76 15:34:01.2	5.2	39.7	105.9	02	486.84	73.2	-X
21892	33	9 Nov. 76 15:45:01.2	5.2	37.9	101.1	.02	486.84	73.2	-X
22714	34	7 Jan. 77 14:36:01.2	5.2	-40.7	100.7	.02	490.59	76.9	+X
22756	35	10 Jan. 77 14:50:01.2	5.2	-41.2	102.0	.02	490.59	76.9	+X
22770	36	11 Jan. 77 15:02:01.2	5.2	-41.4	102.5	.02	490.59	77.9	+X
22799	37	13 Jan. 77 16:52:00	5.2	-41.6	103.0	.02	490.59	77.6	+X
22812	38	14 Jan. 77 15:14:01.2	5.2	-39.8	98.5	.02	490.59	77.6	+X
22828	39	15 Jan. 77 15:18:11.2	5.2	-40.2	99.5	.02	490.59	77.6	+X
22840	40	16 Jan. 77 15:25:01.2	5.2	-41.7	103.2	.02	490.59	78.4	+X
22854	41	17 Jan. 77 15:31:01.2	5.2	-40.6	100.5	.02	490.59	78.1	+X
22868	42	18 Jan. 77 15:36:01.2	5.2	-41.8	103.5	.02	490.59	79.1	+X
22882	43	19 Jan. 77 15:42:01.2	6.0	-48.5	104.1	.02	490.59	79.1	+X
22896	44	20 Jan. 77 15:48:01.2	6.0	-48.7	104.5	.02	490.59	79.1	+X
22910	45	21 Jan. 77 15:53:01.2	6.0	-47.0	100.9	.02	490.59	79.1	+X
22923	46	22 Jan. 77 14:17:01.2	6.0	-48.2	103.4	.02	490.59	79.1	+X
22937	47	23 Jan. 77 14:25:01.2	6 6.0	-47.8	102.6	.02	490.59	79.1	+X
22951	48	24 Jan. 77 14:31:01.2	6.0	-47.4	102.4	.02	486.84	79.1	+X
22965	49	25 Jan. 77 14:34:01.2	6.0	-47.6	102.8	.02	486.84	79.1	+X
23007	50	28 Jan. 77 14:51:01.2	1.2	-9.9	103.1	.00	486.84	79.9	+X
24822	51	7 June 77 18:23:01.2	4.8	-35.5	98.1	.02	472.21	68.6	+X

*Test Burns

1 Initial Fuel Capacity - 67 lbs.
2 Unavailable

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FOLDOUT FRAME 2

Table 7-2. Landsat-1 OAS Telemetry Values

Function No.	Name	Units	Orbit								
			35	5099	10182	15254	20364	22928	24618	25050	25455
2001	Prop. Tank Temp.	°C	22.03	22.86	23.28	21.62	21.20	26.19	20.78	20.39	21.61
2003	Thrust Chamber No. 1 (-x) Temp.**	°C	29.57	29.93	30.55	30.52	27.32	22.78	25.37	24.63	22.62
2004	Thrust Chamber No. 2 (+x) Temp.**	°C	38.76	40.28	38.91	36.25	35.20	34.63	32.77	33.90	32.93
2005	Thrust Chamber No. 3 (-y) Temp.**	°C	34.55	34.41	36.09	38.45	43.88	71.18	48.77	48.70	53.63
2006	Line Pressure	psia	539.29	486.87	490.61	486.87	489.66	490.47	472.96	471.96	475.66

**Wide spread of temperature is due to nozzle locations and satellite day/night transitions relative 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)

From launch through this report period Landsat-1's MMCA has been energized eleven times in seven orbits, i.e., Orbits 73, 85, 110, 220, 11181, 11185* and 11186*. The MMCA was operated in the early orbits to reduce +Roll pneumatic gating. (*Energized 3 times in one orbit).

In Orbits 11181 and 11186, it was energized in the plus and minus Yaw dipole configuration respectively in order to save freon gas by reducing the amplitude of the Pitch flywheel orbit frequency oscillation. In a short successful test during Orbit 11185 the plus Roll dipole was temporarily energized to determine if a positive roll dipole at the poles could unload the pitch flywheel. Upon test completion the Roll dipole was returned to 500 pole-cm.

No dipole adjustments were made during 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	20364	22928	24618	25050	25455
4001	A1 Board Temp	°C	19.77	19.03	19.11	17.59	16.69	18.05	15.50	15.66	16.14
4002	A2 Board Temp	°C	23.58	23.05	23.13	21.83	21.05	22.26	20.08	20.17	20.60
4003	Hall Current	TMV	3.48	3.48	3.48	3.47	3.48	3.47	3.47	3.47	3.48
4004	Yaw Flux Density	TMV	3.11	3.11	3.15	4.02	4.03	4.04	4.04	4.04	4.04
4005	Pitch Flux Density	TMV	3.13	2.51	2.52	2.52	2.52	2.52	2.52	2.52	2.52
4006	Roll Flux Density	TMV	3.19	3.19	3.20	3.28	3.28	3.28	3.28	3.28	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 performed all functions nominally during this period.

Table 9-1 shows telemetry values since launch. All are nominal.

Figure 9-1 shows the USB power output history since launch. 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	20364	22928	24618	25050	25455
11001	USB Rcvr AGC	DBM	-122.78	-131.99	-129.81	-105.41	-132.06	-127.95	-128.62	-128.93	-126.09
11002	USB Xmtr Pwr	WTS	1.60	0.29	1.54	1.53	1.55	1.56	1.53	1.56	1.44
11003	USB Rcvr Error	KHZ	21.79	-21.32	-23.25	-18.01	-21.76	-21.44	-21.94	-22.44	-23.02
11004	USB Xpond Temp	DGC	22.92	22.64	25.64	25.11	25.37	37.31	26.61	26.51	28.59
11005	USB Xpond Press	PSI	15.91	15.91	15.92	15.94	15.90	16.72	16.09	16.06	16.19
11007	USB Xmtr A -15V	VDC	-15.20	-15.20	**	**	**	**	**	**	**
11008	USB Xmtr B -15V	VDC	**	**	-15.20	-15.20	-15.20	-15.20	-15.20	-15.20	-15.20
11109	USB Range -15V	VDC	-14.76	-14.76	-14.58	-14.58	-14.58	-14.58	-14.58	-14.58	-14.58
11101	PMP Pwr A Volt	VDC	-15.12	-15.18	**	**	**	**	**	**	**
11102	PMP Pwr B Volt	VDC	**	**	-15.12	-15.12	-15.12	-15.11	-15.12	-15.10	-15.12
11103	PMP Temp A	DGC	30.44	30.23	26.60	26.09	26.62	43.53	28.98	28.60	32.67
11104	PMP Temp B	DGC	**	**	31.64	31.67	31.12	47.58	33.39	33.21	37.04

**Units Not in Use

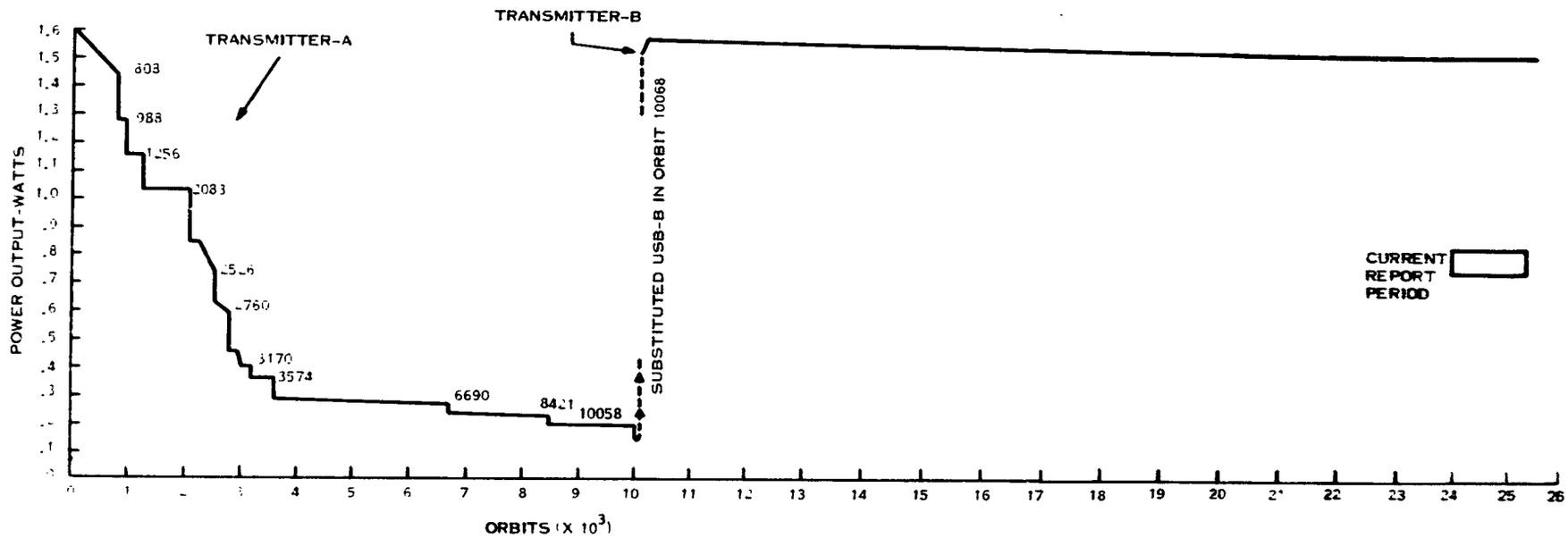

Figure 9-1. USB Power Output History (Landsat-1)

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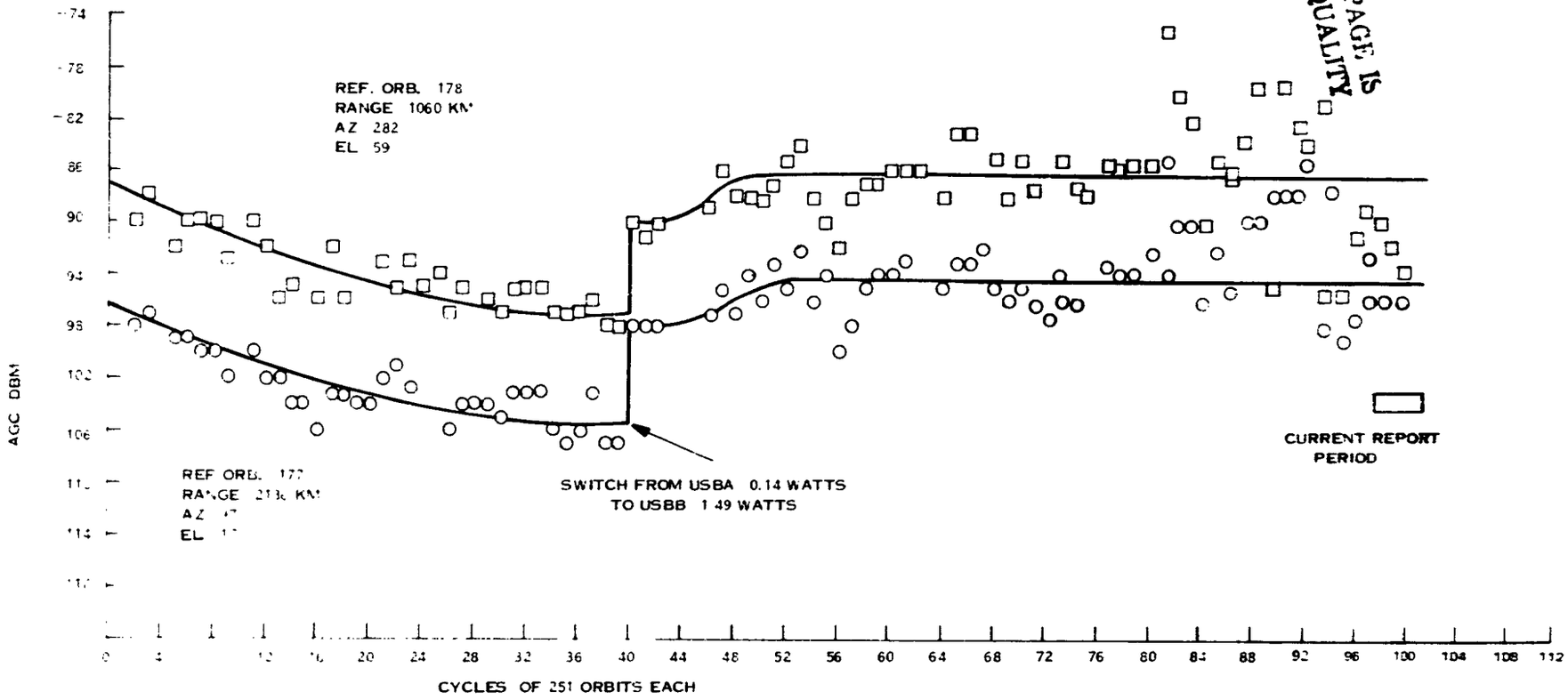

Figure 9-2. USB (Link 4) AGC Readings at Goldstone with 30' Antenna, Landsat-1

SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM (EIS)
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

			Orbit								
Functions	Description	Unit	7	5098	10182	15254	20364	22928	24618	25050	25455
13200	APU, -24.5 VDC	VDC	-24.90	-24.90	-24.91	-24.90	-24.90	-24.90	-24.89	-24.89	-24.89
13201	APU, -12 Volts	VDC	-12.08	-12.08	-12.07	-12.06	-12.05	-12.05	-12.05	-12.05	-12.05
13202	APU Temp.	DGC	25.49	26.95	27.15	26.82	27.31	35.35	27.57	27.33	28.93

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.

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SECTION 11

THERMAL SUBSYSTEM (THM)
LANDSAT-1

SECTION 11

THERMAL SUBSYSTEM (THM)

The Thermal Subsystem continues to operate satisfactorily.

Since the time of launch, the right sun sensor on Landsat-1 has registered temperatures higher than expected. This is due to the particular location and bonding techniques used for the sensor. During Orbit 4396 (3 June 1973) telemetry function 7101 (THM TH07 ST1) became disabled when four telemetry gates mounted on one integrated circuit chip failed.

Landsat-1 experiences an annual cycle of high and low temperatures due to a combination of high sun intensity and sun angle, and to longer satellite days. The cycles of sun angle and length of satellite day reach higher and higher peaks in successive years due to the drift in the satellite's orbital plane. During February 1977, Landsat-1 experienced high temperatures, especially along bays 11 through 17, which are normally warmer than others.

During this report period the sun intensity ranged between 0.989 and 0.969 of the mean annual value and the spacecraft temperatures decreased. Figure 11-1 shows a typical thermal profile for average bay temperatures of the sensory ring at the end of this report period.

Table 11-1 shows average analog telemetry values from data recorded on the NBR, for selected orbits since launch.

The compensation load configuration on Landsat-1 has been switched several times to balance temperatures among spacecraft components. A history of compensation load switching 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			Orbit								
No.	Description	Unit	26	5098	10182	15254	20364	22928	24618	25050	25455
7001	THM TH01 ST1	DGC	19.52	20.85	21.65	19.48	18.72	22.17	18.31	18.32	19.37
7002	THM TH02 SBO	DGC	18.60	19.95	20.60	18.62	17.87	19.05	17.21	17.32	17.68
7003	THM TH03 STI	DGC	18.48	20.16	20.87	18.11	17.20	19.19	16.20	16.18	16.79
7004	THM TH10 TCB	DGC	19.47	20.25	20.36	19.76	19.75	24.57	19.46	19.23	20.05
7005	THM TH04 STI	DGC	18.39	19.71	20.35	17.86	17.08	18.52	16.02	15.99	16.45
7006	THM TH05 SBO	DGC	17.57	18.39	18.81	17.20	16.47	17.14	15.67	15.74	16.12
7007	OA-X THRUSTER	DGC	21.95	22.95	22.90	22.25	21.33	21.80	20.21	20.07	20.02
7008	THM TH06 STO	DGC	15.95	16.61	16.90	15.34	14.52	15.16	13.52	13.54	13.94
7009	THM TH06 SBI	DGC	19.38	20.35	20.93	18.98	17.86	19.02	16.73	16.76	17.34
7010	THM TH07 STI	DGC	18.61	*	*	*	*	*	*	*	*
7011	THM TH08 STO	DGC	21.78	22.77	22.88	22.03	21.17	21.27	19.98	19.89	19.88
7012	THM TH09 SBI	DGC	21.81	22.87	23.08	22.20	21.66	23.09	20.22	20.15	20.53
7013	THM TH10 SBO	DGC	18.73	19.53	19.64	19.00	18.56	21.00	17.95	17.72	18.14
7014	THM TH11 STI	DGC	22.37	23.35	23.57	22.80	22.88	28.82	22.50	22.29	23.52
7015	THM TH12 SBO	DGC	22.37	23.17	23.03	22.86	23.71	34.60	24.94	24.39	26.48
7016	THM TH13 STI	DGC	20.95	22.02	22.47	22.00	22.89	35.27	24.30	23.88	26.60
7017	RBV BEAM CTR LN	DGC	21.53	22.62	22.84	21.88	21.63	24.85	20.26	20.16	20.98
7018	THM TH14 STO	DGC	20.38	21.40	21.93	21.83	23.19	39.86	25.50	25.06	28.89
7019	NBR RAD OUTBD B4	DGC	5.09	5.86	6.00	4.37	3.31	5.02	2.51	2.53	3.00
7020	THM TH15 SBI	DGC	21.14	23.24	23.99	22.18	23.06	36.93	24.48	24.18	27.64
7021	THM TH16 STI	DGC	20.73	22.90	23.68	21.64	21.68	32.84	22.47	22.27	25.14
7022	THM TH17 SBI	DGC	20.22	22.76	23.56	21.47	20.83	29.63	21.53	21.41	23.89
7023	THM TH18 SBO	DGC	21.90	24.29	25.19	23.47	22.56	28.16	22.54	22.96	24.63
7030	THM TH03 BUR	DGC	16.05	17.07	17.42	15.35	14.62	15.38	13.88	13.89	14.10
7031	THM TH06 BUR	DGC	13.59	14.17	14.28	12.87	12.07	12.46	11.06	11.05	11.32
7032	THM TH09 BUR	DGC	19.92	20.75	20.74	20.17	19.64	20.88	18.92	18.75	18.88
7033	THM TH12 BUR	DGC	21.51	22.16	22.76	22.65	23.67	36.54	25.35	24.76	27.16
7034	THM TH15 BUR	DGC	19.70	21.67	22.38	21.33	22.23	36.86	23.28	23.53	27.22
7035	THM TH18 BUR	DGC	20.11	21.36	22.02	20.54	20.07	23.54	19.54	20.06	21.15
7040	THM TH01 TCB	DGC	19.27	20.46	21.26	19.19	18.59	20.84	17.94	18.06	18.86
7041	THM TH02 TCB	DGC	17.99	19.23	19.89	17.80	17.11	18.27	16.46	16.50	16.90
7042	THM TH03 TCB	DGC	18.34	19.94	20.92	17.79	17.16	18.02	16.05	16.01	16.26
7043	THM TH04 TCB	DGC	18.95	19.94	20.26	18.60	18.00	18.84	17.30	17.32	17.62
7044	THM TH05 TCB	DGC	16.27	16.98	17.32	15.90	15.22	15.88	14.38	14.38	14.86
7045	THM TH07 TCB	DGC	18.41	19.21	19.45	18.25	17.46	17.96	16.30	16.31	16.56
7046	THM TH09 TCB	DGC	19.38	20.37	20.64	19.85	19.17	20.64	18.29	18.23	18.69
7048	THM TH11 TCB	DGC	21.98	22.94	23.18	22.80	23.18	30.53	23.48	23.13	24.50
7049	THM TH12 TCB	DGC	21.92	22.46	22.35	22.30	23.35	36.47	25.15	24.64	27.37
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	22.26	23.62	39.63	26.19	25.55	29.14
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	22.74	23.83	39.94	25.55	25.09	29.19
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	22.68	23.00	35.04	23.99	23.89	27.04
7053	THM TH17 TCB	DGC	21.73	24.03	25.02	23.33	21.89	28.64	22.24	22.30	24.18
7054	THM TH18 TCB	DGC	20.02	22.20	23.35	21.04	20.10	23.40	19.83	19.99	21.42
7060	THM SHUTTER BY 1	DEG	25.85	33.12	38.62	24.41	19.19	37.39	14.49	14.16	21.17
7061	THM SHUTTER BY 2	DEG	6.62	8.65	13.28	1.73	0.00	0.00	0.00	0.00	0.00
7062	THM SHUTTER BY 3	DEG	10.96	23.58	30.24	17.30	12.44	13.59	8.89	8.22	8.27
7063	THM SHUTTER BY 4	DEG	30.60	35.71	37.92	29.50	25.00	25.50	17.02	18.30	20.20
7064	THM SHUTTER BY 5	DEG	15.03	16.25	15.00	8.08	4.62	3.99	2.31	2.31	2.31
7065	THM SHUTTER BY 7	DEG	17.14	24.64	21.96	14.50	8.00	8.50	4.50	4.50	4.50
7067	THM SHUTTER BY 9	DEG	33.26	38.44	39.50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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7049	THM TH12 TCB	DGC	21.92	22.46	22.35	22.30	23.35	36.47	25.15	24.64	27.37
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	22.26	23.62	39.63	26.19	25.55	29.14
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	22.74	23.83	39.94	25.55	25.09	29.19
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	22.68	23.00	35.04	23.99	23.89	27.04
7053	THM TH17 TCB	DGC	21.73	24.03	25.02	23.33	21.89	28.64	22.24	22.30	24.18
7054	THM TH18 TCB	DGC	20.02	22.20	23.35	21.04	20.10	23.40	19.83	19.99	21.42
7060	THM SHUTTER BY 1	DEG	25.85	33.12	38.62	24.41	19.19	37.39	14.49	14.16	21.17
7061	THM SHUTTER BY 2	DEG	6.62	8.65	13.28	1.73	0.00	0.00	0.00	0.00	0.00
7062	THM SHUTTER BY 3	DEG	10.96	23.58	30.24	17.30	12.44	13.59	8.89	8.22	8.27
7063	THM SHUTTER BY 4	DEG	30.60	35.71	37.92	29.50	25.00	25.50	17.02	18.30	20.20
7064	THM SHUTTER BY 5	DEG	15.03	16.25	15.00	8.08	4.62	3.99	2.31	2.31	2.31
7065	THM SHUTTER BY 7	DEG	17.14	24.64	21.96	14.50	8.00	8.50	4.50	4.50	4.50
7067	THM SHUTTER BY 9	DEG	33.26	38.44	39.50	38.24	37.50	41.00	34.20	33.75	36.56
7068	THM SHUTTER BY 10	DEG	24.68	28.68	27.31	26.03	24.26	56.48	0.00	0.00	0.00
7069	THM SHUTTER BY 11	DEG	39.66	46.89	48.96	46.97	48.40	64.69	48.59	46.62	54.65
7070	THM SHUTTER BY 12	DEG	43.81	46.63	45.68	45.95	52.19	67.97	59.58	57.83	66.56
7071	THM SHUTTER BY 13	DEG	40.39	46.38	44.79	42.84	44.43	62.62	56.86	54.73	62.25
7072	THM SHUTTER BY 14	DEG	34.20	39.70	41.91	34.28	34.65	49.00	33.81	32.33	42.35
7073	THM SHUTTER BY 15	DEG	45.40	58.74	64.79	55.15	63.60	80.64	71.94	70.55	79.59
7074	THM SHUTTER BY 16	DEG	24.50	48.46	53.54	38.76	40.06	68.80	45.85	43.89	60.09
7075	THM SHUTTER BY 17	DEG	39.06	54.96	61.88	51.06	39.95	78.98	44.15	43.47	57.03
7076	THM SHUTTER BY 18	DEG	29.70	43.15	51.20	35.12	28.09	49.77	26.70	26.46	38.26
7080	THM Q1 T ZENER V	VDC	8.19	8.19	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	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	8.31	8.31
7083	THM Q1 S ZENER V	VDC	8.31	8.32	8.35	8.31	8.31	8.35	8.32	8.31	8.31
7084	THM Q2 S ZENER V	VDC	8.19	8.19	8.20	8.19	8.19	8.23	8.19	8.19	8.19
7085	THM Q3 S ZENER V	VDC	8.15	8.15	8.15	8.15	8.15	8.16	8.15	8.15	8.15
7090	THM PSM MOUNT	DGC	21.60	22.54	22.98	21.43	20.98	26.34	20.17	20.08	21.40
7091	THM IND ATTITUDE	DGC	19.40	20.42	20.88	19.13	18.23	19.51	16.96	16.98	17.48
7092	THM RBV RADIATOR	DGC	15.65	17.22	17.47	16.55	16.52	17.39	13.08	12.84	13.53
7093	THM RBVC CTR BM	DGC	20.30	21.61	21.87	20.73	20.69	22.98	17.87	17.75	18.71
7094	THM WBVTR ROOT	DGC	12.96	15.71	16.07	13.77	12.00	16.49	11.44	11.64	12.74
7095	THM WBVTR RAD CT	DGC	4.81	8.17	8.68	6.99	5.99	8.23	4.90	5.64	6.18
7096	THM WBVTR STRAP	DGC	16.62	19.32	19.66	17.29	14.72	19.11	14.20	14.33	15.46
7097	THM WB MT BAY 1	DGC	20.56	19.52	21.37	16.97	16.35	19.66	15.83	15.71	16.57
7098	THM WB MAT BAY 1	DGC	20.22	18.90	20.39	17.12	16.65	20.81	16.36	16.23	17.28
7099	THM WBVTR SEP 3	DGC	18.60	20.55	21.05	18.45	17.09	19.69	16.26	16.27	17.02
7100	THM WBVTR SEP 17	DGC	21.31	23.66	24.23	22.02	20.96	28.69	21.35	21.21	23.36
7101	THM WBVTR 1 CENT	DGC	21.49	23.72	24.01	21.63	18.23	22.99	17.93	17.86	19.20
7102	THM WBVTR 2 BAY	DGC	17.46	18.92	19.32	17.23	16.31	18.50	15.39	15.44	16.11
7103	THM WBVTR 2 BY 15	DGC	21.00	23.16	23.82	21.73	21.33	31.92	21.97	21.75	24.43
7104	THM WBVTR 2 CTR	DGC	19.35	21.51	21.81	19.54	17.53	23.44	17.18	17.13	18.67
7105	THM NBTR B SEP 6	DGC	18.06	19.30	19.79	17.82	16.74	19.45	15.56	15.67	16.47
7106	THM NBTR B SEP 1	DGC	20.82	22.35	22.89	21.61	22.04	33.67	22.97	22.65	25.47
7107	THM NBTR BM CTR	DGC	19.37	21.04	21.34	19.51	18.94	24.31	18.12	18.04	19.52
7108	THM MSS MOUNT 14	DGC	19.18	21.15	21.70	20.06	20.70	32.41	21.80	21.48	24.29
7109	THM OA -Y THRUSTER	DGC	22.21	23.80	24.69	24.40	26.22	42.52	28.44	28.22	32.05
7110	THM MSS WBVTR BM	DGC	18.14	20.06	20.53	18.18	17.38	21.15	16.36	16.41	17.48
7111	THM OA +X THRUSTER	DGC	20.30	19.92	21.22	18.07	17.57	20.90	17.09	17.09	17.93
7130	THM AUX P1 T	DGC	15.69	8.49	-18.90	9.68	10.29	20.22	14.74	12.69	13.92
7131	THM AUX P2 T	DGC	10.63	1.59	.41	5.64	25.81	37.79	29.84	27.76	28.79

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

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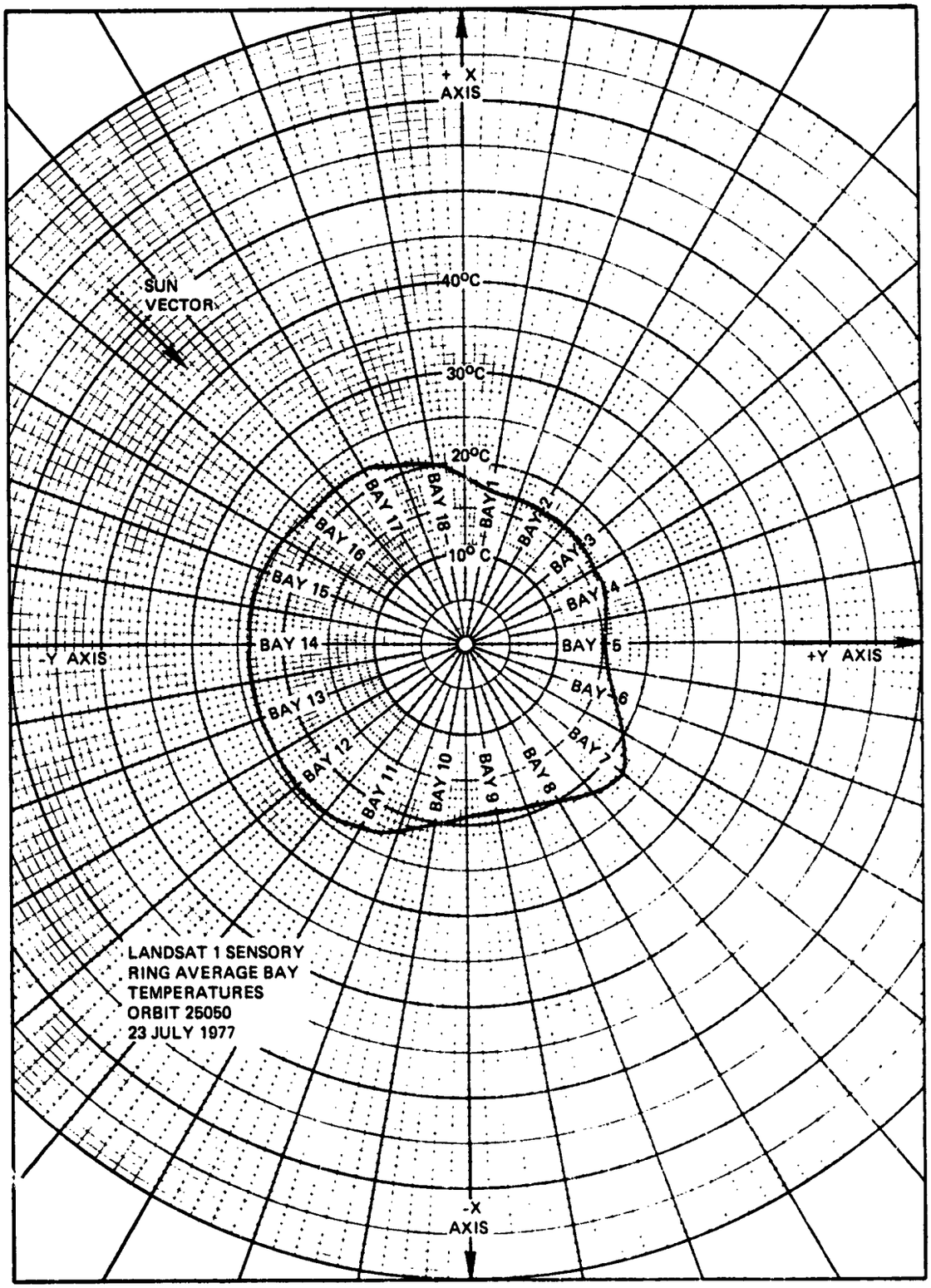

Figure 11-1. Landsat-1 Sensory Ring Thermal Profile

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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
22487	x	x	0	0	0	0	0	0
23113	0	0	0	0	0	0	0	0

*Note: x - ON; 0 OFF

SECTION 12

NARROWBAND TAPE RECORDERS (NBR)
LANDSAT-1

SECTION 12

NARROW BAND TAPE RECORDERS (NBR)

Narrowband Recorder-A operated satisfactorily during this report 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	17,980	25,960	722	17,258
B*	11,909	12,666	476	11,433

*Not used since Orbit 15,253, 22 July 1975

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

Function		Typical Telemetry Values - Orbits								
No.	Name	6	3750-3751	10862	15256	20375	22928	24615	25036	25368
10001	A - Motor Cur. (ma)									
	Record	190.10	189.20	186.31	192.63	196.20	183.26	184.34	186.20	183.26
	P/B	180.00	178.69	180.00	N.A.	192.60	186.41	186.41	178.30	198.41
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	313.24	313.20	343.18	343.18	343.24	341.74
	P/B	535.78	568.38	567.75	N.A.	572.90	576.97	567.90	569.48	576.97
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)	25.17	34.40	23.60	22.00	20.80	25.43	22.02	22.26	22.88
10103	B - Rec. Temp. (DGC)	24.58	23.41	23.41	23.18	18.40	21.26	17.45	17.59	18.40
10004	A - Supply (VDC)	-21.17	-24.14	-24.62	-21.62	-21.60	-24.56	-24.56	-24.57	-24.58
10104	B - Supply (VDC)	-21.41	-21.51	-21.29	-24.57	-21.70	-24.71	-24.71	-24.71	-24.72

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

SECTION 13

WIDEBAND TELEMETRY SUBSYSTEM (WBTS)
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 since launch. All are nominal.

Figure 13-1 is the AGC history at Goldstone. The scatter of data points reflects variations in the ground station calibration and readout.

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	20358	22081	24618	25005	25452
12101	Temp TWT Coll. (Max)	(DgC)	35.38	34.24	35.96	29.77	33.90	34.23	31.92	34.80	29.61
12102	Helix Current	(Ma)	7.32	7.70	7.67	7.90	7.82	7.69	7.76	7.88	7.90
12103	TWT Cath. Cur.	(Ma)	44.30	43.85	42.72	43.70	42.83	43.84	42.64	43.64	43.84
12104	Forward Pwr	(DBM)	43.57	43.57	43.47	43.52	43.41	43.50	43.49	43.56	43.38
12105	Reflected Pwr	(DBM)	31.59	32.79	32.62	33.07	32.60	32.83	32.85	32.90	32.97
12228	Loop Str. AFC Con Volt (1)	(MHz)	1.11	-0.78	-1.12	-1.05	-1.53	-1.93	-1.79	-1.52	-2.13
12229	Mod Temp VCO	(DgC)	21.70	20.88	21.50	21.78	23.65	19.26	19.00	19.55	18.09
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.68	2.69	2.69	2.65	2.66	2.69	2.69	2.65	2.69
12234	-15 VDC Pwr Sup A	(TMV)	5.90	5.98	5.92	5.81	5.85	5.94	5.98	5.84	5.97
12236	+5 VDC Pwr Sup A	(TMV)	3.97	4.01	4.01	3.97	3.96	4.02	4.01	3.97	4.01
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	5.37	5.48	5.56	5.48	5.61
12242	Inv. Temp	(DgC)	23.03	22.96	23.86	23.66	22.73	21.64	19.06	20.51	21.10

(1) Satisfactory if not -14.0 to +14.0. (2) B Power Supply not yet used in orbit

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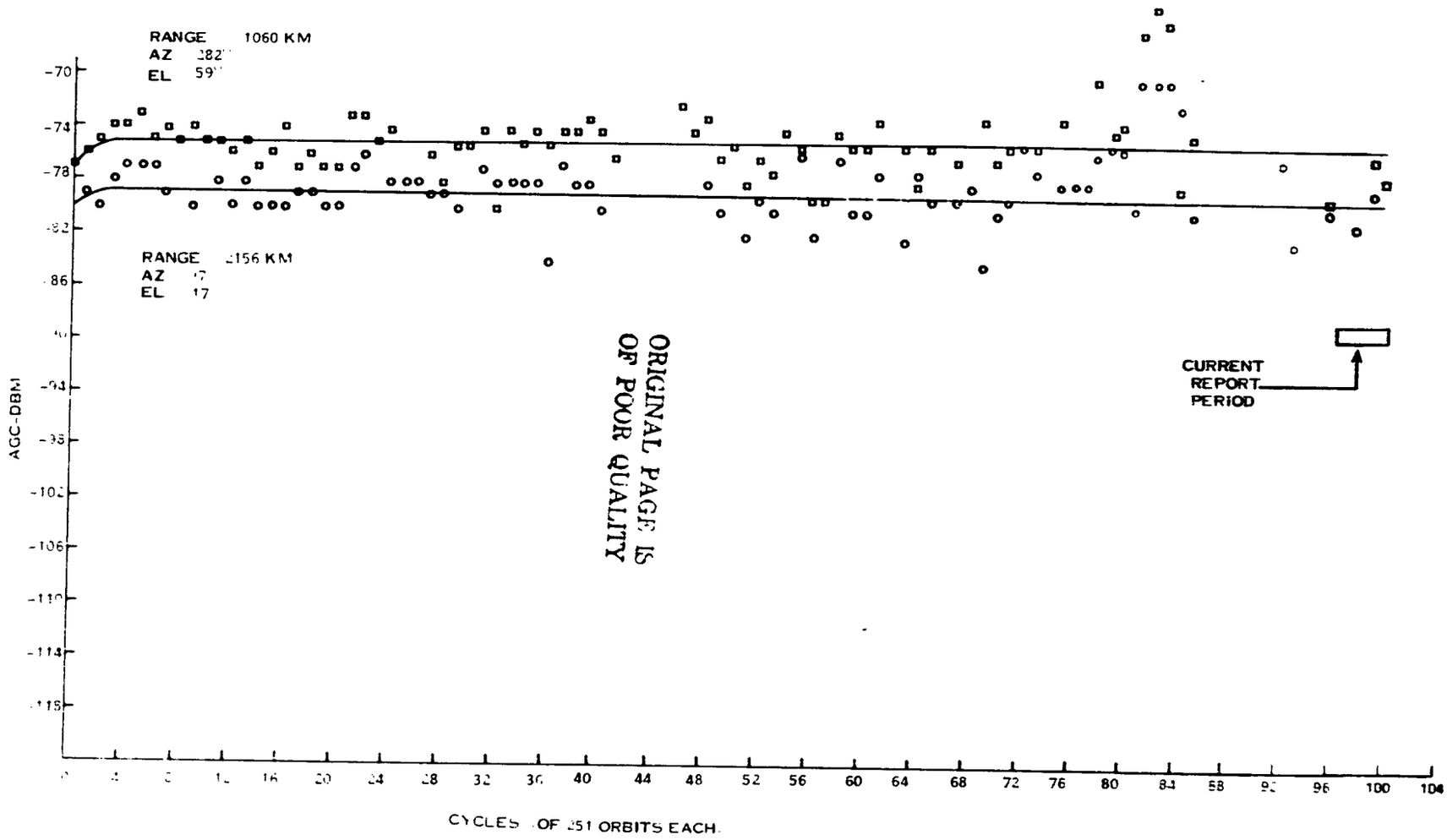

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Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna - Landsat-1

SECTION 14

ATTITUDE MEASUREMENT SENSOR (AMS)
LANDSAT-1

SECTION 14

ATTITUDE MEASUREMENT SYSTEM (AMS)

The AMS subsystem was launched in the OFF mode and energized in Orbit 6. Its performance since Orbit 6 has been without incident. Attitude measurements made with the AMS are in good agreement with ACS fine attitude error measurements.

Table 14-1 gives typical AMS telemetry values. All are nominal.

Table 14-1. Landsat-1 AMS Temperature Telemetry

Function	Description	Units	Orbits								
			35	5099	10182	15254	20364	22928	24618	25050	25523
3004	Case-Temp 1	DGC	18.92	19.42	19.71	18.54	18.23	19.59	17.02	16.9[illegible]	17.2[illegible]
3005	Assembly-Temp 2	DGC	19.15	19.76	19.96	18.73	18.51	19.98	17.24	17.23	17.54

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)
LANDSAT-1

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

WBVTR-2 has not been operated since its failure in Orbit 148, 3 August 1972.

WBVTR-1 was removed from operational service after Orbit 9881, 2 July 1974, because of high minor frame sync error counts. The recorder has remained inactive since suspension of engineering tests after Orbit 10861, 10 September 1974.

SECTION 16

RETURN BEAM VIDICON (RBV)
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 (MSS)
LANDSAT-1

SECTION 17

MULTISPECTRAL SCANNER SUBSYSTEM (MSS)

The MSS Subsystem is now operating in only three of its four spectral bands, all above 0.6 micrometers wave length. Band 1 (0.5 to 0.6 micrometers), the green band, was turned off because of a failure, probably in the ±15V power supply, on March 3, 1977 during Orbit 23480.

MSS was returned to service, 3 bands only, during Orbit 23969 on 7 April 1977. The Cal Lamp current shows a drop from 1.12 to 1.10 TMV, but this telemetry point reflects ground returns from other current to cause this apparent drop. Computer printouts of sensor response to cal lamp generation of the cal wedge show identical response level before and after the failure. The 19 VDC supply shows a rise of 70 ma, consistent with the hypothesis of a partial short in the ±15 VDC power supply.

Figure 17-1 shows the number of scenes imaged at each geographical location in the first three years of operation. Figure 17-2 shows the number of scenes imaged since the first three years. Figure 17-3 shows scenes imaged in this report period. In these maps, only those scenes received by U.S. ground stations are shown. Scenes transmitted to Canada, Brazil and Italy (44% of total) are not shown.

Table 17-1 shows typical MSS Telemetry Values for this report period. 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 20 has declined most (24%) since launch. This is twice the average sensor decline.

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

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

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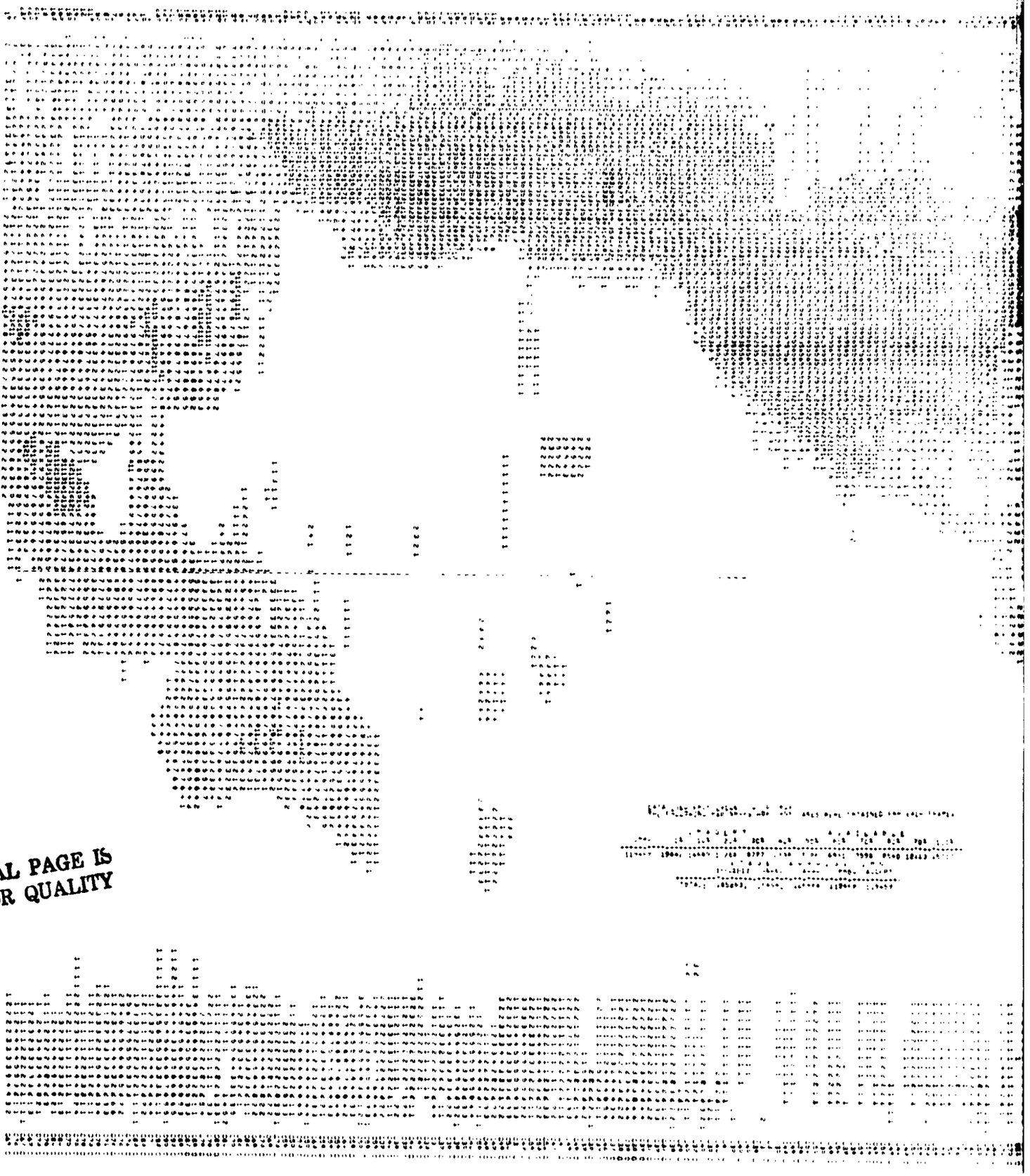

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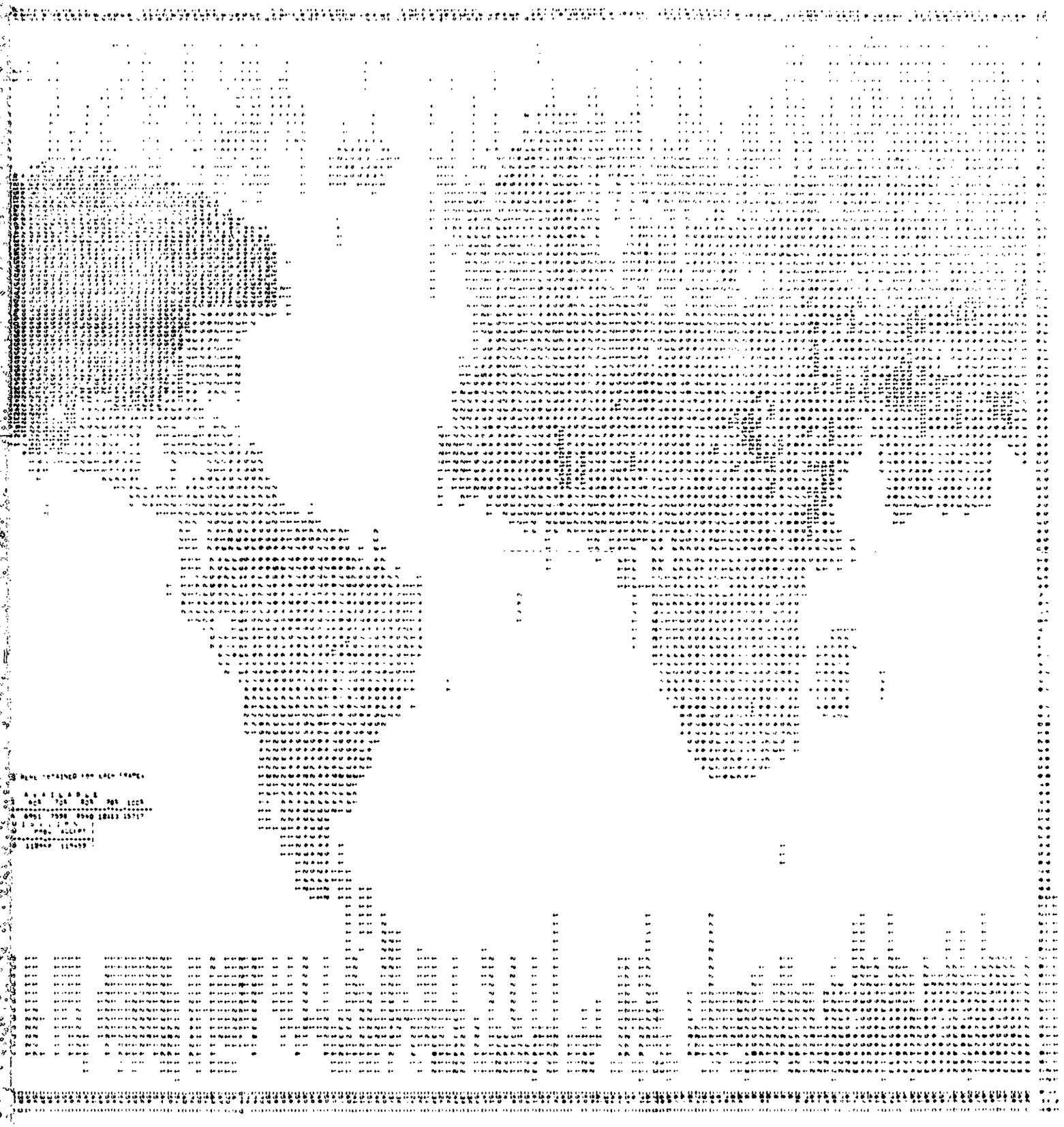

Figure 17-1. Computer Map of MSS Scenes for First Three Years Operation - Landsat-1

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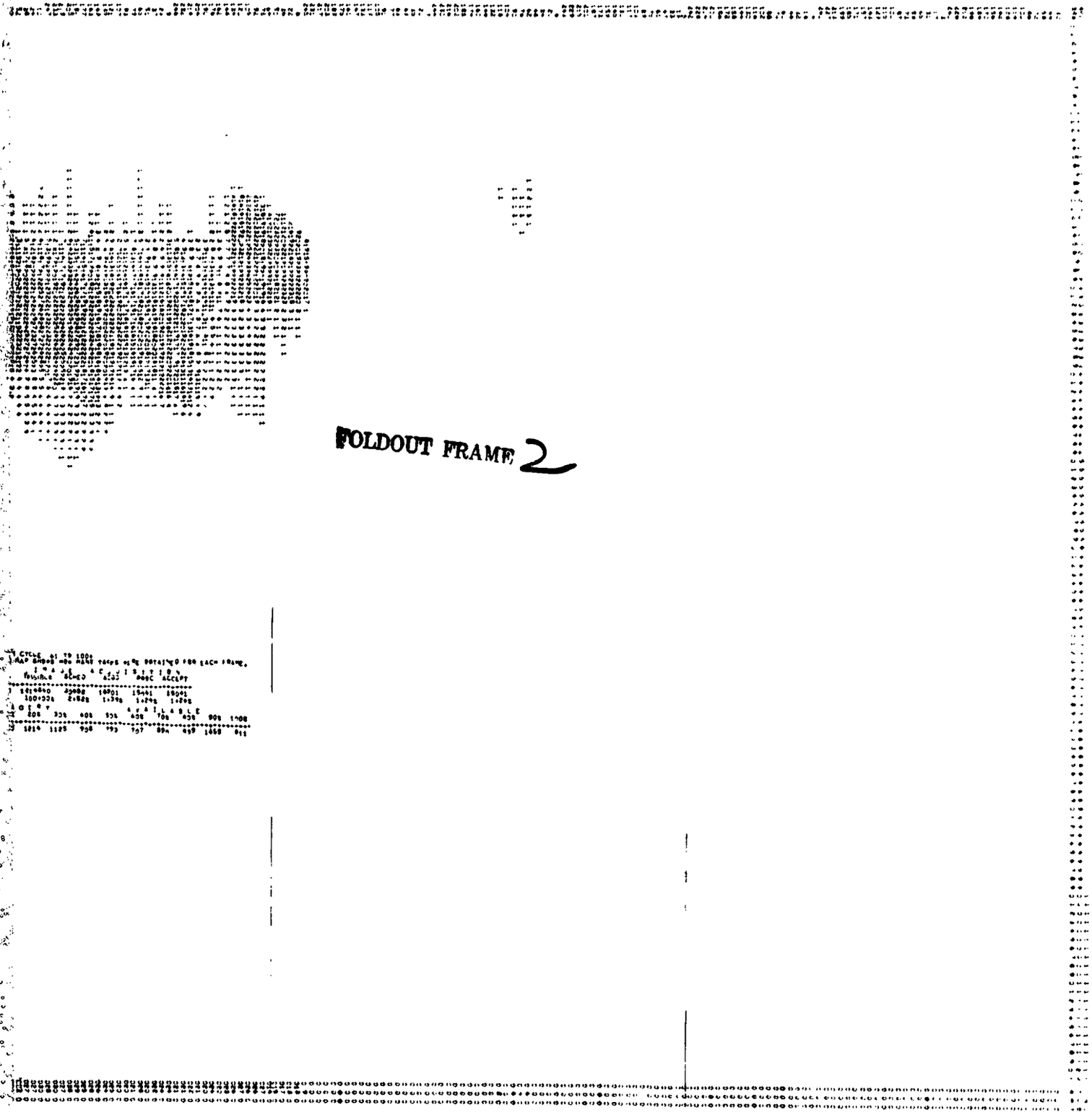

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Figure 17-2. Scenes from End of Three-Year Period to Present Quarter - Landsat-1

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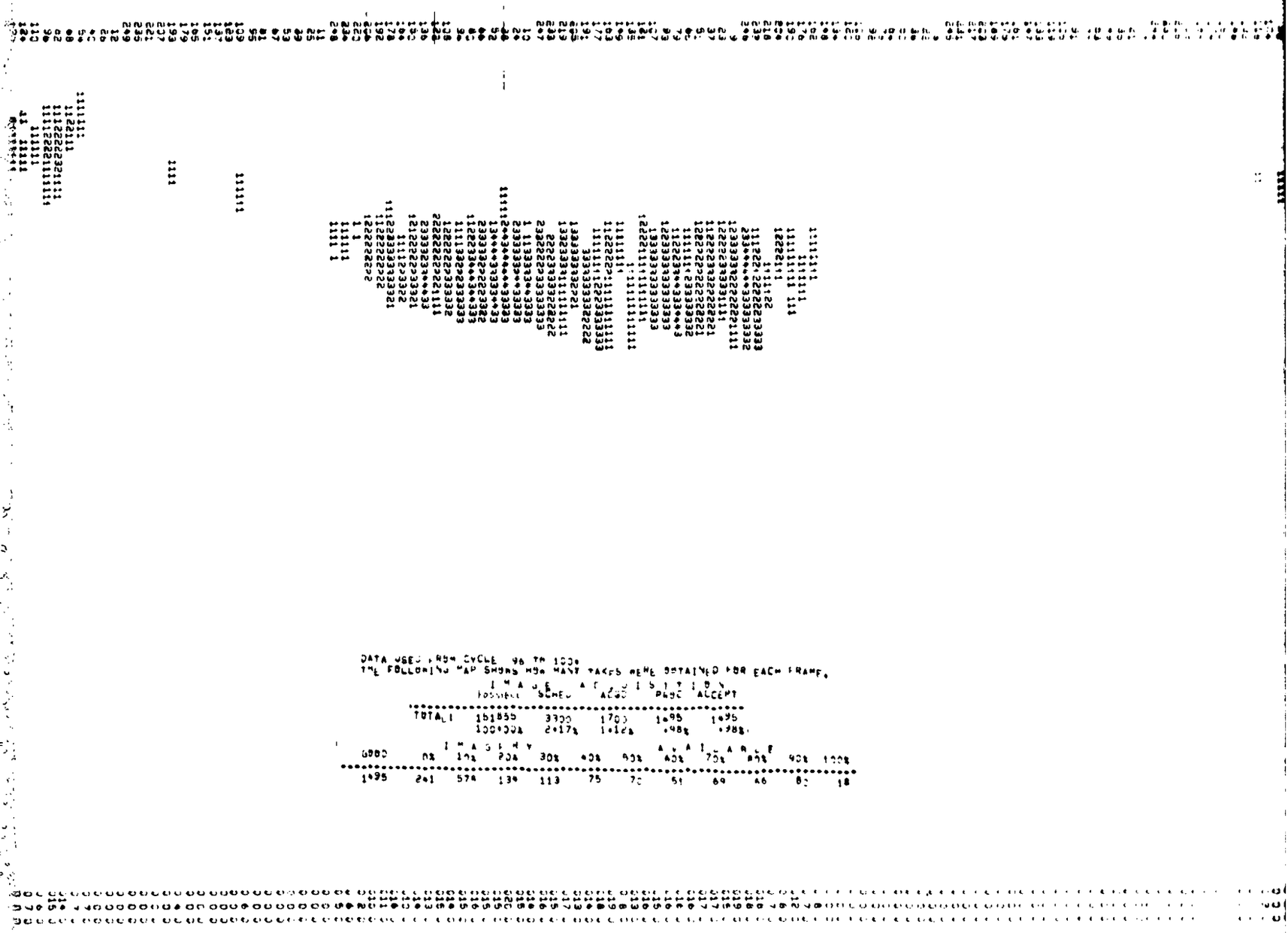

DATA USED FROM CYCLE 96 TO 100.
THE FOLLOWING MAP SHOWS HOW MANY TAKES WERE OBTAINED FOR EACH FRAME.

	IMAGE ACQUISITION				
	POSSIBLE	SCHED	ACQD	PROC	ACCEPT
TOTAL	151855	3300	1700	1495	1495
	100.00%	2.17%	1.12%	.98%	.98%

	IMAGERY						AVAILABLE				
GOOD	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1495	241	574	139	113	75	70	51	69	46	82	18

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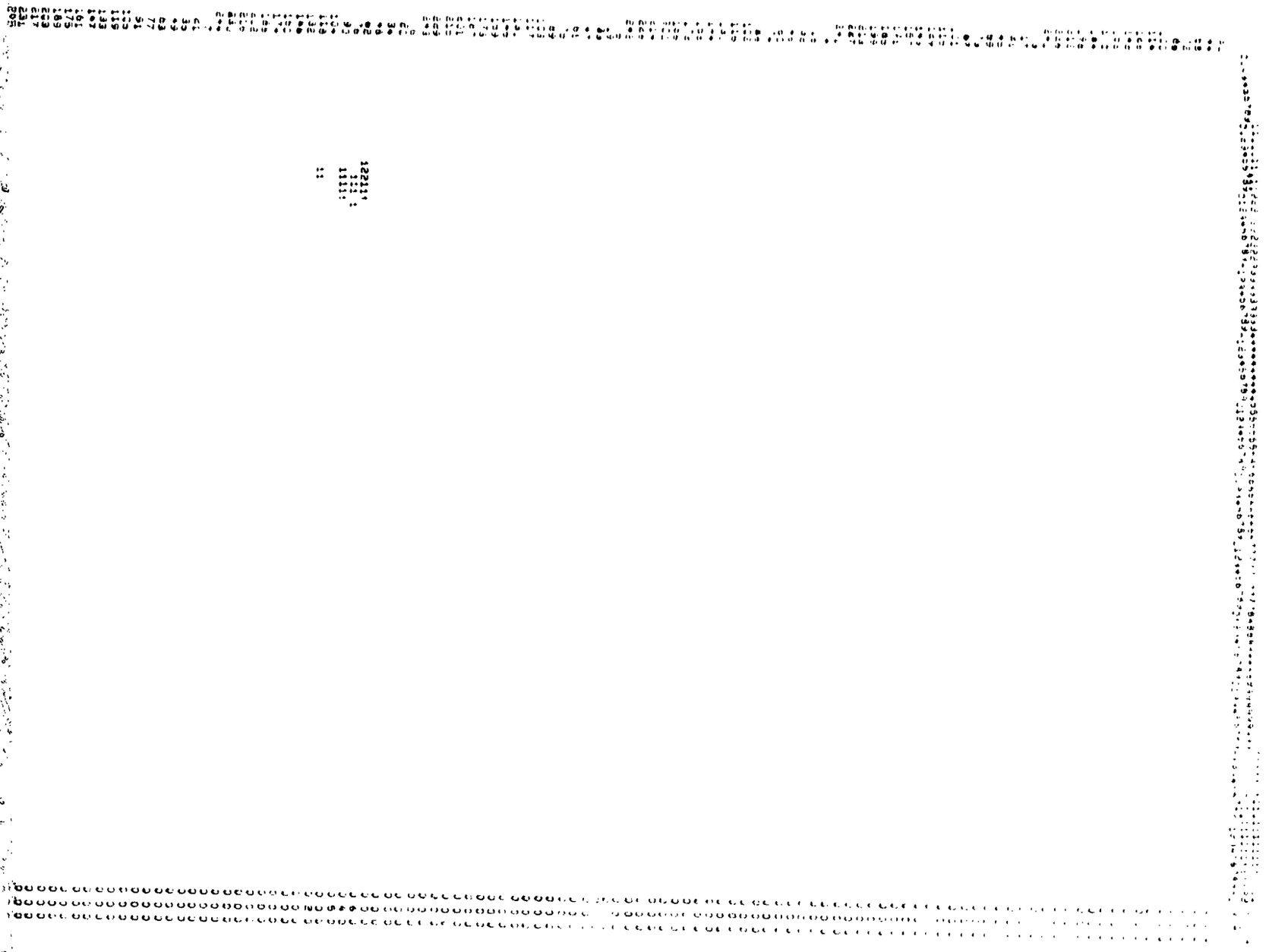

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Figure 17-3. Computer Map of MSS Scenes This Period - Landsat-1

Table 17-1. MSS Telemetry Values

Function No.	Name	Telemetry Value in Orbit									
		Units	20	5060	10:57	15:33	203:[illegible]	2141	2161[illegible]	2[illegible]	2[illegible]
15011	FOPT 2 T	(DGC)	17.16	19.[illegible]4	19.7[illegible]	1[illegible].1[illegible]	1[illegible].05	20.15	16.9[illegible]	16.66	1[illegible].[illegible]
15016	LIFC CVR T	(DGC)	19.37	21.[illegible]3	21.96	20.20	20.11	20.[illegible]1	17.91	1[illegible]	1[illegible].16
15048	SCAN MIR REG T	(DGC)	16.3[illegible]	19.75	20.4[illegible]	20.94	21.90	23.3[illegible]	1[illegible].1[illegible]	20.[illegible]	21.11
15050	SCAN MIR DR. COIL T	(DGC)	15.91	19.30	19.7[illegible]	19.21	19.96	22.[illegible]1	17.6[illegible]	1[illegible].[illegible]	19.[illegible]6
15052	ROT SHUT HSG T	(DGC)	16.91	20.07	20.23	1[illegible].71	1[illegible].7[illegible]	20.57	17.60	17.43	1[illegible].15
15043	FOPT 1 T	(DGC)	17.67	20.01	19.93	1[illegible].35	1[illegible].2[illegible]	20.37	17.21	16.[illegible]7	17.[illegible]6
15045	MUX T	(DGC)	21.19	22.03	23.[illegible]7	26.92	2[illegible].63	2[illegible].02	21.50	26.[illegible]	2[illegible].[illegible]
15047	PWR SUP T	(DGC)	17.41	20.00	20.21	19.[illegible]3	20.2[illegible]	21.[illegible]1	17.63	1[illegible].3[illegible]	19.11
15049	SCAN MIR DR. ELC T	(DGC)	16.12	19.41	20.23	21.16	22.11	23.42	17.[illegible]1	20.26	21.[illegible]
15051	SCAN MIR HSG T	(DGC)	15.60	19.0[illegible]	19.49	1[illegible].40	19.01	22.16	17.43	17.60	1[illegible].92
15040	MUX -6 VDC	(TMV)	4.03	4.03	3.98	4.02	4.03	4.03	4.03	4.03	4.03
15042	AVE DENS DATA	(TMV)	1.67	2.13	2.05	2.2[illegible]	2.2[illegible]	1.72	1.76	2.03	2.06
14054	CAL LAMP CUR A	(TMV)	1.12	1.12	1.12	1.12	1.12	1.12	1.10	1.10	1.10
15056	BAND 2 ±15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10	5.10	5.10
15058	BAND 4 ±15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10	5.10	5.10
15060	12 -6 VDC REG	(TMV)	4.8[illegible]	5.02	4.97	5.02	5.02	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	5.08	5.08	5.08
15064	BAND 1 HV A	(TMV)	5.10	5.16	5.12	5.12	5.12	5.12	OFF	OFF	OFF
15066	BAND 2 HV A	(TMV)	4.50	4.52	4.52	4.50	4.50	4.52	4.50	4.50	4.50
15068	BAND 3 HV A	(TMV)	4.60	4.62	4.62	4.62	4.62	4.62	4.62	4.61	4.62
15070	SHUT MOT CON OUT	(TMV)	2.43	2.44	2.47	2.51	2.50	2.50	2.51	2.50	2.50
15041	A D SUPPLY	(TMV)	5.93	5.93	5.87	5.93	5.92	5.93	5.92	5.93	5.93
15053	SCAN MIR REG V	(TMV)	4.42	4.51	4.51	4.61	4.61	4.61	4.61	4.61	4.61
15055	BAND 1 ±15V	(TMV)	4.97	4.97	4.92	4.97	4.97	4.97	OFF	OFF	OFF
15057	BAND 3 ±15V	(TMV)	5.00	5.00	4.94	5.00	5.00	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	5.02	5.02
15061	-5 VDC LOGIC REG	(TMV)	4.82	4.81	4.77	4.76	4.78	4.80	4.72	4.73	4.73
15063	-19 VDC REG OUT	(TMV)	3.43	3.39	3.50	3.58	3.57	3.57	3.[illegible]	3.[illegible]	3.[illegible]
15071	SCAN MIR DR. CLK	(TMV)	1.93	1.97	1.98	2.00	1.96	2.00	1.98	2.00	2.00

Table 17-2. MSS Response History Landsat-1

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

Band	Sensor	1st Year: Launch	1st Year: 2-4 Quar.	2nd Year: 5-8 Quar.	3rd Year: 9-12 Quar.	4th Year: 13-16 Quar.	5th Year: 17-19 Quar.	5th Year: This Quarter	% Chg. Since Launch
1	1	43	39	39	38	37	37	POWER SUPPLY FAILED	
	2	44	39	40	40	39	38.5		
	3	43	38	40	40	39	39.5		
	4	43	38	39	39	38	37.5		
	5	41	36	35	31	32	31		
	6	43	39	41	41	40	39		
2	7	47	43	43	42	41	41	41	-14
	8	46	41.5	41	41	40	39	39	-1
	9	47	44	42.5	42	41	40	39	[illegible]
	10	46	42	41.5	41	41	40	40	-13
	11	47	42.5	42	42	41	41	41	-13
	12	45	42	42.5	42	42	41	42	- 7
3	13	46	46	49	51	52	53	54	17
	14	44	42	42	42	42	43	43	- 2
	15	45	42.5	42	41	41	41	42	- 7
	16	40	37.5	37.5	37	37	37	38	- 5
	17	42	39	40	40	40	41	41	- 2
	18	44	40	40.5	41	41	41	41	- 2
4	19	28	28	27	25	23	23	22	-21
	20	25	26	25	23	21	20	19	-24
	21	26	27	26.5	25	23	22	21	-19
	22	23	23	22	21	19	19	18	-22
	23	22	22.5	23	21	21	20	20	- 9
	24	24	23.5	24	23	22	22	21	-13
Line Length		3221	3219	3217	3216	3217	3216	3216	-0.16

SECTION 18

DATA COLLECTION SUBSYSTEM (DCS)
LANDSAT-1

SECTION 18

DATA COLLECTION SUBSYSTEM (DCS)

The Data Collection Subsystem was turned OFF after Orbit 12690 on 19 January 1975 and the Data Collection mission was assumed by Landsat-2 at that time. The Landsat-1 Data Collection Subsystem is capable of resuming operational status, if desired.

APPENDIX A

LANDSAT-1 ANOMALY LIST

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Landsat-1 Anomalies and Observations

Date	Anomaly Observation	How Observed	Comments
7 24 72	Sun Sensor Temperature High	Off-Line	No Action Required for ERTS-1; ERTS-B Redesigned
7 24 72	Solar Paddle Temperature Excursions Greater Than Expected	Off-Line	No Action Required for ERTS-1; Math Model Corrected
7 25 72	USB Power Output Decreasing	Off-Line	Switched to Side B in Orbit 10069 on 7/15/74 after decline to 0.14 watts. USB Side B stable and holding at 1.5 watts
8 03 72	WBVTR No. 2 Power Converter Shorted	Real Time & Off-Line	Turned All P/L Off During Pass. Formed NASA/GE/RCA Evaluation Committee. Disconnected since Anomaly. Redesigned for ERTS-B
8 03 72	Decrease in Solar Array Current	Off-Line	Evaluate Degradation Effect Due to Solar Flare Activity
8 06 72	RBV Power Transient PSM Turn-Off Failure	Real Time	NASA/GE/RCA Evaluation Committee Formed. RBV off since Anomaly; Redesigned PSM for ERTS-B
8 10 72	DCS Reject Messages Rose to Over 40% of Total Messages for 15 Days	Off-Line	External Interference; Located Source; No Serious Interference Since
8 10 72	MSS Cal Wedge Levels Decreasing	Off-Line	Leveled Off After Orbit 1000; At Or About 5% Below Earlier Values
8 0[illegible] 72	Incorrect Time Tags in Comstor "B" Cell 12	Real Time	Reload Comstors and Verify; (Discontinued Active Use of Cell 12)
12 04 72 12 0[illegible] 72	Pitch Motor Drive Duty Cycles Roll Increased for Short Yaw Period	Off-Line	Evaluate - Prepared Contingency Plan
[illegible]	WBVTR No. 1, High BER	Real Time	Formed NASA/GE/RCA Committee; Lapped Heads; Now in Operational Use. Temporarily Restricted to Last 600 Feet (600 Seconds) of Tape
4 [illegible]	Slow Leak in Forward IR Scanner Pressure	Off-Line	Not Expected to Interfere with Normal Operations
[illegible]	Defect in Signal of Left Cosine Pot at S/C Midnight	Off-Line	Not Expected to Interfere with Normal Operations
[illegible]	Failure of Integrated Circuit Chip and TLM of Functions [illegible], 1011, 1223[illegible] and 7010	Real Time & Off-Line	TLM Failure only. S/C Operations Normal
11 [illegible]	WBVTR-1 Tape Unit Pressure Drop	Real Time	Defect in Pressure Instrumentation which Causes Occasional Rapid Pressure Drop in TLM - Returns to Normal
11 [illegible]	Solar Array Drive	Real Time	Slight Peaks on Drive Voltage Ripple which Picked up Limit Flag - Returned to Normal
[illegible]	High Head Wheel Current, WBVTR-1, During Rewind	Real Time	Resumed Operations After Investigation WBVTR-1 Performed in a Nominal Manner
[illegible]	Pitch Motor Driver Duty Cycle Increased	Real Time	Similar to Entry 12 4 72 except more Sustained
[illegible]	RMP-1 and RMP-2 Showed Excessive Noise Output	Real Time	Condition Lasted for Several Orbits and Returned to Normal
[illegible]	Pitch Wheel Stopped During Sun Transient	Off-Line	During a sun transient in Orbit 8040 the pitch flywheel was changing directions. As it passed thru zero speed, the pitch flywheel stopped and did not resume operation until 2 minutes had elapsed in spite of application of 100% clockwise pitch motor driver duty cycle during that interval
	[illegible]	Real Time & Off-Line	[illegible]
	[illegible]	Real Time & Off Line	Suspended Operation Pending Study

[illegible]	[illegible] Motor Driver Duty Cycle Increased	Real Time	Similar to Entry 12/4/72 except more Sustained
12 22 72	RMP-1 and RMP-2 Showed Excessive Noise Output	Real Time	Condition Lasted for Several Orbits and Returned to Normal
2 20 74	Pitch Wheel Stopped During Sun Transient	Off-Line	During a sun transient in Orbit 8040 the pitch flywheel was changing directions. As it passed thru zero speed, the pitch flywheel stopped and did not resume operation until 2 minutes had elapsed in spite of application of 100% clockwise pitch motor driver duty cycle during that interval
[illegible] 74	WBVTR No. 1 High BER High HW-1	Real Time & Off Line	Limited Usage of Tape Footage
[illegible] 7 74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study
[illegible] 21 74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study
[illegible] 27 74	WBVTR-1 MSFE Count High	Off-Line	Suspended Operation Pending Study
4 02 74	WBVTR-1 MFSE Count High	Off-Line	Suspended Operation Pending Study
5 21 74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7 02 74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7 02 74	WBVTR-1 High HW-1 and MFSE	Real Time & Off Line	Suspended operation pending study
[illegible] 06 74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
[illegible] 74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
[illegible] 74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
[illegible] 74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
[illegible] 74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
[illegible] 74	[illegible] Regulator Switchover from [illegible]	Real Time	VHF interference signal present. Occurred at 02:46:21. Spacecraft was normal
[illegible]	[illegible] Regulator Switchover from [illegible]	Real Time	VHF interference signal present. Occurred at 01:49:17. Spacecraft is normal
[illegible]	[illegible] Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
[illegible]	[illegible] Stopped	Real Time	The pitch CCW motor driver duty cycle begain increasing in Orbit 11120. The pitch flywheel stopped (from 400 RPM) following a sun transient in Orbit 11125. After a period of approximately [illegible] hours, and attitude disturbances, the pitch flywheel restarted. Earth acquisition was obtained and operations returned to normal in Orbit 11133.
[illegible]	[illegible] Variations	Off-Line & Real Time	As a precautionary measure a switch was made to RMP A in Orbit 11257. RMP B is still functioning and can be used in the event of RMP A failure
	[illegible]	On Line	Solar array current drops 500-600 ma for 1 to 14 minutes early in the day then return to normal. Solar panel temperature range at notch is -20 to +20°C. No effect on S/C Mission
	[illegible]	Real Time & Off-Line	Bit Errors [illegible] in Orbit 12837 and unit was turned off in Orbit [illegible] 12/75. Limited operation was resumed in Orbit [illegible] and continued until failure to move tape in Orbit [illegible]
		[illegible]	Battery [illegible] and rose slightly in charge [illegible] Battery temperature [illegible] battery in Orbit [illegible]. Battery was allowed [illegible] to [illegible] volts when it was turned on in Orbit [illegible]. Normal operation resumed
6/18/75	Battery 6 Turned Off	Real Time &	[illegible]

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FRAME 2

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	1 to 2		Spacecraft was normal
[illegible]	[illegible] switchover from [illegible]	Real Time	VHF interference signal present. Occurred at 01:49:17. Spacecraft is normal
[illegible]	[illegible] CCW Motor Driver Duty Cycle Increase	Real Time & Off Line	Similar to 12/4/72 entry. Returned to Normal
[illegible]	Pitch Flywheel Stopped	Real Time	The pitch CCW motor driver duty cycle began increasing in Orbit 11120. The pitch flywheel stopped (from 400 RPM) following a sun transient in Orbit 11125. After a period of approximately [illegible] hours, and attitude disturbances, the pitch flywheel restarted. Earth acquisition was obtained and operations returned to normal in Orbit 11133.
[illegible]	RMP B Motor Current Variations	Off-Line & Real Time	As a precautionary measure a switch was made to RMP A in Orbit 11257. RMP B is still functioning and can be used in the event of RMP A failure
	[illegible]	On Line	Solar array current drops 500-600 ma for 1 to 14 minutes early in the day then return to normal. Solar panel temperature range at notch is -20 to +20°C. No effect on S/C Mission
[illegible]	[illegible] Band Recorder [illegible] Pit [illegible] Rise	Real Time & Off-Line	Bit Errors began build up in Orbit 12837 and unit was turned off in Orbit 13015 on 2/12/75. Limited operation was resumed in Orbit [illegible] and continued until failure to move tape in Orbit [illegible]
[illegible]	Battery [illegible] Turned Off	Real Time & Off Line	Battery 6 decrease in load share and rose slightly in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 13346. Battery was allowed to discharge to -26.5 volts when it was turned on in Orbit 14100. Normal operation resumed
[illegible]	Battery [illegible] Turned Off	Real Time & Off-Line	Battery [illegible] decreased in load share and rose in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 14780. Battery was allowed to discharge to -26.5 volts when it was turned on in Orbit 15467. Normal battery operation resumed.
[illegible]	[illegible] Motor [illegible] Duty Cycle Increase and Pitch [illegible] Stopped	Real Time & Off-Line	The pitch flywheel motor driver duty cycle was high from Orbit 1[illegible]191 to 15[illegible] when it returned to normal. The pitch flywheel stopped for duration up to 202 minutes between Orbits [illegible] to [illegible]24.
[illegible]	High Current Transient Chem. All Batter[illegible] [illegible]	Real Time & Off-Line	High current transient caused low voltage tripping [illegible] prematurely and low voltage pneumatic interlock. A short is postulated in switching relay located in ALC. All Batter[illegible] command restricted. Redesigned ALC for Landsat [illegible]
[illegible]	Battery [illegible] Turned Off	Real Time & Off Line	Battery 8 decreased in load share and rose in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 1[illegible]. Battery 8 will not be reactivated except in an emergency due to All Battery On command restriction.
[illegible]	[illegible]	On Line	Similar to 12/4/72 entry, peaked at [illegible]. Returned to normal after rear scanner failure
[illegible]	[illegible]	[illegible]	[illegible] intermittent [illegible] and failed in Orbit 1[illegible]. S/C switched to single scanner mode [illegible] operation resumed
		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Battery [illegible] decreased in load share and rose in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit [illegible]. Battery [illegible] will not be reactivated except in an emergency due to All Battery [illegible]

APPENDIX B

LANDSAT-1 SPACECRAFT ORBIT REFERENCE TABLES

LANDSAT-1

SPACECRAFT ORBIT REFERENCE TABLES

FROM JANUARY 1977 THROUGH JUNE 1978

ORBIT 22622 THROUGH 30235

FLIGHT DAY 1623 THROUGH 2168

LANDSAT-1

JAN, 1977

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DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	1	1623	22622-22635			
2	2	1624	22636-22649			
3	3	1625	22650-22663			
4	4	1626	22664-22677			
5	5	1627	22678-22691			
6	6	1628	22692-22705			
7	7	1629	22706-22719			
8	8	1630	22720-22733			
9	9	1631	22734-22747			
10	10	1632	22748-22761			
11	11	1633	22762-22775			
12	12	1634	22776-22789			
13	13	1635	22790-22803			
14	14	1636	22804-22816	REFERENCE FRAME BEING		
15	15	1637	22817-22830	SHIFTED THREE DAYS		
16	16	1638	22831-22844	(NOV 76 - JAN 77)		
17	17	1639	22845-22858			
18	18	1640	22859-22872			
19	19	1641	22873-22886			
20	20	1642	22887-22900			
21	21	1643	22901-22914			
22	22	1644	22915-22928			
23	23	1645	22929-22942			
24	24	1646	22943-22956			
25	25	1647	22957-22970			
26	26	1648	22971-22984			
27	27	1649	22985-22998			
28	28	1650	22999-23012			
29	29	1651	23013-23026			
30	30	1652	23027-23040			
31	31	1653	23041-23054			

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FEB.1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	32	1654	23[illegible]-23[illegible]	140-153	11	92
2	33	1655	23[illegible]-23061	154-167	12	92
3	34	1656	23062-23096	168-181	13	92
4	35	1657	23096-23109	182-195	14	92
5	36	1658	23110-23123	196-209	15	92
6	37	1659	23124-23137	210-223	16	92
7	38	1660	23138-23151	224-237	17	92
8	39	1661	23152-23165	238-251	18	92
9	40	1662	23166-23179	1- 14	1	93
10	41	1663	23180-23193	15- 28	2	93
11	42	1664	23194-23207	29- 42	3	93
12	43	1665	23208-23221	43- 56	4	93
13	44	1666	23222-23235	57- 70	5	93
14	45	1667	23236-23249	71- 84	6	93
15	46	1668	23250-23263	85- 98	7	93
16	47	1669	23264-23276	99-111	8	93
17	48	1670	23277-23290	112-125	9	93
18	49	1671	23291-23304	126-139	10	93
19	50	1672	23305-23318	140-153	11	93
20	51	1673	23319-23332	154-167	12	93
21	52	1674	23333-23346	168-181	13	93
22	53	1675	23347-23360	182-195	14	93
23	54	1676	23361-23374	196-209	15	93
24	55	1677	23375-23388	210-223	16	93
25	56	1678	23389-23402	224-237	17	93
26	57	1679	23403-23416	238-251	18	93
27	58	1680	23417-23430	1- 14	1	94
28	59	1681	23431-23444	15- 28	2	94

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MAR#1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	60	1682	23445-23458	29- 42	3	94
2	61	1683	23459-23472	43- 56	4	94
3	62	1684	23473-23486	57- 70	5	94
4	63	1685	23487-23500	71- 84	6	94
5	64	1686	23501-23514	85- 98	7	94
6	65	1687	23515-23527	99-111	8	94
7	66	1688	23528-23541	112-125	9	94
8	67	1689	23542-23555	126-139	10	94
9	68	1690	23556-23569	140-153	11	94
10	69	1691	23570-23583	154-167	12	94
11	70	1692	23584-23597	168-181	13	94
12	71	1693	23598-23611	182-195	14	94
13	72	1694	23612-23625	196-209	15	94
14	73	1695	23626-23639	210-223	16	94
15	74	1696	23640-23653	224-237	17	94
16	75	1697	23654-23667	238-251	18	94
17	76	1698	23668-23681	1- 14	1	95
18	77	1699	23682-23695	15- 28	2	95
19	78	1700	23696-23709	29- 42	3	95
20	79	1701	23710-23723	43- 56	4	95
21	80	1702	23724-23737	57- 70	5	95
22	81	1703	23738-23751	71- 84	6	95
23	82	1704	23752-23765	85- 98	7	95
24	83	1705	23766-23778	99-111	8	95
25	84	1706	23779-23792	112-125	9	95
26	85	1707	23793-23806	126-139	10	95
27	86	1708	23807-23820	140-153	11	95
28	87	1709	23821-23834	154-167	12	95
29	88	1710	23835-23848	168-181	13	95
30	89	1711	23849-23862	182-195	14	95
31	90	1712	23863-23876	196-209	15	95

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DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE No.
1	91	1713	23877-23890	210-223	16	95
2	92	1714	23891-23904	224-237	17	95
3	93	1715	23905-23918	238-251	18	95
4	94	1716	23919-23932	1- 14	1	96
5	95	1717	23933-23946	15- 28	2	96
6	96	1718	23947-23960	29- 42	3	96
7	97	1719	23961-23974	43- 56	4	96
8	98	1720	23975-23988	57- 70	5	96
9	99	1721	23989-24002	71- 84	6	96
10	100	1722	24003-24016	85- 98	7	96
11	101	1723	24017-24029	99-111	8	96
12	102	1724	24030-24043	112-125	9	96
13	103	1725	24044-24057	126-139	10	96
14	104	1726	24058-24071	140-153	11	96
15	105	1727	24072-24085	154-167	12	96
16	106	1728	24086-24099	168-181	13	96
17	107	1729	24100-24113	182-195	14	96
18	108	1730	24114-24127	196-209	15	96
19	109	1731	24128-24141	210-223	16	96
20	110	1732	24142-24155	224-237	17	96
21	111	1733	24156-24169	238-251	18	96
22	112	1734	24170-24183	1- 14	1	97
23	113	1735	24184-24197	15- 28	2	97
24	114	1736	24198-24211	29- 42	3	97
25	115	1737	24212-24225	43- 56	4	97
26	116	1738	24226-24239	57- 70	5	97
27	117	1739	24240-24253	71- 84	6	97
28	118	1740	24254-24267	85- 98	7	97
29	119	1741	24268-24280	99-111	8	97
30	120	1742	24281-24294	112-125	9	97

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MAY 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	121	1743	24295-24308	126-139	10	97
2	122	1744	24309-24322	140-153	11	97
3	123	1745	24323-24336	154-167	12	97
4	124	1746	24337-24350	168-181	13	97
5	125	1747	24351-24364	182-195	14	97
6	126	1748	24365-24378	196-209	15	97
7	127	1749	24379-24392	210-223	16	97
8	128	1750	24393-24406	224-237	17	97
9	129	1751	24407-24420	238-251	18	97
10	130	1752	24421-24434	1- 14	1	98
11	131	1753	24435-24448	15- 28	2	98
12	132	1754	24449-24462	29- 42	3	98
13	133	1755	24463-24476	43- 56	4	98
14	134	1756	24477-24490	57- 70	5	98
15	135	1757	24491-24504	71- 84	6	98
16	136	1758	24505-24518	85- 98	7	98
17	137	1759	24519-24531	99-111	8	98
18	138	1760	24532-24545	112-125	9	98
19	139	1761	24546-24559	126-139	10	98
20	140	1762	24560-24573	140-153	11	98
21	141	1763	24574-24587	154-167	12	98
22	142	1764	24588-24601	168-181	13	98
23	143	1765	24602-24615	182-195	14	98
24	144	1766	24616-24629	196-209	15	98
25	145	1767	24630-24643	210-223	16	98
26	146	1768	24644-24657	224-237	17	98
27	147	1769	24658-24671	238-251	18	98
28	148	1770	24672-24685	1- 14	1	99
29	149	1771	24686-24699	15- 28	2	99
30	150	1772	24700-24713	29- 42	3	99
31	151	1773	24714-24727	43- 56	4	99

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JUNE 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	152	1774	24728-24741	57- 70	5	99
2	153	1775	24742-24755	71- 84	6	99
3	154	1776	24756-24769	85- 98	7	99
4	155	1777	24770-24782	99-111	8	99
5	156	1778	24783-24796	112-125	9	99
6	157	1779	24797-24810	126-139	10	99
7	158	1780	24811-24824	140-153	11	99
8	159	1781	24825-24838	154-167	12	99
9	160	1782	24839-24852	168-181	13	99
10	161	1783	24853-24866	182-195	14	99
11	162	1784	24867-24880	196-209	15	99
12	163	1785	24881-24894	210-223	16	99
13	164	1786	24895-24908	224-237	17	99
14	165	1787	24909-24922	238-251	18	99
15	166	1788	24923-24936	1- 14	1	100
16	167	1789	24937-24950	15- 28	2	100
17	168	1790	24951-24964	29- 42	3	100
18	169	1791	24965-24978	43- 56	4	100
19	170	1792	24979-24992	57- 70	5	100
20	171	1793	24993-25006	71- 84	6	100
21	172	1794	25007-25020	85- 98	7	100
22	173	1795	25021-25033	99-111	8	100
23	174	1796	25034-25047	112-125	9	100
24	175	1797	25048-25061	126-139	10	100
25	176	1798	25062-25075	140-153	11	100
26	177	1799	25076-25089	154-167	12	100
27	178	1800	25090-25103	168-181	13	100
28	179	1801	25104-25117	182-195	14	100
29	180	1802	25118-25131	196-209	15	100
30	181	1803	25132-25145	210-223	16	100

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JUL, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	182	1804	25146-25159	224-237	17	100
2	183	1805	25160-25173	238-251	18	100
3	184	1806	25174-25187	1- 14	1	101
4	185	1807	25188-25201	15- 28	2	101
5	186	1808	25202-25215	29- 42	3	101
6	187	1809	25216-25229	43- 56	4	101
7	188	1810	25230-25243	57- 70	5	101
8	189	1811	25244-25257	71- 84	6	101
9	190	1812	25258-25271	85- 98	7	101
10	191	1813	25272-25284	99-111	8	101
11	192	1814	25285-25298	112-125	9	101
12	193	1815	25299-25312	126-139	10	101
13	194	1816	25313-25326	140-153	11	101
14	195	1817	25327-25340	154-167	12	101
15	196	1818	25341-25354	168-181	13	101
16	197	1819	25355-25368	182-195	14	101
17	198	1820	25369-25382	196-209	15	101
18	199	1821	25383-25396	210-223	16	101
19	200	1822	25397-25410	224-237	17	101
20	201	1823	25411-25424	238-251	18	101
21	202	1824	25425-25438	1- 14	1	102
22	203	1825	25439-25452	15- 28	2	102
23	204	1826	25453-25466	29- 42	3	102
24	205	1827	25467-25480	43- 56	4	102
25	206	1828	25481-25494	57- 70	5	102
26	207	1829	25495-25508	71- 84	6	102
27	[illegible]	[illegible]	25509-25522	85- 98	7	102
[illegible]	[illegible]	[illegible]	25523-25535	99-111	8	102
[illegible]	[illegible]	[illegible]	25536-25549	112-125	9	102
30	[illegible]	[illegible]	25550-25563	126-139	10	102
31	[illegible]	[illegible]	25564-25577	140-153	11	102

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AUG. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	213	1835	25578-25591	154-167	12	102
2	214	1836	25592-25605	168-181	13	102
3	215	1837	25606-25619	182-195	14	102
4	216	1838	25620-25633	196-209	15	102
5	217	1839	25634-25647	210-223	16	102
6	218	1840	25648-25661	224-237	17	102
7	219	1841	25662-25675	238-251	18	102
8	220	1842	25676-25689	1- 14	1	103
9	221	1843	25690-25703	15- 28	2	103
10	222	1844	25704-25717	29- 42	3	103
11	223	1845	25718-25731	43- 56	4	103
12	224	1846	25732-25745	57- 70	5	103
13	225	1847	25746-25759	71- 84	6	103
14	226	1848	25760-25773	85- 98	7	103
15	227	1849	25774-25786	99-111	8	103
16	228	1850	25787-25800	112-125	9	103
17	229	1851	25801-25814	126-139	10	103
18	230	1852	25815-25828	140-153	11	103
19	231	1853	25829-25842	154-167	12	103
20	232	1854	25843-25856	168-181	13	103
21	233	1855	25857-25870	182-195	14	103
22	234	1856	25871-25884	196-209	15	103
23	235	1857	25885-25898	210-223	16	103
24	236	1858	25899-25912	224-237	17	103
25	237	1859	25913-25926	238-251	18	103
26	238	1860	25927-25940	1- 14	1	104
27	239	1861	25941-25954	15- 28	2	104
28	240	1862	25955-25968	29- 42	3	104
29	241	1863	25969-25982	43- 56	4	104
30	242	1864	25983-25996	57- 70	5	104
31	243	1865	25997-26010	71- 84	6	104

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SEP.1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	244	1866	26011-26024	85- 98	7	104
2	245	1867	26025-26037	99-111	8	104
3	246	1868	26038-26051	112-125	9	104
4	247	1869	26052-26065	126-139	10	104
5	248	1870	26066-26079	140-153	11	104
6	249	1871	26080-26093	154-167	12	104
7	250	1872	26094-26107	168-181	13	104
8	251	1873	26108-26121	182-195	14	104
9	252	1874	26122-26135	196-209	15	104
10	253	1875	26136-26149	210-223	16	104
11	254	1876	26150-26163	224-237	17	104
12	255	1877	26164-26177	238-251	18	104
13	256	1878	26178-26191	1- 14	1	105
14	257	1879	26192-26205	15- 28	2	105
15	258	1880	26206-26219	29- 42	3	105
16	259	1881	26220-26233	43- 56	4	105
17	260	1882	26234-26247	57- 70	5	105
18	261	1883	26248-26261	71- 84	6	105
19	262	1884	26262-26275	85- 98	7	105
20	263	1885	26276-26288	99-111	8	105
21	264	1886	26289-26302	112-125	9	105
22	265	1887	26303-26316	126-139	10	105
23	266	1888	26317-26330	140-153	11	105
24	267	1889	26331-26344	154-167	12	105
25	268	1890	26345-26358	168-181	13	105
26	269	1891	26359-26372	182-195	14	105
27	270	1892	26373-26386	196-209	15	105
28	271	1893	26387-26400	210-223	16	105
29	272	1894	26401-26414	224-237	17	105
30	273	1895	26415-26428	238-251	18	105

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OCT.1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	274	1896	26429-26442	1- 14	1	106
2	275	1897	26443-26456	15- 28	2	106
3	276	1898	26457-26470	29- 42	3	106
4	277	1899	26471-26484	43- 56	4	106
5	278	1900	26485-26498	57- 70	5	106
6	279	1901	26499-26512	71- 84	6	106
7	280	1902	26513-26526	85- 98	7	106
8	281	1903	26527-26539	99-111	8	106
9	282	1904	26540-26553	112-125	9	106
10	283	1905	26554-26567	126-139	10	106
11	284	1906	26568-26581	140-153	11	106
12	285	1907	26582-26595	154-167	12	106
13	286	1908	26596-26609	168-181	13	106
14	287	1909	26610-26623	182-195	14	106
15	288	1910	26624-26637	196-209	15	106
16	289	1911	26638-26651	210-223	16	106
17	290	1912	26652-26665	224-237	17	106
18	291	1913	26666-26679	238-251	18	106
19	292	1914	26680-26693	1- 14	1	107
20	293	1915	26694-26707	15- 28	2	107
21	294	1916	26708-26721	29- 42	3	107
22	295	1917	26722-26735	43- 56	4	107
23	296	1918	26736-26749	57- 70	5	107
24	297	1919	26750-26763	71- 84	6	107
25	298	1920	26764-26777	85- 98	7	107
26	299	1921	26778-26790	99-111	8	107
27	300	1922	26791-26804	112-125	9	107
28	301	1923	26805-26818	126-139	10	107
29	302	1924	26819-26832	140-153	11	107
30	303	1925	26833-26846	154-167	12	107
31	304	1926	26847-26860	168-181	13	107

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NOV. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	305	1927	26861-26874	182-195	14	107
2	306	1928	26875-26888	196-209	15	107
3	307	1929	26889-26902	210-223	16	107
4	308	1930	26903-26916	224-237	17	107
5	309	1931	26917-26930	238-251	18	107
6	310	1932	26931-26944	1- 14	1	108
7	311	1933	26945-26958	15- 28	2	108
8	312	1934	26959-26972	29- 42	3	108
9	313	1935	26973-26986	43- 56	4	108
10	314	1936	26987-27000	57- 70	5	108
11	315	1937	27001-27014	71- 84	6	108
12	316	1938	27015-27028	85- 98	7	108
13	317	1939	27029-27041	99-111	8	108
14	318	1940	27042-27055	112-125	9	108
15	319	1941	27056-27069	126-139	10	108
16	320	1942	27070-27083	140-153	11	108
17	321	1943	27084-27097	154-167	12	108
18	322	1944	27098-27111	168-181	13	108
19	323	1945	27112-27125	182-195	14	108
20	324	1946	27126-27139	196-209	15	108
21	325	1947	27140-27153	210-223	16	108
22	326	1948	27154-27167	224-237	17	108
23	327	1949	27168-27181	238-251	18	108
24	328	1950	27182-27195	1- 14	1	109
25	329	1951	27196-27209	15- 28	2	109
26	330	1952	27210-27223	29- 42	3	109
27	331	1953	27224-27237	43- 56	4	109
28	332	1954	27238-27251	57- 70	5	109
29	333	1955	27252-27265	71- 84	6	109
30	334	1956	27266-27279	85- 98	7	109

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DEC, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	335	1957	27280-27292	99-111	8	109
2	336	1958	27293-27306	112-125	9	109
3	337	1959	27307-27320	126-139	10	109
4	338	1960	27321-27334	140-153	11	109
5	339	1961	27335-27348	154-167	12	109
6	340	1962	27349-27362	168-181	13	109
7	341	1963	27363-27376	182-195	14	109
8	342	1964	27377-27390	196-209	15	109
9	343	1965	27391-27404	210-223	16	109
10	344	1966	27405-27418	224-237	17	109
11	345	1967	27419-27432	238-251	18	109
12	346	1968	27433-27446	1- 14	1	110
13	347	1969	27447-27460	15- 28	2	110
14	348	1970	27461-27474	29- 42	3	110
15	349	1971	27475-27488	43- 56	4	110
16	350	1972	27489-27502	57- 70	5	110
17	351	1973	27503-27516	71- 84	6	110
18	352	1974	27517-27530	85- 98	7	110
19	353	1975	27531-27543	99-111	8	110
20	354	1976	27544-27557	112-125	9	110
21	355	1977	27558-27571	126-139	10	110
22	356	1978	27572-27585	140-153	11	110
23	357	1979	27586-27599	154-167	12	110
24	358	1980	27600-27613	168-181	13	110
25	359	1981	27614-27627	182-195	14	110
26	360	1982	27628-27641	196-209	15	110
27	361	1983	27642-27655	210-223	16	110
28	362	1984	27656-27669	224-237	17	110
29	363	1985	27670-27683	238-251	18	110
30	364	1986	27684-27697	1- 14	1	111
31	365	1987	27698-27711	15- 28	2	111

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JAN, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF. DAY	CYCLE NO.
1	1	1988	27712-27725	29- 42	3	111
2	2	1989	27726-27739	43- 56	4	111
3	3	1990	27740-27753	57- 70	5	111
4	4	1991	27754-27767	71- 84	6	111
5	5	1992	27756-27781	85- 98	7	111
6	6	1993	27782-27794	99-111	8	111
7	7	1994	27795-27808	112-125	9	111
8	8	1995	27809-27822	126-139	10	111
9	9	1996	27823-27836	140-153	11	111
10	10	1997	27837-27850	154-167	12	111
11	11	1998	27851-27864	168-181	13	111
12	12	1999	27865-27878	182-195	14	111
13	13	2000	27879-27892	196-209	15	111
14	14	2001	27893-27906	210-223	16	111
15	15	2002	27907-27920	224-237	17	111
16	16	2003	27921-27934	238-251	18	111
17	17	2004	27935-27948	1- 14	1	112
18	18	2005	27949-27962	15- 28	2	112
19	19	2006	27963-27976	29- 42	3	112
20	20	2007	27977-27990	43- 56	4	112
21	21	2008	27991-28004	57- 70	5	112
22	22	2009	28005-28018	71- 84	6	112
23	23	2010	28019-28032	85- 98	7	112
24	24	2011	28033-28045	99-111	8	112
25	25	2012	28046-28059	112-125	9	112
26	26	2013	28060-28073	126-139	10	112
27	27	2014	28074-28087	140-153	11	112
28	28	2015	28088-28101	154-167	12	112
29	29	2016	28102-28115	168-181	13	112
30	30	2017	28116-28129	182-195	14	112
31	31	2018	28130-28143	196-209	15	112

FEB, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	32	2019	28144-28157	210-223	16	112
2	33	2020	28158-28171	224-237	17	112
3	34	2021	28172-28185	238-251	18	112
4	35	2022	28186-28199	1- 14	1	113
5	36	2023	28200-28213	15- 28	2	113
6	37	2024	28214-28227	29- 42	3	113
7	38	2025	28228-28241	43- 56	4	113
8	39	2026	28242-28255	57- 70	5	113
9	40	2027	28256-28269	71- 84	6	113
10	41	2028	28270-28283	85- 98	7	113
11	42	2029	28284-28296	99-111	8	113
12	43	2030	28297-28310	112-125	9	113
13	44	2031	28311-28324	126-139	10	113
14	45	2032	28325-28338	140-153	11	113
15	46	2033	28339-28352	154-167	12	113
16	47	2034	28353-28366	168-181	13	113
17	48	2035	28367-28380	182-195	14	113
18	49	2036	28381-28394	196-209	15	113
19	50	2037	28395-28408	210-223	16	113
20	51	2038	28409-28422	224-237	17	113
21	52	2039	28423-28436	238-251	18	113
22	53	2040	28437-28450	1- 14	1	114
23	54	2041	28451-28464	15- 28	2	114
24	55	2042	28465-28478	29- 42	3	114
25	56	2043	28479-28492	43- 56	4	114
26	57	2044	28493-28506	57- 70	5	114
27	58	2045	28507-28520	71- 84	6	114
28	59	2046	28521-28534	85- 98	7	114

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MAR. 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	60	2047	28535-28547	99-111	8	114
2	61	2048	28548-28561	112-125	9	114
3	62	2049	28562-28575	126-139	10	114
4	63	2050	28576-28589	140-153	11	114
5	64	2051	28590-28603	154-167	12	114
6	65	2052	28604-28617	168-181	13	114
7	66	2053	28618-28631	182-195	14	114
8	67	2054	28632-28645	196-209	15	114
9	68	2055	28646-28659	210-223	16	114
10	69	2056	28660-28673	224-237	17	114
11	70	2057	28674-28687	238-251	18	114
12	71	2058	28688-28701	1- 14	1	115
13	72	2059	28702-28715	15- 28	2	115
14	73	2060	28716-28729	29- 42	3	115
15	74	2061	28730-28743	43- 56	4	115
16	75	2062	28744-28757	57- 70	5	115
17	76	2063	28758-28771	71- 84	6	115
18	77	2064	28772-28785	85- 98	7	115
19	78	2065	28786-28798	99-111	8	115
20	79	2066	28799-28812	112-125	9	115
21	80	2067	28813-28826	126-139	10	115
22	81	2068	28827-28840	140-153	11	115
23	82	2069	28841-28854	154-167	12	115
24	83	2070	28855-28868	168-181	13	115
25	84	2071	28869-28882	182-195	14	115
26	85	2072	28883-28896	196-209	15	115
27	86	2073	28897-28910	210-223	16	115
28	87	2074	28911-28924	224-237	17	115
29	88	2075	28925-28938	238-251	18	115
30	89	2076	28939-28952	1- 14	1	116
31	90	2077	28953-28966	15- 28	2	116

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DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	91	2078	28967-28980	29- 42	3	116
2	92	2079	28981-28994	43- 56	4	116
3	93	2080	28995-29008	57- 70	5	116
4	94	2081	29009-29022	71- 84	6	116
5	95	2082	29023-29036	85- 98	7	116
6	96	2083	29037-29049	99-111	8	116
7	97	2084	29050-29063	112-125	9	116
8	98	2085	29064-29077	126-139	10	116
9	99	2086	29078-29091	140-153	11	116
10	100	2087	29092-29105	154-167	12	116
11	101	2088	29106-29119	168-181	13	116
12	102	2089	29120-29133	182-195	14	116
13	103	2090	29134-29147	196-209	15	116
14	104	2091	29148-29161	210-223	16	116
15	105	2092	29162-29175	224-237	17	116
16	106	2093	29176-29189	238-251	18	116
17	107	2094	29190-29203	1- 14	1	117
18	108	2095	29204-29217	15- 28	2	117
19	109	2096	29218-29231	29- 42	3	117
20	110	2097	29232-29245	43- 56	4	117
21	111	2098	29246-29259	57- 70	5	117
22	112	2099	29260-29273	71- 84	6	117
23	113	2100	29274-29287	85- 98	7	117
24	114	2101	29288-29300	99-111	8	117
25	115	2102	29301-29314	112-125	9	117
26	116	2103	29315-29328	126-139	10	117
27	117	2104	29329-29342	140-153	11	117
28	118	2105	29343-29356	154-167	12	117
29	119	2106	29357-29370	168-181	13	117
30	120	2107	29371-29384	182-195	14	117

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MAY 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	121	2108	29385-29398	196-209	15	117
2	122	2109	29399-29412	210-223	16	117
3	123	2110	29413-29426	224-237	17	117
4	124	2111	29427-29440	238-251	18	117
5	125	2112	29441-29454	1- 14	1	118
6	126	2113	29455-29468	15- 28	2	118
7	127	2114	29469-29482	29- 42	3	118
8	128	2115	29483-29496	43- 56	4	118
9	129	2116	29497-29510	57- 70	5	118
10	130	2117	29511-29524	71- 84	6	118
11	131	2118	29525-29538	85- 98	7	118
12	132	2119	29539-29551	99-111	8	118
13	133	2120	29552-29565	112-125	9	118
14	134	2121	29566-29579	126-139	10	118
15	135	2122	29580-29593	140-153	11	118
16	136	2123	29594-29607	154-167	12	118
17	137	2124	29608-29621	168-181	13	118
18	138	2125	29622-29635	182-195	14	118
19	139	2126	29636-29649	196-209	15	118
20	140	2127	29650-29663	210-223	16	118
21	141	2128	29664-29677	224-237	17	118
22	142	2129	29678-29691	238-251	18	118
23	143	2130	29692-29705	1- 14	1	119
24	144	2131	29706-29719	15- 28	2	119
25	145	2132	29720-29733	29- 42	3	119
26	146	2133	29734-29747	43- 56	4	119
27	147	2134	29748-29761	57- 70	5	119
28	148	2135	29762-29775	71- 84	6	119
29	149	2136	29776-29789	85- 98	7	119
30	150	2137	29790-29802	99-111	8	119
31	151	2138	29803-29816	112-125	9	119

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JUN. 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	152	2139	29817-29830	126-139	10	119
2	153	2140	29831-29844	140-153	11	119
3	154	2141	29845-29858	154-167	12	119
4	155	2142	29859-29872	168-181	13	119
5	156	2143	29873-29886	182-195	14	119
6	157	2144	29887-29900	196-209	15	119
7	158	2145	29901-29914	210-223	16	119
8	159	2146	29915-29928	224-237	17	119
9	160	2147	29929-29942	238-251	18	119
10	161	2148	29943-29956	1- 14	1	120
11	162	2149	29957-29970	15- 28	2	120
12	163	2150	29971-29984	29- 42	3	120
13	164	2151	29985-29998	43- 56	4	120
14	165	2152	29999-30012	57- 70	5	120
15	166	2153	30013-30026	71- 84	6	120
16	167	2154	30027-30040	85- 98	7	120
17	168	2155	30041-30053	99-111	8	120
18	169	2156	30054-30067	112-125	9	120
19	170	2157	30068-30081	126-139	10	120
20	171	2158	30082-30095	140-153	11	120
21	172	2159	30096-30109	154-167	12	120
22	173	2160	30110-30123	168-181	13	120
23	174	2161	30124-30137	182-195	14	120
24	175	2162	30138-30151	196-209	15	120
25	176	2163	30152-30165	210-223	16	120
26	177	2164	30166-30179	224-237	17	120
27	178	2165	30180-30193	238-251	18	120
28	179	2166	30194-30207	1- 14	1	121
29	180	2167	30208-30221	15- 28	2	121
30	181	2168	30222-30235	29- 42	3	121

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APPENDIX C

LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD

APPENDIX C

LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title and Date
1	PIR-U-1N45-203	Tentative Comparison of Uplinks, Goldstone vs. Santiago, using Landsat-1/2 Receivers, dated 4-29-77.

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INTRODUCTION

This is the 11th report in a continuing series of documents issued at launch, and quarterly thereafter, to present flight performance analyses 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
76SDS4207	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 October 1975 to 23 January 1976.	29 February 1976
76SDS4248	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 January 1976 to 23 April 1976.	14 July 1976
76SDS4263	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 April 1976 to 23 July 1976.	15 October 1976
76SDS4278	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 July 1976 to 23 October 1976	30 November 1976
77SDS4204	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 October 1976 to 22 January 1977.	22 February 1977
77SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 January 1977 to 23 April 1977.	23 May 1977

This report contains analysis of performance for Orbits 11461 to 12732 for Landsat-2.

SECTION 1

SUMMARY

LANDSAT-2 OPERATIONS

SECTION 1

SUMMARY LANDSAT-2 OPERATIONS

The Lansat-2 spacecraft was launched from the Western Test Range on January 22, 1975, at 022:17:55:51.604. The launch and orbit injection phase of the space flight were nominal and deployment of the spacecraft followed predictions.

All Systems continue to perform normally 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 on 2 July 1975.

WBVTR-1 failed to rewind during Orbit 1021, 5 July 1975, and had intermittent operation until Orbit 2238, 2 July 1975, when normal operation was resumed. WBVTR-1 had a new anomaly in Orbit 2683 on August 3, 1975 because of failure of one of the 4 heads. As a result, it could not be used with MSS data, but performed satisfactorily with RBV data (because RBV provides a synchronizing pulse which permits data from the bad head to be isolated and eliminated). The loss of 25% of the data was obscured by substituting an adjacent line of data maintaining usefulness of the scene for most purposes. After Orbit 7181 on June 20, 1976, the recorder was used regularly in service recording RBV data until failure of a second head in Orbit 10064, 13 January 1977. All operation of WBVTR-1 have been discontinued since that date.

WBVTR-2 started to rewind but stopped prematurely in Orbit 1919, 9 June 1975, and again in Orbit 3854, 26 October 1975, with the cause unknown. Unit remains operational. Occasional slippage in the power supply causes motor speed changes and high bit errors, but these are quickly corrected by a simple operational procedure.

Batteries 1, 2, 5, and 6 have been turned OFF for restoration cycles and returned to service after a few weeks. Battery 1, turned OFF, in Orbit 12562 on 11 July, 1977, remained off thru this report period.

The Spacecraft continues to perform its mission satisfactorily. Table 1-1 shows cumulative in-orbit payload system performance.

Table 1-1. In-Orbit Payload Systems Performance Launch thru Orbit 12,783 (7/27/77) Landsat-2

RBV	Total Scenes Imaged	2506
	Avg. Scenes/Day in Operation	7
	Total Area Imaged (million sq. n mi.)	21.8
	ON TIME (hr.)	24.2
	ON/OFF Cycles	313
	% Real Time Images	70
	% Recorded Images	30
MSS	Total Scenes Imaged	187,778
	Avg. Scenes/Day	188
	Total Area Imaged (million sq. n. mi.)	1354
	ON TIME (hr.)	2035
	ON/OFF Cycles	12,755
	% Real Time Images	75
	% Recorded Images	25
DCS	Messages at OCC	1,108,684
	Users	48
	ON TIME (hr.)	22,004
WPA-1	% Real Time Mode	69
	% Playback Mode	31
	ON TIME (hr.)	103
	ON/OFF Cycles	671
WPA-2	% Real Time Mode	70
	% P/B Mode	30
	ON TIME (hr.)	1809
	ON/OFF Cycles	9925
WBVTR-1	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	Time Head-Tape Contact (hr.)	121.7
	Cycles Head-Tape Contact	1950
	ON TIME (hr.)	154
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.)	787
	Cycles Head-Tape Contact	10,016
	ON TIME (hr.)	996

SECTION 2

ORBITAL PARAMETERS

LANDSAT-2

SECTION 2

ORBITAL PARAMETERS

During this report period, Landsat-2's ground track has decreased to within 0.45 n.m. longitude error at the equator. This was accomplished by controlling the ACS Pitch gates through use of the Pitch Position Bias mode. (See Section 4 also). Therefore, no orbit maintenance burn of the OAS was required during the current report period.

The errors in longitude since launch as a function of time and orbit maintenance burns are shown in Figure 2-1. Figure 2-2 shows the mean local time at the descending equatorial crossings.

As of 23 July 1977, Landsat-2 has descending equatorial crossings at approximately 09:08:39 mean local time as opposed to 08:21:23 AM for Landsat-1. A projection of mean local time at the descending modes for both spacecrafts is given in Figure 2-3.

The difference in orbital periods between Landsat-1 and Landsat-2 caused a drift in the angular phasing between the two satellites with Landsat-1 converging on Landsat-2. Landsat-1's orbit was adjusted between 20 October 1976 and 28 January 1977 in order to increase the time (angular) separation between the Landsat spacecrafts to 29.73 minutes. Figure 2-4 shows this phasing pattern, showing Landsat-2 leading Landsat-1 by 00:21:49, an orbital equivalent of about 76°.

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

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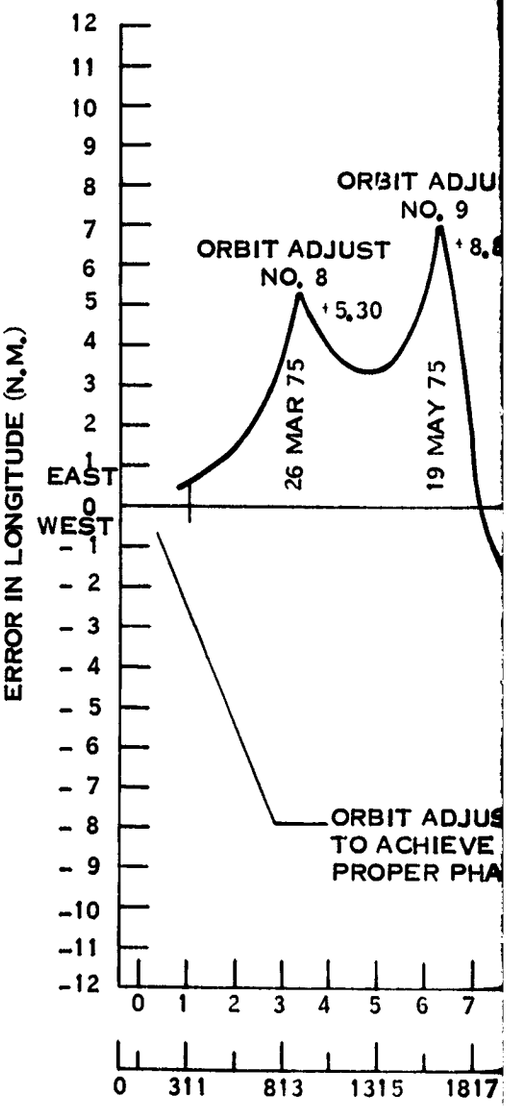

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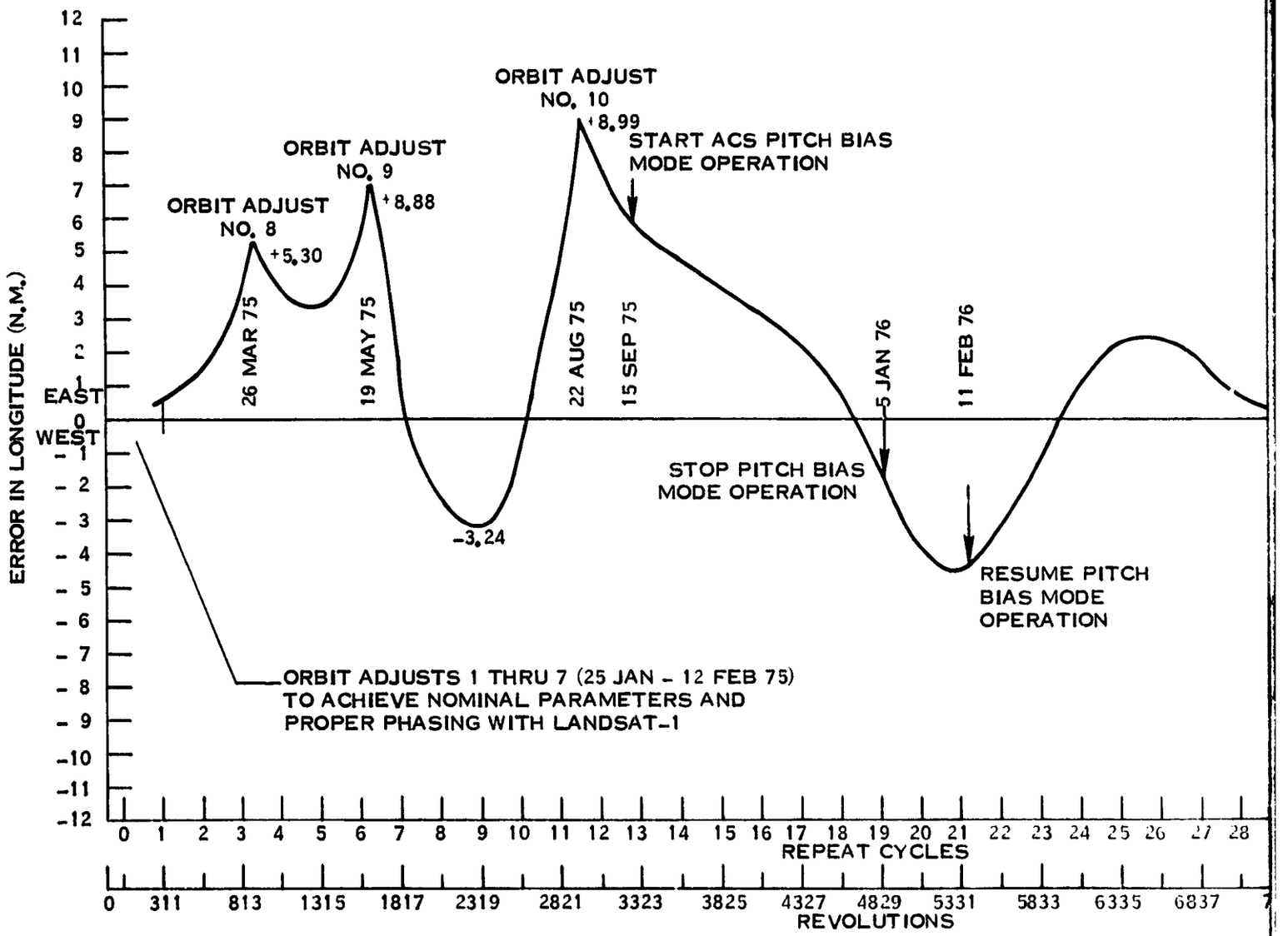

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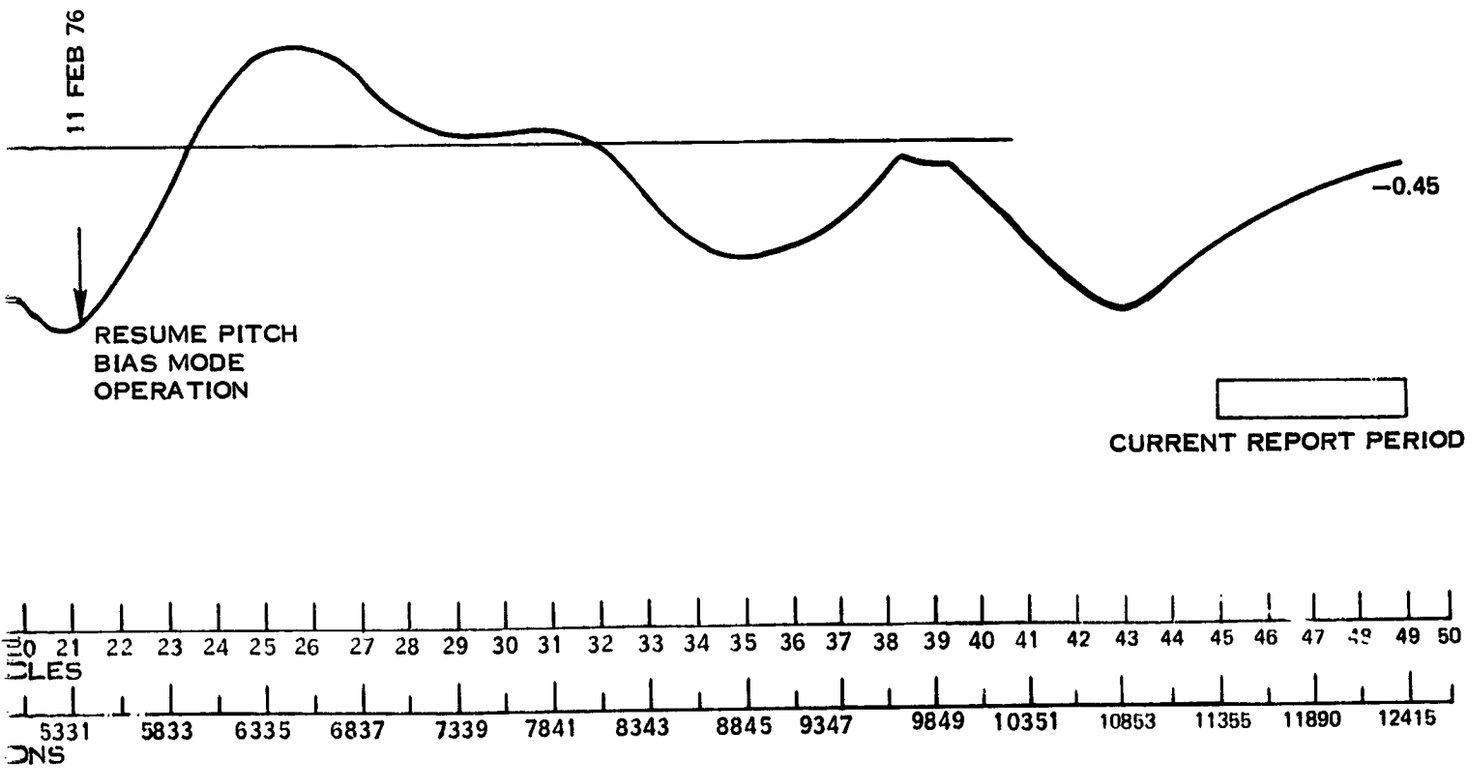

Figure 2-1. Effect of Orbit Adjusts and Pitch Position Bias Orbit Maintenance on Landsat-2's Ground Track

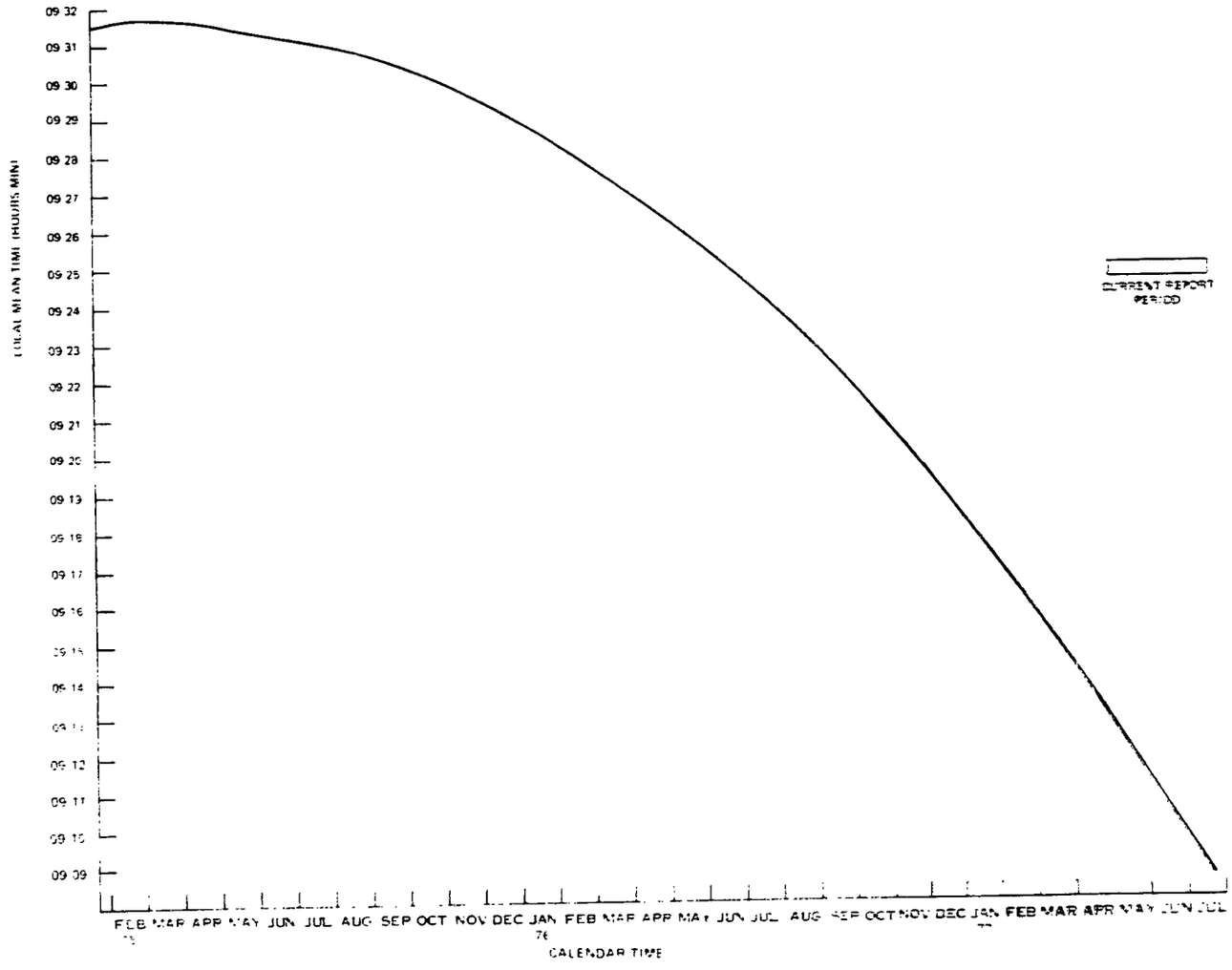

Figure 2-2. Local Mean Time of Descending Node – Landsat-2

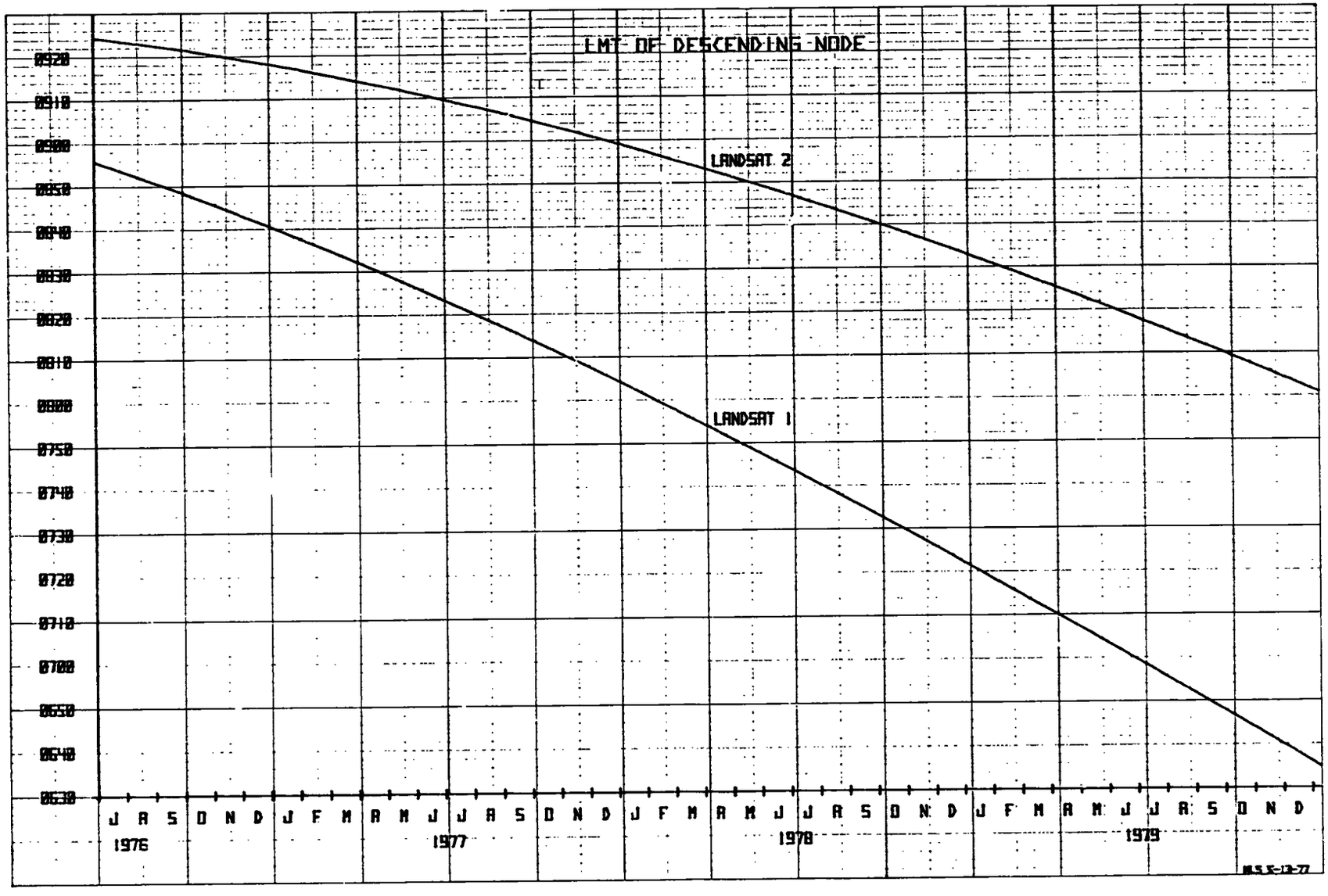

Figure 2-3. Predicted Local Mean Time of Descending Node for LS-1 and LS-2, 1976, 1977, 1978, 1979

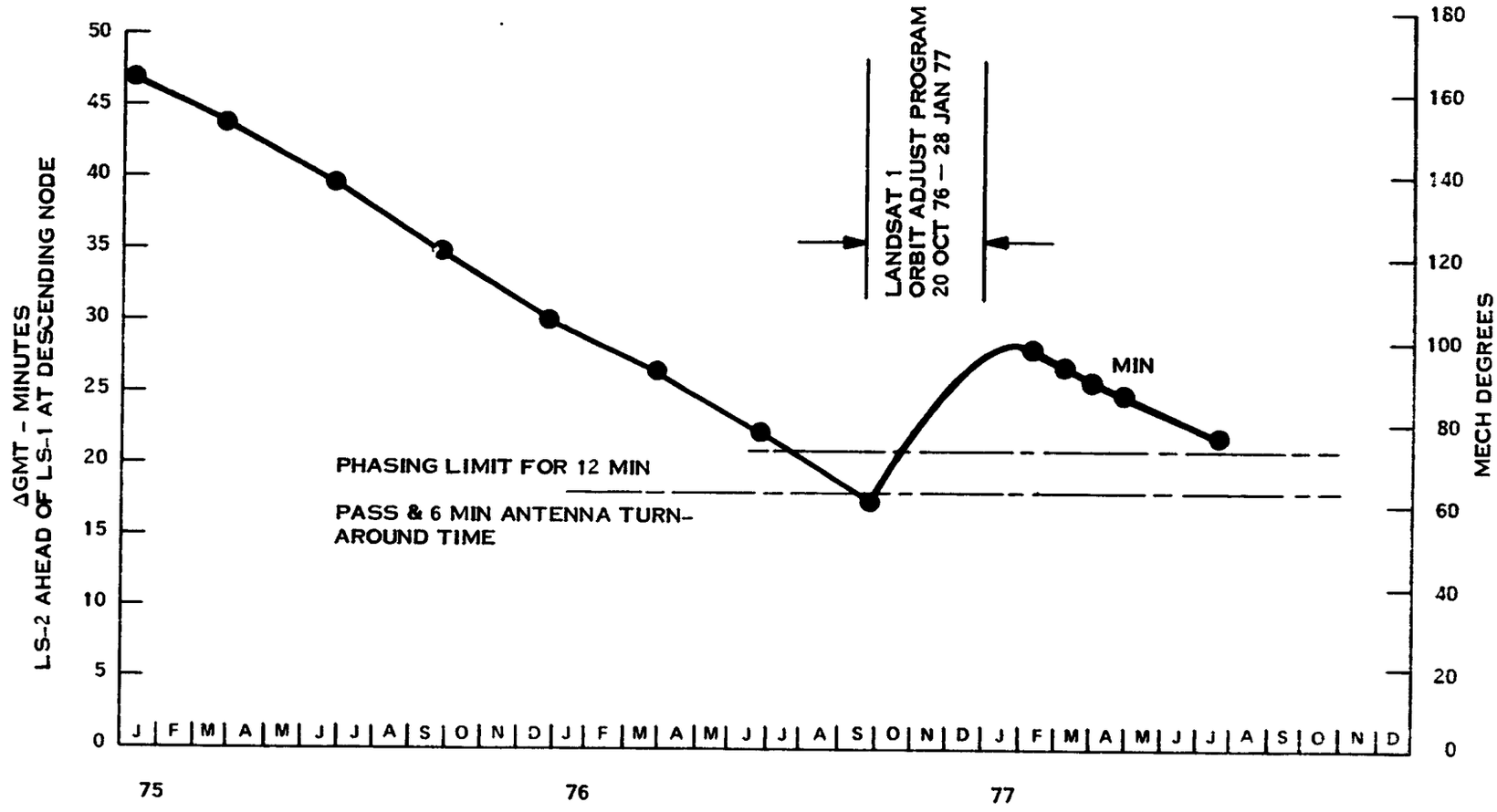

Figure 2-4. Drift in the Angular Phasing Between Landsat-1 and Landsat-2

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

Element / Date	Apogee (KM)	Perigee (KM)	Inclination (Deg.)	Semi-Major Axis (KM)	Eccentricity	Anomolistic 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	0.00=250	103.150	103.266	282.749	353.366	257.271
24 Jan 1976	917.36	897.81	99.016	7285.751	0.001342	103.150	103.266	31.621	84.584	148.179
23 Apr 1976	917.67	897.44	99.029	7285.721	0.001389	103.149	103.265	139.745	172.774	40.033
22 July 1976	916.62	898.40	99.021	7285.677	0.001251	103.148	103.264	253.964	260.924	286.054
22 Oct. 1976	916.95	898.09	99.009	7285.683	0.001251	103.148	103.264	6.744	350.795	173.119
22 Jan. 1977	917.59	897.47	98.993	7285.693	0.001381	103.149	103.265	111.579	80.587	68.155
22 Apr 1977	916.84	898.09	98.975	7285.633	0.001287	103.147	103.263	221.210	168.277	318.768
24 Jul 1977	916.47	898.46	98.967	7285.632	0.001236	103.147	103.263	334.189	257.806	205.754

1 Post launch

2 After the sequence of phasing maneuvers completed in Orbit 212

SECTION 3

POWER SUBSYSTEM (PWR)

LANDSAT-2

SECTION 3

POWER SUBSYSTEM (PWR)

The Power Subsystem on Landsat-2 has performed satisfactorily throughout this report period.

The solar arrays continued to provide excess energy above spacecraft and payload requirements and are expected to support the Landsat-2 mission through 1978. 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 at the end of 30 months in Orbit was 16.9%, which is 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.

The battery packs on-line averaged 10 to 11% depth of discharge (DOD) during this report period. When any battery reached high charge-to-discharge current ratios (C/D) it has been turned OFF for a restoration cycle of a few weeks, leaving 7 batteries on-line at all times. The history of these restoration cycles is shown in Table 3-1. Battery 1 was in such a restoration cycle at the end of this report period. All other battery-pack performance remained satisfactory. Battery voltages have been maintained within suitable limits with Landsat-2 power management procedure, excess array energy being dissipated through auxiliary loads. Temperatures ranged from 16.7° to 25.9°C during this report period.

The power subsystem electronics have performed well during this report period with all regulated voltages stable. Table 3-2 shows major subsystem parameters and Table 3-3 shows power subsystem telemetry for selected orbits. Some parameters in Table 3-2 may be slightly different from those in Table 3-3 because Table 3-2 uses a power management time span (night followed by day), whereas the time span used in Table 3-3 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 sun angle through 1977 for Landsat-1 and 2.

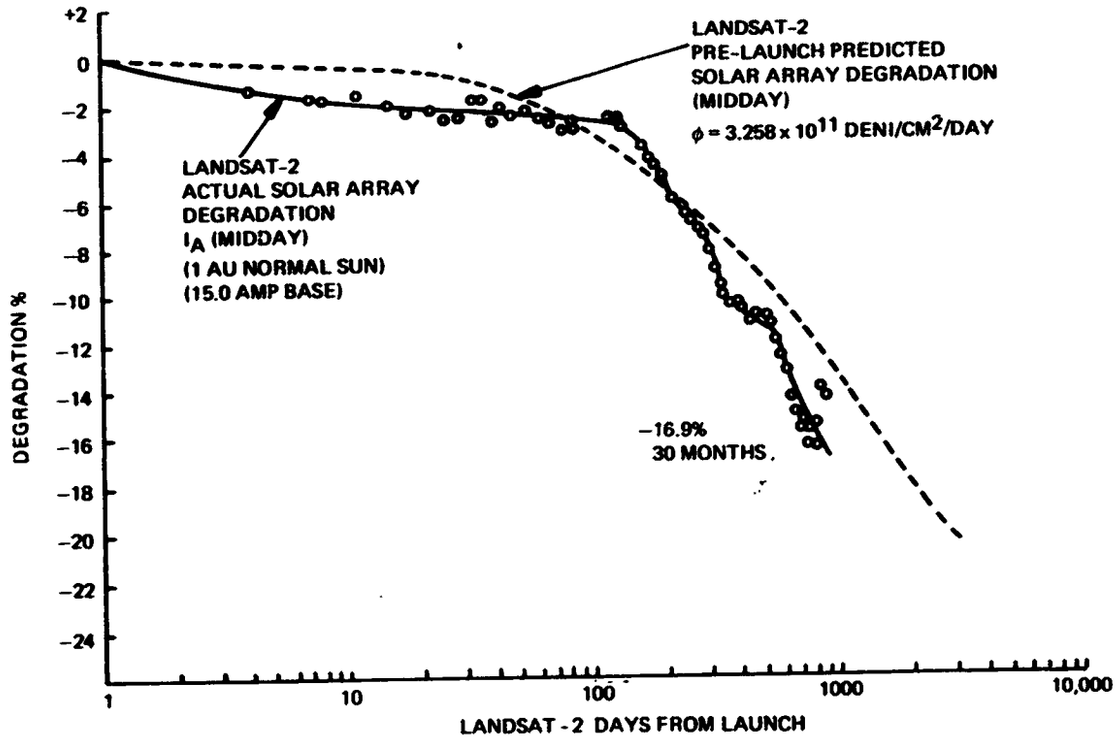

Figure 3-1. Landsat-2 I_A (Midday) Degradation Vs Days

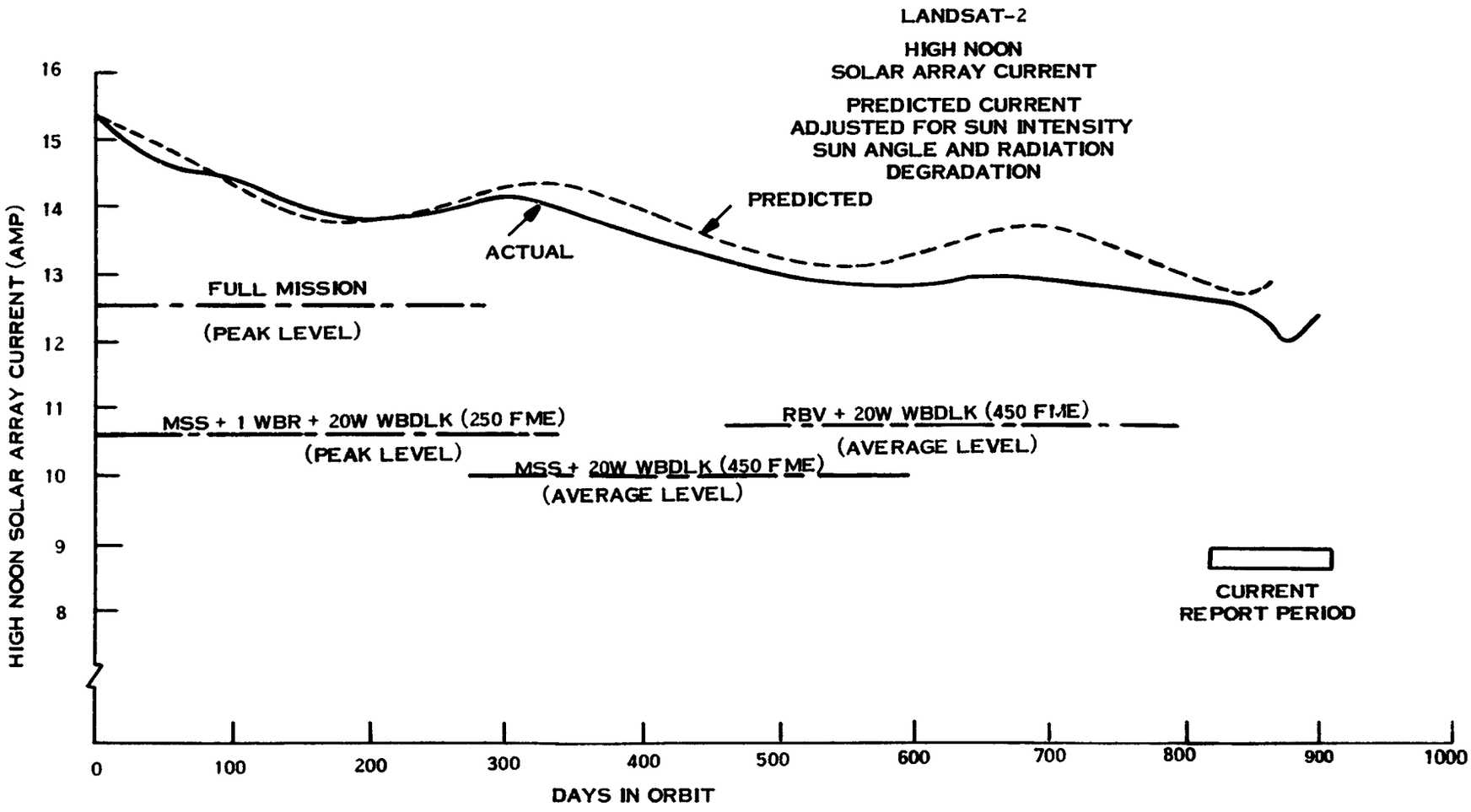

Figure 3-2. Landsat-2 Midday Solar Array Current

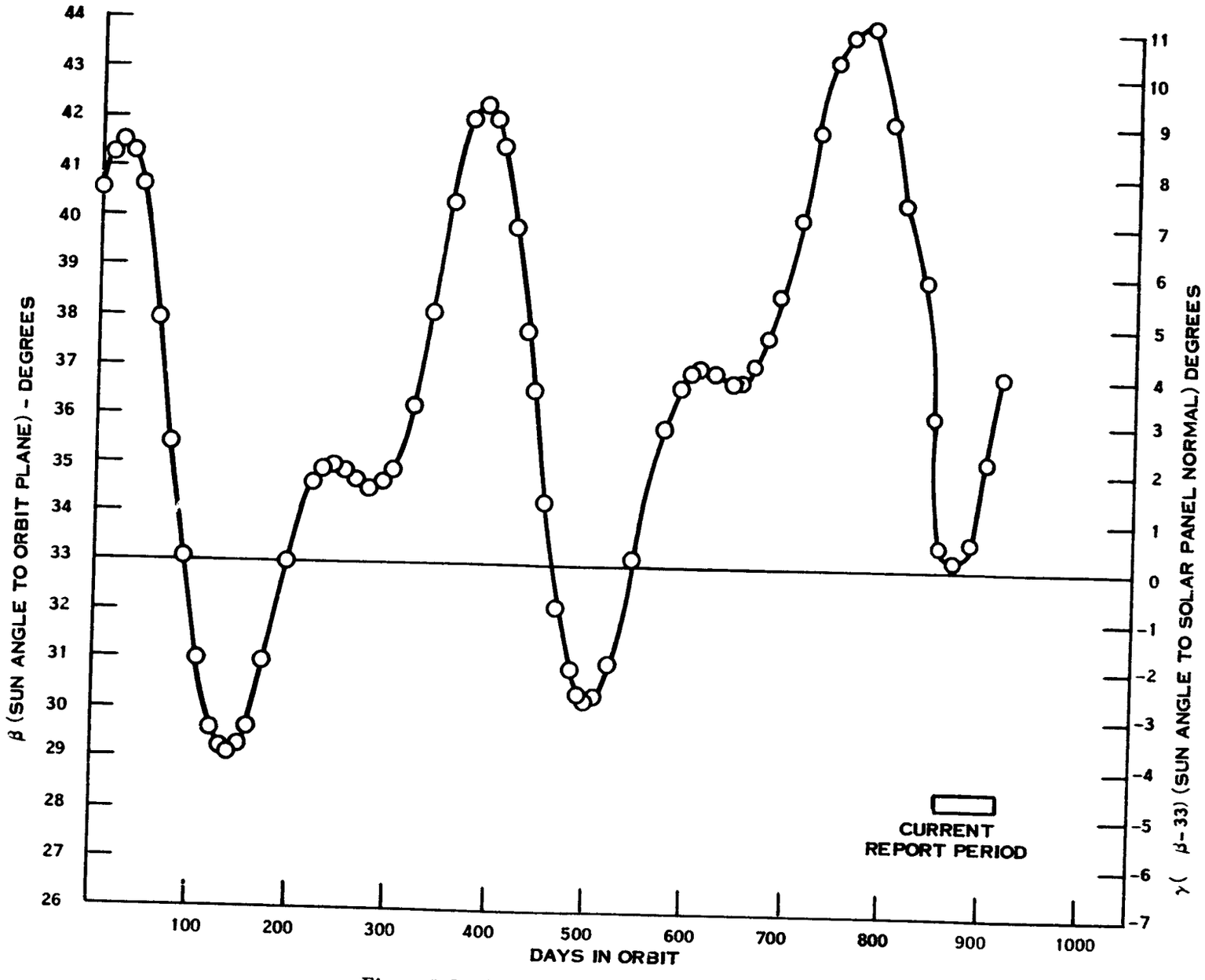

Figure 3-3. Landsat-2 Actual β and α (Paddle) Sun Angles

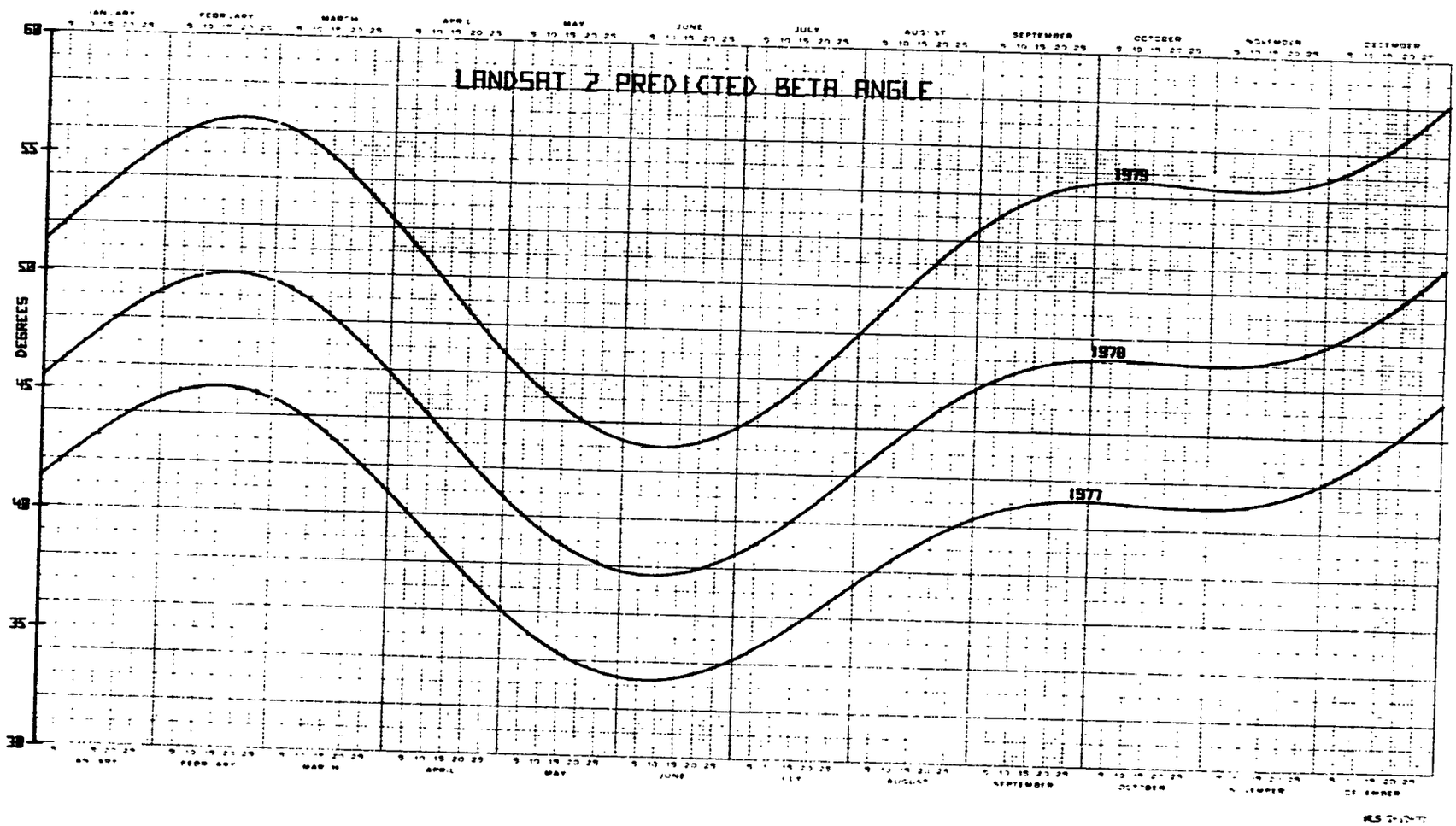

Figure 3-4. Predicted Beta Angle for LS-2 - 1977, 1978, 1979

Table 3-1. Landsat-2 Battery Restoration Cycles

			1	2	3	4	5	6
BATT. 1	OFF	ORB	8029	11420	12562			
		DATE	8-20-76	4-20-77	7-11-77			
	ON	ORB	8509	11947				
		DATE	9-23-76	5-28-77				
BATT. 2	OFF	ORB	12078					
		DATE	6-6-77					
	ON	ORB	12273					
		DATE	6-20-77					
BATT. 5	OFF	ORB	10249					
		DATE	1-26-77					
	ON	ORB	10657					
		DATE	2-24-77					
BATT. 6	OFF	ORB	7601	8591	9652	10962	11993	12271
		DATE	7-20-76	10-29-76	12-7-76	3-18-77	5-31-77	6-20-77
	ON	ORB	7992	9164	10028	11311	12077	12532
		DATE	8-17-76	11-9-76	1-10-77	4-12-77	6-6-77	7-9-77

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

Pwr. Mgmt. Orbit No.	50	2540	5100	7610	10192	11912	12311	12722
Batt 1 Max	33.43	33.25	32.66	33.08	32.57	OFF	-32.91	OFF
2 Chge	33.40	33.14	32.63	33.05	32.54	-32.54	-32.89	-32.89
3 Volts	33.35	33.09	32.57	33.09	32.57	-32.57	-32.92	-32.92
4	33.45	33.30	32.68	33.20	32.59	-32.59	-32.91	-32.95
5	33.42	33.25	32.65	33.08	32.56	-32.65	-32.91	-32.91
6	33.41	33.24	32.64	28.79	32.56	-32.56	OFF	-32.90
7	33.45	33.28	32.68	33.11	32.59	-32.68	-32.93	-32.93
8	33.45	33.27	32.68	33.10	32.59	-32.68	-32.93	-32.93
Average	33.42	33.21	32.65	33.10	32.57	-32.59	-32.36	-32.91
Batt 1 End-of-Night	29.32	29.06	29.06	29.06	28.98	OFF	-28.98	OFF
2 Volts	29.38	29.12	29.04	29.12	28.95	-28.70	-29.01	-28.95
3	29.32	29.07	29.07	29.07	28.89	-28.64	-28.98	-28.98
4	29.34	29.09	29.09	29.09	28.91	-28.66	-29.00	-28.91
5	29.40	29.06	29.06	29.06	28.97	-28.63	-29.06	-28.97
6	29.31	28.96	28.96	28.71	28.88	-28.62	OFF	-28.96
7	29.34	29.08	29.08	29.00	29.00	-28.65	-29.00	-29.00
8	29.34	29.00	29.00	29.00	28.91	-28.65	-29.00	-28.91
Average	29.34	29.05	29.04	29.06	28.94	-28.65	-28.91	-28.96
Batt 1 Chge	12.76	12.13	12.43	15.51	13.74	OFF	15.65	OFF
2 Share	11.68	12.45	11.42	13.54	11.44	15.31	13.91	13.66
3 (%)	12.24	13.67	12.48	14.13	12.41	14.06	13.77	13.84
4	11.99	12.50	11.76	13.97	11.81	13.94	13.42	13.50
5	12.84	11.52	13.24	14.32	12.95	14.04	14.37	14.15
6	13.35	13.20	14.32	**	15.14	16.35	OFF	15.62
7	12.90	12.81	12.97	14.30	11.74	13.10	14.41	13.85
8	12.24	11.72	11.38	13.14	10.77	12.49	13.46	14.25
Batt 1 Load	12.60	11.35	11.80	12.84	11.16	OFF	14.51	OFF
2 Share	12.70	13.99	13.34	15.60	14.14	14.63	16.81	15.83
3 (%)	12.67	14.38	13.74	15.41	13.94	15.72	16.22	15.83
4	12.44	12.99	12.48	14.71	13.00	14.84	14.82	15.06
5	12.34	11.58	12.36	13.69	9.96	14.64	13.94	14.05
6	12.70	11.30	11.56	**	15.27	14.67	OFF	15.46
7	12.47	12.35	12.70	14.03	11.33	13.04	11.87	12.63
8	12.04	12.06	12.02	13.72	11.21	12.46	11.82	11.15
Batt 1 Temp	21.46	21.34	21.94	21.47	22.71	19.20	21.66	19.31
2 in	20.25	21.44	19.94	19.90	20.30	21.07	20.65	19.69
3 (°C)	18.60	19.18	17.86	17.79	17.52	17.41	17.73	17.01
4	20.83	20.91	20.36	20.37	20.36	20.01	20.20	19.83
5	24.08	22.31	27.27	22.64	30.49	22.29	22.81	23.13
6	24.26	23.01	27.28	20.49	27.69	22.78	20.97	22.99
7	24.71	23.62	26.32	22.90	27.01	22.75	24.50	24.22
8	23.63	22.71	24.41	22.40	24.55	21.86	23.40	23.54
Average	22.34	21.81	23.17	21.00	23.83	21.86	21.49	21.21
S/C Reg Bus Pwr. (W)	*	185.0	149.3	146.12	154.49	146.0	175.7	134.0
Comp Load Pwr. (W)	*	41.2	24.8	17.64	6.64	6.64	6.64	6.64
P/L Reg Bus Pwr. (W)	*	9.6	9.8	11.81	9.59	9.5	21.5	11.9
C/D Ratio	1.15	1.10	1.11	1.15	1.24	1.18	1.19	1.17
Total Charge (A-M)	271.9	307.55	223.46	239.11	223.51	234.63	232.76	222.11
Total Discharge (A-M)	237.2	244.33	201.45	207.47	180.84	199.66	191.91	189.59
Solar Array (A-M)	1106	981	1003	892	939	851.8	841.8	860.8
S.A. Peak I (Amp)	16.05	14.67	14.43	13.41	13.25	12.63	12.47	12.55
Midday Array I (Amp)	*	13.88	13.72	12.78	12.86	12.31	12.24	12.31
Sun Angle (Deg)	*	-1.22	8.35	0.3	10.7	0.5	0.1	3.0
Max R Pad Temp (°C)	*	59.60	63.20	58.40	58.40	56.00	58.40	54.18
Min R Pad Temp (°C)	*	-38.00	-35.00	-58.00	-34.40	-37.10	-37.10	-30.80
Max L Pad Temp (°C)	*	56.92	62.15	56.92	62.15	56.92	57.69	56.92
Min L Pad Temp (°C)	*	-45.00	-42.14	-15.71	-39.43	-14.29	-45.00	-38.29

* Data not processed and unavailable
** Bat 6 was turned off for a restoration cycle
*** Bat 5 was turned off for a restoration cycle
**** Bat 1 was turned off for a restoration cycle

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

Function	Description	Pnlt	Orbits							
			50	3532	5102	7611	10192	11872	17320	17722
6001	Batt 1 Disc I	Amp	1.01	0.85	0.74	0.85	0.52	.00	.77	.00
6002	2		1.01	0.97	0.84	1.02	0.65	.83	.88	.90
6003	3		1.00	0.99	0.87	1.01	0.64	.88	.78	.99
6004	4		1.00	0.93	0.78	0.91	0.60	.81	.75	.41
6005	5		0.99	0.85	0.78	0.91	0.47	.83	.72	.87
6006*	6		1.02	0.86	0.73	*	0.70	.83	.00	.90
6007	7		1.00	0.91	0.80	0.92	0.52	.73	.61	.77
6008	8		0.97	0.87	0.75	0.90	0.52	.71	.64	.68
6011	Batt 1 Chg I	Amp	0.47	0.57	0.42	0.52	0.46	.01	.68	.03
6012	2		0.43	0.57	0.38	0.46	0.37	.62	.66	.43
6013	3		0.45	0.61	0.42	0.48	0.40	.60	.59	.46
6014	4		0.44	0.57	0.39	0.47	0.39	.59	.58	.45
6015	5		0.47	0.54	0.44	0.48	0.45	.60	.61	.47
6016*	6		0.49	0.60	0.47	*	0.49	.69	.66	.52
6017	7		0.47	0.60	0.43	0.48	0.40	.57	.60	.46
6018	8		0.45	0.55	0.38	0.44	0.36	.54	.56	.46
6021	Batt 1 Volt	VDC	31.50	30.92	31.11	31.12	30.79	-26.75	-30.58	-28.63
6022	2		31.48	30.90	31.09	31.11	30.80	-31.01	-30.58	-31.11
6023	3		31.49	30.91	31.10	31.13	30.81	-31.03	-30.60	-31.13
6024	4		31.49	30.91	31.10	31.13	30.81	-31.03	-30.59	-31.12
6025	5		31.50	30.92	31.11	31.13	30.79	-31.04	-30.59	-31.13
6026*	6		31.19	30.90	31.08	28.69	30.80	-31.01	-28.28	-31.11
6027	7		31.52	30.94	31.14	31.16	30.83	-31.06	-30.61	-31.15
6028	8		31.49	30.92	31.11	31.13	30.81	-31.03	-30.59	-31.39
6031	Batt 1 Temp	DGC	21.59	20.93	21.91	21.15	22.67	19.00	21.98	19.39
6032	2		20.53	20.75	19.90	19.86	20.36	20.71	20.97	19.54
6033	3		18.80	18.66	17.77	17.13	17.54	17.39	17.68	16.81
6034	4		20.90	20.88	20.33	20.31	20.13	20.22	20.21	19.67
6035	5		25.16	22.22	27.18	22.62	30.52	22.10	22.88	23.13
6036	6		24.37	22.55	27.19	20.12	27.67	22.83	20.91	23.01
6037	7		24.83	23.26	26.19	22.59	26.95	22.96	21.61	21.26
6038	8		23.75	22.52	24.36	22.36	24.19	21.91	23.16	23.56
6040	Rt. Pad Temp	DGC	28.96	26.16	30.90	25.31	26.11	23.58	25.25	31.81
6041	Rt. Pad VM	VDC	33.72	33.56	32.86	31.00	31.11	33.11	32.73	33.46
6042	Rt. Pad VN	VDC	33.46	33.18	32.44	33.45	31.27	32.80	32.39	31.30
6044	Lt. Pad Temp	DGC	25.56	21.16	28.22	22.53	26.11	21.58	23.80	31.03
6045	Lt. Pad VF	VDC	34.40	33.80	33.82	34.38	33.36	33.75	33.21	31.38
6046	Lt. Pad VG	VDC	34.48	33.91	33.91	31.48	33.45	33.84	33.31	31.46
6050	S/C UR Bus V	VDC	31.73	31.14	31.33	31.69	30.93	-31.19	-30.71	-31.66
6051	S/C RG Bus V	VDC	24.57	24.57	24.58	24.58	24.57	-24.57	-24.57	-24.58
6052	Aux Reg AV	VDC	23.36	23.40	23.44	23.43	23.44	-23.13	-23.43	-23.44
6053	Aux Reg BV	VDC	23.37	23.39	23.44	23.41	23.43	-23.44	-23.42	-23.41
6054	Solar I	Amp	14.81	13.76	13.40	12.37	12.25	11.69	12.01	11.93
6056	S/C RG Bus I	Amp	7.23	7.17	6.28	5.98	6.11	5.99	7.17	5.47
6058	PC Mod T1	DGC	21.67	21.98	20.77	20.19	20.08	19.83	21.35	18.97
6059	PC Mod T2	DGC	20.44	20.53	19.56	19.39	19.16	18.83	19.44	18.11
6070	P/L RG Bus V	VDC	24.61	21.60	24.60	21.62	24.59	-24.61	-24.60	-24.62
6071	P L UR Bus V	VDC	31.85	31.21	31.40	31.79	30.97	-31.28	-30.78	-31.75
6073	P Aux AV	VDC	23.47	23.51	23.51	23.50	23.50	-23.51	-23.51	-23.51
6074	P Aux BV	VDC	23.46	23.51	23.51	23.50	23.50	-23.52	-23.51	-23.51
6075	PR Mod T1	DGC	20.84	21.39	20.32	20.21	20.82	20.63	21.78	19.83
6076	PR Mod T2	DGC	22.13	22.38	21.79	21.72	22.11	21.85	22.56	21.32
6079	Fuse Blow V	VDC	24.48	24.48	24.19	21.51	24.48	-24.49	-21.47	-21.4[illegible]
6080	Shunt 1 I	Amp	0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6081	2		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6082	3		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6083	4		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6084	5		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6085	6		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6086	7		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6087	8		0.0	0.0	0.00	0.0	0.00	.00	.00	.00
6100	P/L RG Bus I	Amp	0.38	0.80	0.51	0.45	0.40	.96	.88	.49
Total No.	Major Frames	Frm	396	387	785	384	697	384	785	717

*Battery 6 was turned off for a restoration cycle.

SECTION 4

ATTITUDE CONTROL SUBSYSTEM (ACS)
LANDSAT-2

SECTION 4

ATTITUDE CONTROL SUBSYSTEM (ACS)

Landsat-2's Attitude Control System performed normally since launch and has consistently maintained correct spacecraft attitude.

Low pressure in the Forward Scanner resulting from a pre-launch leak has had no effect on the ACS System's performance.

The program implemented in September 1975 to minimize spacecraft ground track drift by controlling Pitch gating was continued during this quarter. Table 4-1 summarizes the Pitch Position Bias mode sequences implemented this year as part of this program, and Figure 2-1 in Section 2 shows the effects of Pitch gating control on the spacecraft's orbital ground track drift.

Table 4-1. Landsat-2 Pitch Position Bias Quarterly Pneumatic Gating Summary

Period		PPB Implementation Sequence Orbit Number			Duration Centered About Satellite Midnight (minutes)	Resulting Average Number of Pitch Gates per Day
From Orbit	To Orbit	N_O	N_O+1	N_O+2		
10265 27 Jan 77	10626 22 Feb 77	+2.0	0.0	+2.0	38 Alternate Orbits	6 to 7 (+P)
10627 22 Feb 77	10723 1 Mar 77	0.0	0.0	0.0	-	12 (+P)
10724 1 Mar 77	10919 15 Mar 77	2.9	2.9	2.9	48	2 to 3 (+P)
10920 15 Mar 77	11226 6 Apr 77	2.0	2.0	2.0	48	1 to 2 (+P)
11227 6 Apr 77	11324 13 Apr 77	2.0	2.0	2.0	50	1 to 2 (+P)
11325 13 Apr 77	11503 26 Apr 77	2.0	2.9	2.0	48	0
11504 26 Apr 77	11685 9 May 77	+2.9	+2.9	+2.9	48	3 to 4 (-P)
11686 9 May 77	11991 31 May 77	+2.9	+2.9	+2.9	52	6 (-P)
11992 31 May 77	12035 3 June 77	+2.0	+2.0	+2.0	50	1 (+P)
12036 3 June 77	12075 6 June 77	+2.0	+2.9	+2.0	45	0
12076 6 June 77	12282 20 June 77	+2.0	+2.9	+2.0	50	0
12283 20 June 77	12966 8 Aug 77	2.0	2.0	2.0	50	1 to 3 (+P)

As a result of the ground track drift maintenance program, Freon Usable Impulse declined at a lower rate as shown in Figures 4-1 and 4-2.

RMP2 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 normal.

Tables 4-2, 4-3, and 4-4 show typical telemetry. All are nominal

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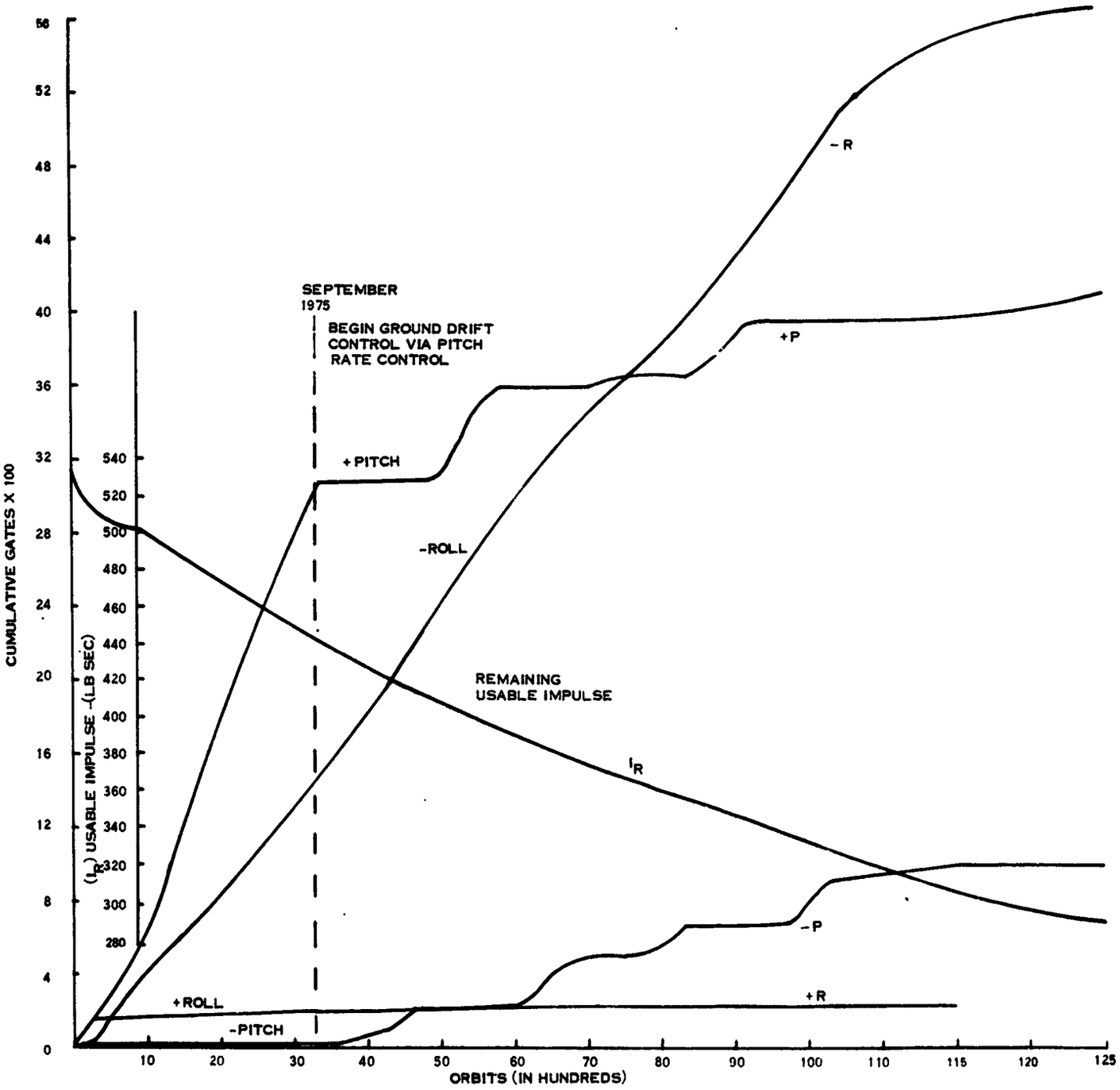

Figure 4-1. Landsat-2 Gating History

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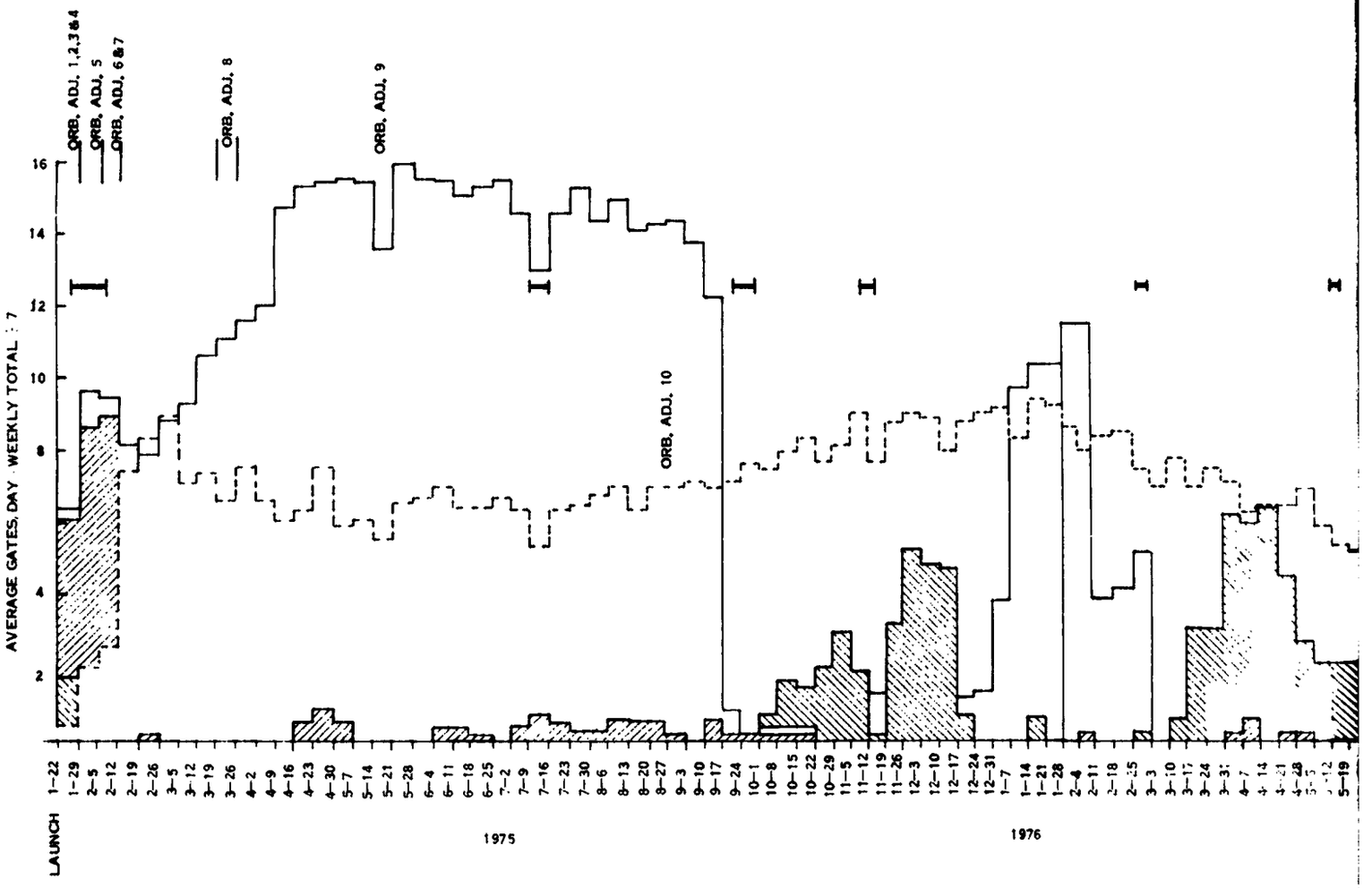

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FOLDOUT FRAME 2

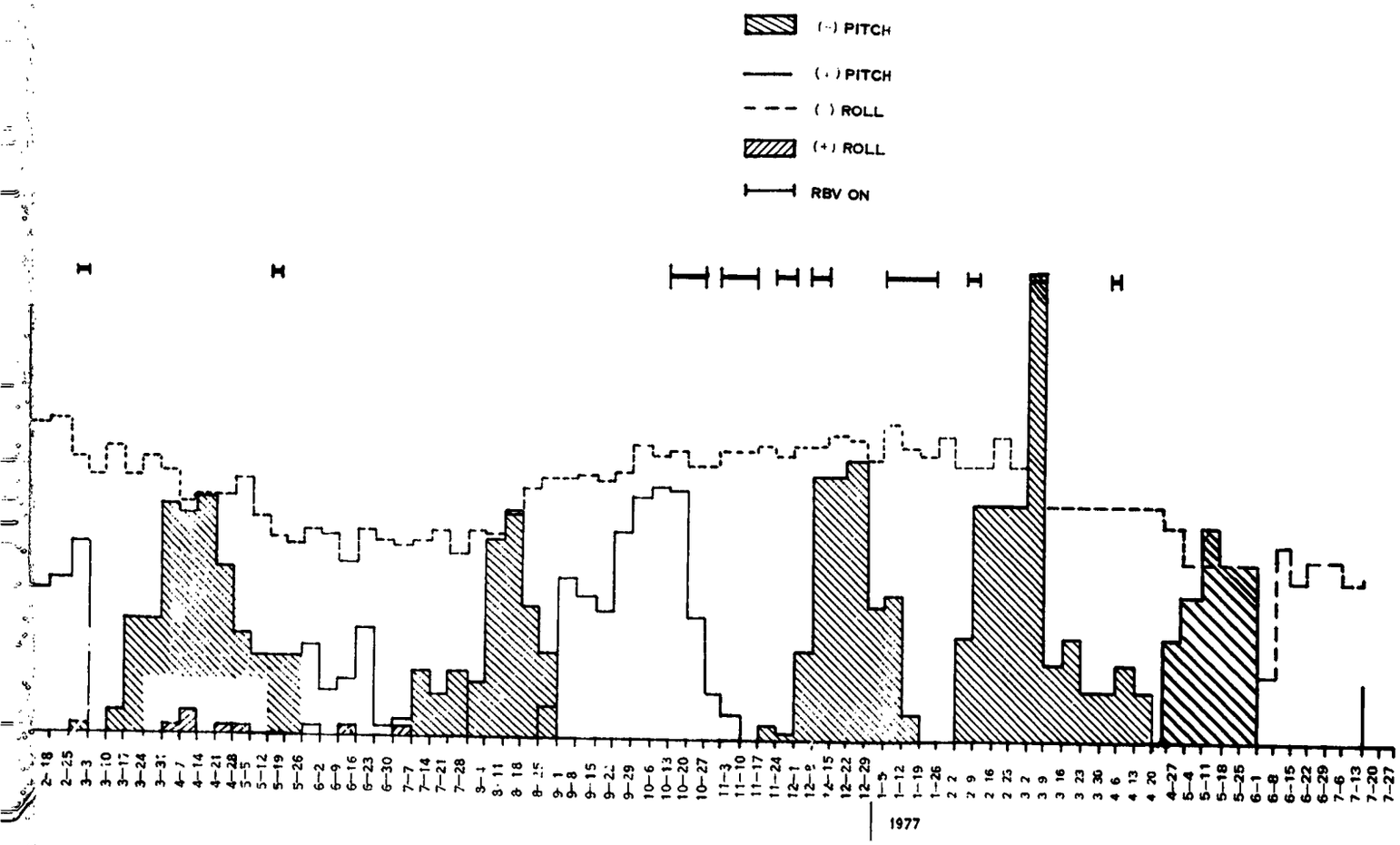

Figure 4-2. Landsat-2 Gating Frequency vs Time

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

Function	Units	Orbits							
		29	2532	5102	7641	10191	11871	12320	12720
1094 RMP 1 Gyro Temperature	DGC	19.33(1)	21.02	22.69	22.45	22.70	23.23	22.87	22.54
1094 RMP 2 Gyro Temperature	DGC	74.00	74.00	74.26	74.45	74.50	74.63	74.59	74.67
1222 SAD RT MTR HSNG Temp.	DGC	19.50	22.23	22.98	23.62	22.73	24.56	24.05	23.43
1242 SAD LT MTR HSNG Temp.	DGC	26.87	27.54	29.79	28.94	30.26	30.05	29.52	29.30
1223 SAD RT MTR WNDNG Temp.	DGC	21.76	24.23	24.36	25.23	23.72	26.15	25.64	24.84
1243 SAD LT MTR WNDNG Temp.	DGC	30.23	30.32	32.83	31.68	33.15	32.76	-140.87	31.92
1228 SAD RT HSG Pressure	PSI	7.26	7.25	7.18	7.13	7.00	6.94	6.94	6.94
1248 SAD LT HSG Pressure	PSI	7.28	7.27	7.21	7.02	6.91	6.78	6.74	6.73
1007 FWD Scanner MTR Temp.	DGC	22.07	22.25	23.80	23.39	23.97	24.18	23.59	23.31
1016 Rear Scanner MTR Temp.	DGC	24.19	23.62	25.04	24.59	24.83	25.42	24.81	24.59
1003 FWD Scanner Pressure	PSI	9.59(2)	D	D	D	D	.27	.28	.27
1012 Rear Scanner Pressure	PSI	6.21	6.00	5.62	5.35	5.11	4.89	4.90	4.82
1212 Gas Tank Pressure	PSI	1948.0	1672.12	1517.04	1381.12	1256.98	1171.50	1149.07	1134.50
1210 Gas Tank Temperature	DGC	20.66	22.33	24.25	23.75	24.43	24.66	24.24	24.00
1213 Manifold Pressure	PSI	53.98	54.83	54.56	54.78	55.26	55.18	55.51	56.00
1211 Manifold Temperature	DGC	19.18	20.50	22.59	21.91	22.78	23.04	22.49	22.07
1059 CLG Power Supply Card Temp	DGC	39.00	39.52	41.47	40.71	41.81	41.69	41.14	41.05
1260 TH01 EBP	DGC	24.29	25.01	27.21	26.43	27.58	27.18	26.90	26.75
1261 TH02 EBP	DGC	20.29	21.36	23.25	22.79	23.48	23.72	23.18	22.98
1262 TH03 EBP	DGC	18.29	20.05	21.46	21.34	21.29	22.35	21.76	21.33
1263 TH01 STS	DGC	6.54	-6.22	0.52	-2.62	-1.66	- .68	- 3.21	- 2.18
1264 TH02 STS	DGC	D	D	D	D	D	D	D	D
1265 TH03 STS	DGC	8.46	-.48	8.67	5.75	11.66	6.56	5.95	7.09
1266 TH04 STS	DGC	-2.78	-9.65	-3.26	-3.63	-0.08	- 3.73	- 3.07	- 2.87
1267 TH05 STS	DGC	9.62	-2.64	5.57	2.20	4.24	3.25	.63	1.98
1224 SAD R FSST	DGC	35.00	36.57	35.81	40.86	34.24	44.81	13.22	3.71
1244 SAD L FSST	DGC	50.00	46.29	49.13	51.71	55.24	54.30	61.00	53.20

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

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

Function	Units	Orbit							
		29	2532	5102	7641	10191	11871	12320	12720
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	OFF	OFF	.00	.00	.00
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	OFF	OFF	.00	.00	.00
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	OFF	OFF	-17.54	-17.56	-17.55
1091 RMP 2 MTR Volts	VDC	29.99	29.94	29.92	29.87	29.87	29.87	29.90	29.91
1092 RMP 2 MTR Current	Amps	0.10	0.10	0.10	0.11	0.10	.10	.10	.10
1090 RMP 2 Supply Volts	VDC	-23.63	-23.61	-23.59	-23.59	-23.58	-23.59	-23.58	-23.59
1220 SAD RT MTR WNDNG Volts	VDC	- 5.47	- 4.51	- 4.47	- 4.22	- 4.09	- 4.05	- 4.08	- 4.20
1240 SAD LT MTR WNDNG Volts	VDC	- 5.08	- 4.70	- 4.72	- 4.54	4.57	- 5.15	- 2.46	- 1.65
1227 SAD RT -15 VDC Conv	VDC	15.14	15.15	15.16	15.13	15.15	15.12	15.14	15.13
1247 SAD LT -15 VDC Conv	VDC	15.23	15.22	15.21	15.20	15.22	15.20	15.23	15.22
1056 CLB ± 6 VDC	TMV	2.35	2.35	2.38	2.38	2.40	2.40	2.40	2.40
1055 CLB ± 10 VDC	TMV	2.88	2.90	2.92	2.93	2.94	2.94	2.94	2.94
1057 CLB Power Supply Volts	TMV	2.97	2.94	2.96	2.96	2.97	2.97	2.97	2.96

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

Function	Units	Orbit							
		26	2532	5102	7641	10191	11871	12320	12720
1041 Pitch Fine Error	DEG	- 0.15	- 0.14	- 0.13	- 1.48*	- 0.82	- 2.28	- 1.36	- 1.37
1043 Pitch Flywheel Speed	RPM	-156.12	-198.41	-162.97	214.14	3.39	206.32	-140.87	-157.35
1038 Pitch Mtr Drvr CCW	PCT	6.64	7.35	6.05	4.24	4.33	4.87	7.06	7.77
1039 Pitch Mtr Drvr CW	PCT	2.03	2.60	1.80	8.51	3.87	8.92	3.05	.04
1030 Roll Fine Error	DEG	- 0.13	- 0.09	- 0.14	- 0.14	- 0.21	- .10	1.04	- .18
1027 Roll Rear Flywheel SPD	RPM	729.30	739.75	748.56	742.88	792.27	733.92	765.78	785.40
1026 Roll Fwd Flywheel SPD	RPM	703.02	725.23	735.81	721.03	737.14	741.94	724.50	756.66
1022 Roll Rear Mtr Drvr CCW	PCT	0.67	0.39	0.63	0.41	0.87	.55	.29	.66
1025 Roll Rear Mtr Drvr CW	PCT	7.54	5.47	6.54	6.80	6.09	6.35	6.32	7.57
1023 Roll Fwd Mtr Drvr CCW	PCT	0.70	0.37	0.87	0.68	0.72	.77	.63	.70
1024 Roll Fwd Mtr Drvr CW	PCT	5.46	4.74	4.01	3.82	4.34	3.75	3.12	3.71
1035 Yaw Tach	RPM	- 95.73	- 41.57	-38.16	- 11.03	-163.04	-175.83	- 23.02	-108.28
1033 Yaw Mtr Drvr CW	PCT	1.98	1.77	2.01	1.76	1.91	- 1.48	1.62	2.10
1034 Yaw Mtr Drvr CCW	PCT	2.10	1.72	1.90	1.64	2.49	2.28	1.65	2.13
1221 SAD Right Tach	D/M	3.38	3.38	3.38	3.38	3.37	3.38	3.37	3.36
1241 SAD Left Tach	D/M	3.68	3.63	3.56	3.55	3.48	3.57	3.56	3.56

*Pitch Pos. Bias Implemented During This Orbit

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SECTION 5

COMMAND/CLOCK SUBSYSTEM (CMD)

LANDSAT-2

SECTION 5

COMMAND/CLOCK SUBSYSTEM (CMD)

The Command Clock Subsystem operated nominally in this report period. Figure 5-1 shows the history of the S/C clock drift since launch. Figure 5-2 shows the cumulative clock drift, 12.502 seconds faster in 30 months; and Figure 5-3 gives drift rate of S/C clock, an average of 0.982 msec fast per orbit. In this period, the drift rate is increasing and is at the average rate of 1.283 msec fast per orbit. The clock of Landsat-2 drifts in opposite direction from the clock of Landsat-1.

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

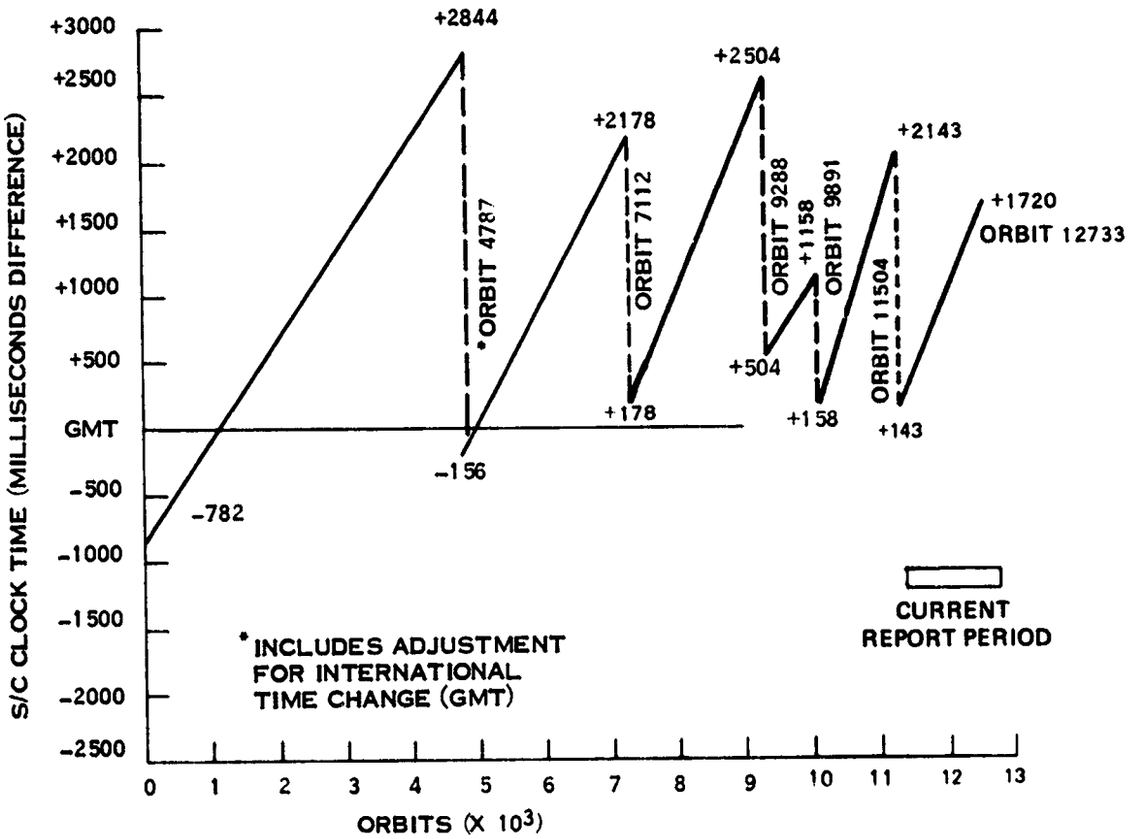

Figure 5-1. Landsat-2 Drift History

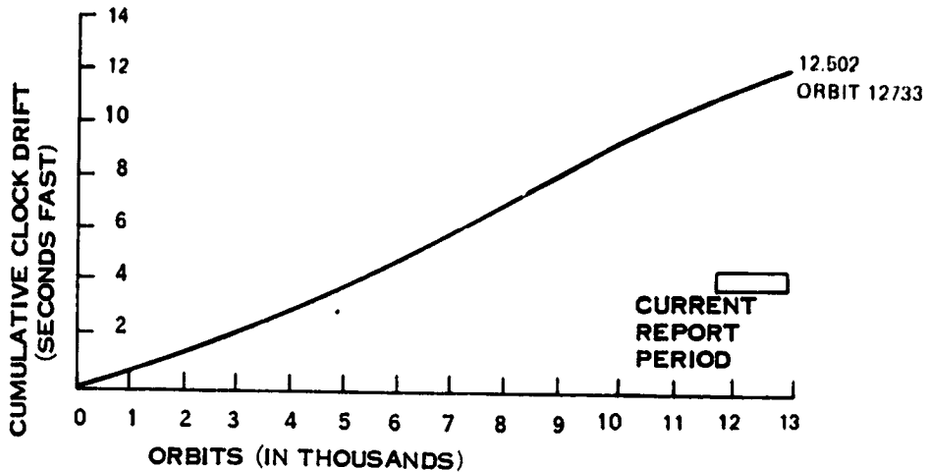

Figure 5-2. Cumulative Clock Drift

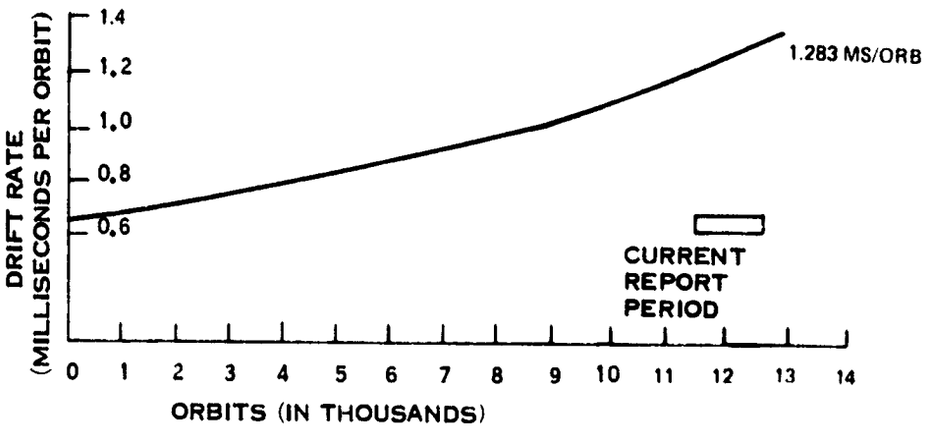

Figure 5-3. Drift Rate of S/C Clock

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

Function No.	Name	Mode	Units	Orbit 35	2462	5091	7640	10,192	11871	12320	12720
8005	Pri. Power Supply Temp	-	DGC	38.82	40.43	39.43	39.94	39.08	39.66	39.36	39.15
8006	Ped. Power Supply Temp	-	DGC	36.93	38.70	38.00	38.52	37.85	38.45	38.17	38.03
8007	Pri. Osc. Temp	-	DGC	28.70	29.35	28.70	28.69	28.56	28.45	28.23	27.92
8008	Red Osc. Temp	-	DGC	27.82	28.68	27.26	27.60	26.97	27.00	26.97	26.95
8009	Pri. Osc. Output	-	TMV	1.06	1.06	1.05	1.05	1.05	1.05	1.06	1.05
8010	Red. Osc. Output	-	TMV	1.17	1.20	1.18	1.19	1.18	1.18	1.19	1.18
8011	100 KHz	Pri. - Red	TMV	3.17	3.16	3.15	3.15	3.15	3.15	3.16	3.15
8012	10 KHz	Pri. - Red	TMV	3.08	3.05	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	2.96	2.95
8014	400 Hz	Pri. - Red	TMV	4.17	4.45	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	2.05
8016	Red. +4V Power Supply	Red Clk ON	VDC	NA	2.01	2.00	2.00	2.00	2.00	2.01	2.00
8017	Pri. +6V Power Supply	Pri. Clk ON	VDC	NA	2.30	2.30	2.30	2.30	2.30	2.31	2.30
8018	Red. +6V Power Supply	Red Clk ON	VDC	NA	2.31	2.30	2.30	2.30	2.30	2.23	2.30
8019	Pri. -6V Power Supply	Pri. Clk ON	VDC	NA	5.23	5.23	5.22	5.23	5.22	5.23	5.23
8020	Red. -6V Power Supply	Red. Clk ON	VDC	NA	5.23	5.23	5.23	5.23	5.22	5.66	5.23
8021	Pri. -23V Power Supply	Pri. Clk ON	VDC	NA	5.70	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	5.29	5.65
8023	Pri. -29V Power Supply	Pri. Clk ON	VDC	NA	5.30	5.29	5.29	5.29	5.29	5.30	5.30
8024	Red -29V Power Supply	Red Clk ON	VDC	NA	5.29	5.29	5.29	5.28	5.28	3.95	5.29
8101	CIU A - 12V	CIU A ON	VDC	3.79	3.97	3.97	3.96	3.96	3.96	3.96	3.96
8102	CIU B - 12V	CIU B ON	VDC	3.78	3.95	3.95	3.95	3.95	3.95	4.10	3.95
8103	CIU A - 5V	CIU A ON	VDC	3.93	4.15	4.15	4.15	4.15	4.14	4.14	4.14
8104	CIU B - 5V	CIU B ON	VDC	3.90	4.10	4.10	4.10	4.10	4.10	19.42	4.10
8105	CIU A Temp	CIU A ON	DGC	26.01	22.50	21.67	21.62	21.67	21.40	21.34	21.06
8106	CIU B Temp	CIU B ON	DGC	23.35	20.38	19.70	19.65	19.71	19.51	22.59	19.20
8201	Receiver RF-A Temp	-	DGC	NA	30.02	29.14	29.22	28.83	28.75	28.69	28.50
8202	Receiver RF-B Temp	-	DGC	29.09	*	*	24.04	22.66	22.54	26.14	22.36
8203	D MOD A Temp	-	DGC	28.95	39.20	38.56	39.08	38.25	38.10	38.14	37.98
8204	D MOD B Temp	-	DGC	37.73	27.56	26.72	28.11	26.31	26.15	.00	25.96
8205	Receiver A AGC	Receiver A ON	DGC	*	-92.18	-91.43	-89.93	-90.78	-94.10	-91.56	-93.39
8206	Receiver B AGC	Receiver B ON	DBM	-87.83	*	*	-88.46	*	*	*	*
8207	Amp. A Output	Receiver A ON	TMV	*	2.51	2.54	2.58	2.75	2.36	2.49	2.35
8208	Amp. B Output	Receiver B ON	TMV	2.10	*	*	2.51	*	*	*	*
8209	Freq. Shift Key A Out	Receiver A ON	TMV	*	1.08	1.08	1.08	1.09	1.08	1.08	1.08
8210	Freq. Shift Key B Out	Receiver B ON	TMV	1.11	*	*	1.13	*	*	*	*
8211	Amp. A Output	Receiver A ON	TMV	*	1.12	1.13	1.11	1.14	1.13	1.13	1.12
8212	Amp. B Output	Receiver B ON	TMV	1.13	*	*	1.16	*	*	*	*
8215	D MOD A - 15V	Receiver A ON	TMV	*	4.87	4.87	4.87	4.87	4.87	4.87	4.87
8216	D MOD B - 15V	Receiver B ON	TMV	4.77	*	*	4.77	*	*	*	*
8217	Regulator A - 10V	Receiver A ON	TMV	*	5.40	5.40	5.40	5.40	5.40	5.40	5.40
8218	Regulator B - 10V	Receiver B ON	TMV	5.32	*	*	5.31	*	*	*	*
8311	ECAM Mem. Tmp	ECAM ON	DGC	NA	18.03	18.41	18.10	18.44	18.29	18.28	18.04
8312	ECAM Pwr Spply Temp	ECAM ON	DGC	NA	23.13	23.13	22.45	23.00	22.53	22.79	22.35

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SECTION 6

TELEMETRY SUBSYSTEM (TLM)

LANDSAT-2

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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. Functions 1264 (Thermal Shield 5 Temperature), 4002 (MMCA Board 2 Temperature) and 13200 (APU 24 Volt Input) were defective before launch but verification of those 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	2407	5091	7611	10,192	11871	12320	12712
9001	Memory Sequencer A Converter	VDC	4.45	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	20.77	21.37	20.46	21.31	19.05	19.84	19.62
9004	Formatter A Converter	VDC	4.52	4.51	4.52	4.50	4.52	4.51	4.50	4.51
9005	Formater B Converter	VDC	**	**	**	**	**	**	**	**
9006	Dig. Mux A Converter	VDC	4.22	4.22	4.22	4.21	4.22	4.21	4.22	4.22
9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**	**
9008	Formatter/Dig Mux Temp	°C	25.00	23.98	27.80	22.51	29.75	24.26	23.23	24.47
9009	Analog Mux A Converter	VDC	4.02	4.05	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	4.03	4.04	4.04	4.03	4.03	4.03
9012	A/D Converter B Voltage	VDC	**	**	**	**	**	**	**	**
9013	Analog Mux, A/D Conv. Temp	°C	25.00	24.91	27.33	25.00	27.44	25.00	24.76	25.21
9014	Preregulator A Voltage	VDC	4.00	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	22.27	24.74	21.89	25.17	22.32	21.77	22.20
9017	Memory A Converter	VDC	4.45	4.45	4.45	4.45	4.45	4.45	4.45	4.45
9018	Memory A Temp	°C	17.50	17.33	17.17	15.62	17.16	15.75	16.54	16.51
9019	Memory B Converter	VDC	**	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.50	17.28	17.41	17.45	17.50	15.97	16.77	16.51
9100	Reflected Power (Xmtr A)	dBm	18.29	13.68	14.18	13.88	14.53	14.03	13.80	14.00
9101	Xmtr A-20 VDC	VDC	3.80	3.98	3.97	3.97	3.98	3.97	3.97	3.97
9103	Xmtr A Temp	°C	27.73	20.97	26.40	21.06	30.37	**	**	**
9104	Xmtr B Temp	°C	*	22.07	27.74	22.13	31.74	21.34	21.27	21.92
9105	Xmtr A Power Output	dBm	27.73	26.19	26.29	26.19	26.11	22.38	22.35	22.99
9106	Xmtr B Power Output	dBm	**	**	**	*	**	26.19	26.22	26.30

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

SECTION 7

ORBIT ADJUST SUBSYSTEM (OAS)

LANDSAT-2

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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 attitude control. Three +X firings and two -X firings were made to phase the satellite with Landsat 1 to obtain the desired 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 7 also).

The Subsystem activity since launch is summarized in Table 7-1. A total of 5.47 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 Used
32	1	25 Jan 75 00 34 00.8	4.8	39	111.3	0.02	539.96	72.0	-X
71	2	27 Jan 75 19 57 00.8	1.8	-36	90.1	0.02	517.16	73.5	X
79	3	28 Jan 75 09 49 00.8	420.0	3455	107.0	1.62	517.16	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	-2971	97.0	1.42	168.75	75.0	X
191	6	5 Feb 75 10 51 00.8	360.0	-2421	97.5	1.15	138.71	75.0	X
212	7	6 Feb 75 22 31 00.8	308.8	-2009	98.6	0.95	116.21	75.0	X
880	8	26 Mar 75 21 14 00.8	12.8	82	107.6	0.01	397.17	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	2532	5102	7641	10191	11872	12322	12721
2001	Prop. Tank Temp.	°C	23.03	23.05	23.89	22.22	23.05	21.39	21.39	21.39
2003	Thrust Chamber No. 1 (-X) Temp.*	°C	24.84	30.14	25.12	28.57	21.75	28.94	28.01	26.62
2004	Thrust Chamber No. 2 (+X) Temp.*	°C	37.34	38.41	38.55	39.29	37.60	37.64	37.49	36.59
2005	Thrust Chamber No. 3 (-Y) Temp.*	°C	47.22	34.20	46.35	34.82	49.78	35.14	34.79	37.16
2006	Line Pressure	psia	545.60	404.97	413.25	415.39	419.94	418.72	419.93	419.94

*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.

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SECTION 8

MAGNETIC MOMENT COMPENSATING ASSEMBLY (MMCA)

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	2532	5102	7641	10191	11872	12322	12721
4001	A1 Board Temp	°C	20.56	19.82	19.47	19.20	19.12	18.82	19.02	18.79
4002	A2 Board Temp	°C	*	*	*	*	*	*	*	*
4003	Hall Current	TMV	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
4004	Yaw Flux Density	TMV	3.05	3.07	3.07	3.07	3.07	3.07	3.07	3.07
4005	Pitch Flux Density	TMV	3.15**	2.90	2.90	2.90	2.90	2.90	2.90	2.90
4006	Roll Flux Density	TMV	2.99	2.98	2.97	2.97	2.97	2.97	2.97	2.97

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

SECTION 9

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

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 indicated power output of about 1.4 watts since launch. Figure 9-1 shows AGC readings of Goldstone for 2 constant positions in space. The scatter of data points reflect variations in the ground station calibration and readout.

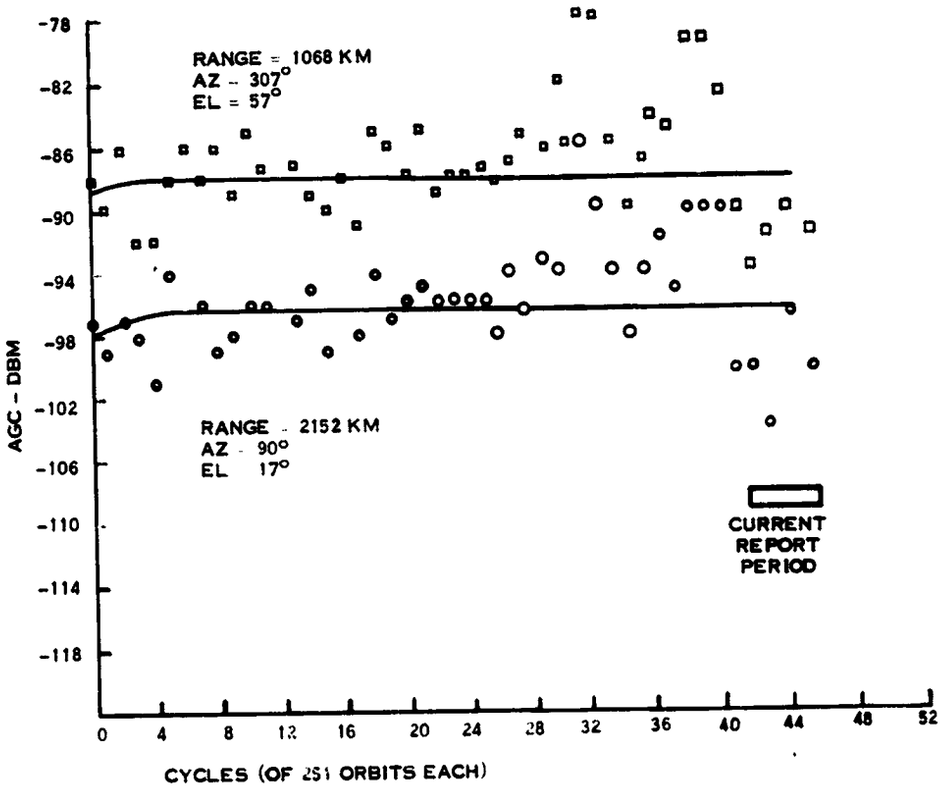

Figure 9-1. USB (Link 4) AGC Readings at Goldstone with 30' Antenna - Landsat-2

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

No.	Function Name	Units	T/V (20°C)	Orbits							
				15	2462	5091	7641	10641	11840	12340	12720
11001	USB Rcvr AGC	DBM	NA	-112.72	-128.8	-124.29	-122.37	-124.85	-121.65	-122.80	-131.50
11002	USB Xmtr Pwr	WTS	1.40	1.36	1.43	1.38	1.37	1.39	1.37	1.39	1.37
11003	USB Rcvr Error	KHz	- 2.15	- 2.15	- 4.64	- 2.97	- 4.30	- 3.43	- 4.86	- 3.93	- 4.09
11004	USB Xpond Temp	DGC	22.93	25.88	24.37	27.49	24.12	29.06	25.03	25.01	24.63
11005	USB Xpond Press	PSI	16.99	17.08	16.74	16.49	15.94	15.96	15.70	15.67	15.62
11007	USB Xmtr A -15V	VDC	2.35	2.36	F	F	F	F	F	F	F
11008	USB Xmtr B -15V	VDC	2.39	F	2.40	2.42	2.39	2.39	2.42	2.39	2.41
11009	USB Range -15V	VDC	2.07	2.07	2.07	2.06	2.05	2.06	2.06	2.05	2.05
11101	PMP Pwr A Volt	VDC	-15.22	- 15.10	F	F	F	F	F	F	F
11102	PMP Pwr B Volt	VDC	-15.07	F	- 15.02	- 14.99	- 14.99	- 14.99	- 14.97	- 14.91	- 15.01
11103	PMP Temp A	DGC	N/A	37.30	29.12	34.67	28.38	37.49	29.10	29.15	29.59
11104	PMP Temp B	DGC	N/A	28.34	30.57	36.08	29.62	38.64	30.91	31.22	30.90

F - Unit OFF in this period.

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SECTION 10

ELECTRICAL INTERFACE SUBSYSTEM (EIS)

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	2532	5102	7641	10192	11840	12340	12720
13200	APU, -24.5 VDC	TMV	*	*	*	*	*	*	*	*
13201	APU, -12 Volts	TMV	2.42	2.45	2.45	2.45	2.45	2.45	2.45	2.45
13202	APU Temp	DGC	27.44	26.60	27.70	26.21	28.78	26.29	26.02	26.20

*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 and WBVTR No. 1 power circuits have been used for limited operation.

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

SECTION 11

THERMAL SUBSYSTEM (THM)

LANDSAT-2

SECTION 11

THERMAL SUBSYSTEM (THM)

The Thermal Control Subsystem in Landsat-2 has provided satisfactory control of all spacecraft equipments since launch.

Table 11-1 gives average subsystem telemetry values for several representative orbits during the 30 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 varied from 0.989 to 0.969 of the mean value and the average spacecraft temperatures decreased.

A history of compensation load switching since launch is shown in Table 11-2.

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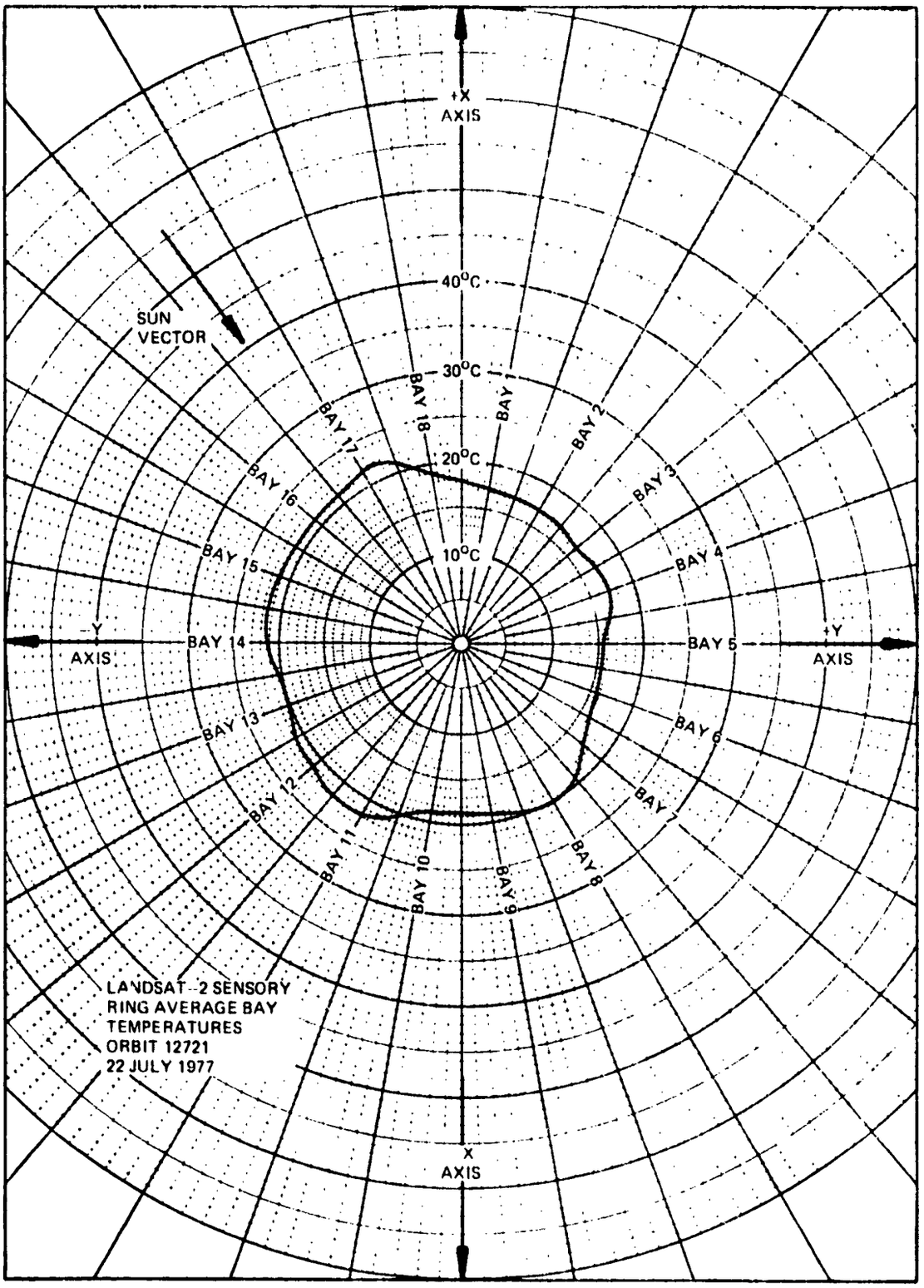

Figure 11-1. Landsat-2 Sensory Ring Thermal Profile

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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	2512	5102	7641	10192	11810	12410	[illegible]
7001	THM TH01 STI	DGC	19.40	19.59	19.95	18.61	19.59	18.11	18.65	[illegible]
7002	THM TH02 SBO	DGC	17.18	18.01	17.17	17.21	17.66	17.56	18.03	[illegible]
7003	THM TH03 STI	DGC	18.71	19.19	18.50	17.73	18.65	18.11	18.11	[illegible]
7004	THM TH10 TCB	DGC	19.18	19.01	19.11	19.64	19.91	18.[illegible]	17.10	[illegible]
7005	THM TH04 STI	DGC	17.19	17.92	16.76	16.30	17.57	15.[illegible]	15.[illegible]	16.[illegible]
7006	THM TH05 SBO	DGC	17.1[illegible]	17.16	16.68	16.52	16.6[illegible]	16.[illegible]	16.[illegible]	[illegible]
7007	OA-X Thruster	DGC	19.66	20.58	19.65	20.02	19.14	19.[illegible]	19.[illegible]	19.[illegible]
7008	THM TH06-STO	DGC	14.78	14.77	14.91	13.78	13.7	13.6[illegible]	13.[illegible]	13.[illegible]
7009	THM TH06 SBI	DGC	19.18	19.18	18.11	18.06	18.10	17.95	[illegible]	[illegible]
7010	THM TH07 STI	DGC	18.08	18.26	17.11	17.56	17.11	17.03	16.86	[illegible]
7011	THM TH08 STO	DGC	19.14	20.22	19.21	19.74	19.00	19.[illegible]	19.21	[illegible]
7012	THM TH09 SBI	DGC	21.44	21.80	20.91	20.68	20.94	20.56	20.5[illegible]	[illegible]
7013	THM TH10 SBO	DGC	18.58	18.56	18.39	18.05	18.59	18.07	[illegible]	[illegible]
7014	THM TH11 STI	DGC	21.65	21.13	21.91	20.61	22.75	20.38	20.12	[illegible]
7015	THM TH12 SBO	DGC	21.91	22.11	21.68	21.83	26.68	22.28	21.07	[illegible]
7016	THM TH13 STI	DGC	22.21	20.51	21.62	20.24	25.73	20.28	20.0[illegible]	[illegible]
7017	RBV Beam Ctr Ln	DGC	20.48	20.33	19.92	19.09	20.16	18.83	18.13	[illegible]
7018	THM TH14 STO	DGC	24.12	21.29	26.11	21.40	29.64	21.13	21.5[illegible]	[illegible]
7019	NBR Rad Outbd B4	DGC	2.72	3.26	2.91	2.31	2.44	2.27	2.09	1.89
7020	THM TH15 SBI	DGC	23.07	21.13	25.56	20.11	27.07	20.66	20.55	[illegible]
7021	THM TH16 STI	DGC	23.26	22.29	25.46	21.07	25.87	21.21	21.55	[illegible]
7022	THM TH17 SBI	DGC	21.77	21.22	24.74	20.21	23.75	20.23	20.95	[illegible]
7023	THM TH18 SBO	DGC	21.67	21.49	23.36	21.30	23.69	20.75	22.39	[illegible]
7030	THM TH03 Bur	DGC	15.50	16.28	15.11	15.21	15.59	16.06	16.[illegible]	15.1[illegible]
7033	THM TH12 Bur	DGC	23.05	21.70	24.59	21.44	27.14	22.05	21.1[illegible]	21.99
7035	THM TH18 Bur	DGC	19.53	19.32	20.19	19.05	20.20	18.[illegible]	18.[illegible]	18.51
7040	THM TH01 TCB	DGC	19.12	19.78	19.72	18.82	19.96	18.98	19.58	18.[illegible]
7041	THM TH02 TCB	DGC	17.55	18.02	17.39	17.06	17.42	17.57	17.18	17.[illegible]
7042	THM TH03 TCB	DGC	16.85	18.23	16.32	16.37	18.04	18.53	18.21	17.78
7043	THM TH04 TCB	DGC	19.90	20.05	19.11	19.21	19.65	19.[illegible]	19.11	19.31
7044	THM TH05 TCB	DGC	16.32	16.21	15.75	15.47	15.44	15.55	15.10	[illegible]
7045	THM TH07 TCB	DGC	17.76	18.12	17.33	17.64	17.01	17.21	17.[illegible]	16.[illegible]
7046	THM TH09 TCB	DGC	19.30	19.31	18.81	18.83	18.82	18.56	18.71	18.[illegible]
7048	THM TH11 TCB	DGC	23.27	22.45	23.71	22.07	24.99	22.16	21.[illegible]	22.0[illegible]
7049	THM TH12 TCB	DGC	23.04	20.62	23.91	20.34	26.83	20.93	20.1[illegible]	[illegible]
7050	THM TH13 TCB	DGC	22.89	20.34	24.67	20.46	27.61	20.41	20.2[illegible]	[illegible]
7051	THM TH14 TCB	DGC	25.07	22.11	27.69	22.22	31.17	22.17	22.36	[illegible]
7052	THM TH16 TCB	DGC	22.22	21.59	24.29	20.64	25.62	21.05	22.19	[illegible]
7053	THM TH17 TCB	DGC	23.52	22.79	24.86	22.53	25.00	22.10	23.52	[illegible]
7054	THM TH18 TCB	DGC	20.01	20.05	20.99	20.27	21.41	18.77	20.81	18.[illegible]
7060	THM Shutter By 1	DEG	22.54	24.43	26.63	15.42	27.36	15.[illegible]	19.31	14.[illegible]
7061	THM Shutter By 2	DEG	19.34	24.75	21.14	17.50	17.89	17.[illegible]	18.19	17.[illegible]
7062	THM Shutter By 3	DEG	22.75	31.67	11.99	12.70	28.91	6.75	32.30	[illegible]
7063	THM Shutter By 4	DEG	34.89	36.32	33.00	33.02	32.90	33.59	34.43	[illegible]
7064	THM Shutter By 5	DEG	7.50	8.67	2.90	2.88	2.42	1.82	2.07	1.87
7065	THM Shutter By 7	DEG	17.06	22.52	14.11	18.98	8.88	11.57	10.13	[illegible]
7067	THM Shutter By 9	DEG	33.75	38.22	34.12	33.75	33.70	31.08	32.21	[illegible]
7068	THM Shutter By 10	DEG	37.46	34.96	37.09	33.32	40.64	31.88	30.0[illegible]	[illegible]
7069	THM Shutter By 11	DEG	52.25	10.16	17.19	3.29	22.81	0.96	0.07	[illegible]
7070	THM Shutter By 12	DEG	61.38	46.20	67.46	45.57	80.70	48.40	47.01	[illegible]
7071	THM Shutter By 13	DEG	63.61	45.76	[illegible]	41.35	81.89	47.27	46.11	[illegible]
7072	THM Shutter By 14	DEG	39.44	40.40	[illegible]	40.22	72.91	38.[illegible]	39.58	[illegible]
7073	THM Shutter By 15	DEG	67.79	53.78	82.12	48.88	83.87	54.4[illegible]	51.13	[illegible]
7074	THM Shutter By 16	DEG	45.20	43.68	61.14	36.55	68.30	42.05	44.18	[illegible]
7075	THM Shutter By 17	DEG	57.88	52.10	67.62	50.12	68.67	45.53	44.81	[illegible]
7076	THM Shutter By 18	DEG	40.49	49.12	15.84	40.47	47.49	29.73	42.41	[illegible]
7080	THM Q1 T Zener V	VDC	4.85	4.85	4.85	4.85	4.85	4.85	4.85	[illegible]
7081	THM Q2 T Zener V	VDC	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
7082	THM Q3 T Zener V	VDC	5.05	5.04	5.05	5.04	5.04	5.03	5.03	[illegible]
7083	THM Q1 S Zener V	VDC	4.97	4.96	4.96	4.95	4.96	4.95	4.96	4.9[illegible]
7084	THM Q2 S Zener V	VDC	4.98	4.98	4.99	4.98	4.98	4.98	4.98	4.98
7085	THM Q3 S Zener V	VDC	5.15	5.15	5.15	5.15	5.15	5.15	5.16	[illegible]
7090	THM PSM Mount	DGC	21.02	21.05	21.71	19.63	21.28	19.11	19.08	[illegible]
7091	THM Ind Attitude	DGC	17.79	17.86	17.24	16.55	16.95	16.75	16.[illegible]	16.2[illegible]
7092	THM RBV Radiator	DGC	18.01	18.06	16.24	14.46	16.71	11.78	11.23	11.[illegible]
7093	THM RBVC Ctr Bm	DGC	20.74	20.82	19.41	17.95	19.44	17.91	17.61	17.[illegible]
7094	THM WBVTR Root	DGC	14.77	14.71	15.72	11.86	13.90	12.13	12.11	1.[illegible]
7095	THM WBVTR Rad Ct	DGC	4.64	4.99	5.[illegible]	3.21	4.15	3.73	3.79	[illegible]
7096	THM WBVTR Strap	DGC	15.90	16.95	17.63	13.18	15.29	13.71	13.79	[illegible]
7097	THM WB Mt Bay 1	DGC	22.91	22.60	22.49	21.29	16.47	15.41	15.83	17.[illegible]
7098	THM WB Mat Bay 1	DGC	22.07	19.25	20.11	18.71	16.20	14.80	15.28	11.[illegible]
7099	THM WBVTR Sep 3	DGC	18.01	18.76	18.1[illegible]	16.69	17.79	17.[illegible]	17.00	[illegible]
7100	THM WBVTR Sep 17	DGC	21.81	21.55	23.[illegible]	19.96	22.98	19.[illegible]	20.38	[illegible]
7101	THM WBVTR 1 Cent	DGC	22.45	21.14	23.78	18.59	20.33	18.09	18.78	[illegible]
7102	THM WBVTR 2 Bay	DGC	17.41	17.69	17.29	16.15	17.01	16.[illegible]	16.[illegible]	16.1[illegible]
7103	THM WBVTR 2 By 15	DGC	21.77	20.99	22.85	19.11	23.40	19.11	20.13	[illegible]
7104	THM WBVTR 2 Ctr	DGC	20.21	21.08	[illegible]	17.73	19.94	1[illegible]	17.[illegible]	[illegible]
7105	THM NBTR B Sep 6	DGC	17.82	17.90	[illegible]	16.61	17.29	[illegible]	[illegible]	16.13
7106	THM NBTR B Sep 1	DGC	2.11	0.70	[illegible]	19.82	21.92	19.0[illegible]	19.[illegible]	19.[illegible]
7107	THM NBTR Bm Ctr	DGC	20.[illegible]	20.11	21.[illegible]	18.38	20.20	18.[illegible]	18.[illegible]	18.[illegible]
7108	THM MSS Mount 14	DGC	20.59	19.10	2[illegible]	18.20	20.8[illegible]	18.[illegible]	18.[illegible]	18.[illegible]
7109	THM OA - Y Thruster	DGC	2.61	1.99	[illegible]	21.88	29.91	[illegible]	[illegible]	[illegible]
7110	THM MSS WBVTR Bm	DGC	16.[illegible]	17.54	18.[illegible]	11.97	16.81	1[illegible]	1[illegible]	1[illegible]
7111	THM OA - X Thruster	DGC	9.[illegible]	19.72	9.1[illegible]	19.28	17.[illegible]	16.[illegible]	1[illegible]	10.[illegible]
7130	THM Aux P1 T	DGC	4.18	6.[illegible]	9.67	[illegible]	12.01	2.05	[illegible]	[illegible]
7131	THM Aux P2 T	DGC	2.90	2.[illegible]	6.[illegible]	[illegible]	18.16	[illegible]	[illegible]	[illegible]

Table 11-2. Landsat-2 Compensation Load History

Orbits	Compensation Load Status*							
	1	2	3	4	5	6	7	8
Launch	0	0	0	0	0	0	0	0
2	X	X	X	X	X	0	X	X
237	X	X	X	X	X	0	0	0
272	X	X	X	X	X	0	X	X
306	X	X	0	X	X	0	0	0
572	X	X	0	X	X	0	0	X
1367	X	X	X	X	X	0	0	X
1645	X	X	0	X	X	0	0	X
1657	X	X	X	X	X	0	0	X
4202	0	0	X	X	0	0	0	0
4372	0	0	X	X	0	0	0	X
6735	0	X	X	0	0	X	0	0
8312	X	X	0	0	X	0	0	0
9753	X	X	0	0	0	0	0	0

* Note

X = ON
0 = OFF

SECTION 12

NARROWBAND TAPE RECORDERS (NBR)

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.

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

Table 12-1. NBR Operating Hours by Mode

NBR	ON	OFF	PLAYBACK	RECORD
A	11550	10440	448	11102
B	11550	10440	448	11102

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

Function		Typical Telemetry Values - Orbits							
No.	Name	36/37	2111/2112	4980/4981	7631/7632	11460/11461	11871/11872	12320/12321	12720/12721
10001	A - Motor Cur. (ma)								
	Record	132.0	133.3	130.2	128.6	125.50	123.81	126.23	131.74
	P/B	108.0	95.2	93.7	90.5	92.30	93.20	92.80	90.50
10101	B - Motor Cur. (ma)								
	Record	148.5	141.7	135.7	129.6	129.10	128.12	128.72	128.12
	P/B	143.6	138.7	135.7	125.1	127.65	128.62	130.15	130.68
10002	A - Pwr Sup. Cur. (ma)								
	Record	170.5	167.5	162.5	155.9	152.13	159.21	155.92	158.40
	P/B	410.0	399.3	399.3	396.0	472.26	472.34	476.34	478.12
10102	B - Pwr Sup. Cur. (ma)								
	Record	260.0	261.3	264.5	261.4	264.47	267.69	268.12	268.12
	P/B	481.0	479.7	489.2	470.2	479.80	478.14	479.10	479.80
10003	A - Rec. Temp (DGC)	26.1	26.1	24.2	21.8	21.64	24.48	22.49	22.44
10103	B - Rec. Temp. (DGC)	27.0	27.0	26.2	25.4	24.71	21.37	24.24	24.15
10004	A - Supply (VDC)	-24.87	-25.1	-25.1	-25.1	-25.09	-25.05	-25.09	-25.09
10104	B - Supply (VDC)	-24.55	-24.6	-24.6	-24.4	-24.61	-24.74	-24.62	-24.62

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SECTION 13

WIDEBAND TELEMETRY SUBSYSTEM (WBTS)
LANDSAT-2

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SECTION 13

WIDEBAND TELEMETRY SUBSYSTEM (WBTS)
LANDSAT-2

The WBTS has operated nominally in this report period.

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

Figure 13-1 is the AGC history recorded at Goldstone with the spacecraft successively at the same two 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 that power amplifier is used.

Table 13-1. Typical Wideband Subsystem Telemetry

Function (1)	Name	20W	Orbit 47	2462	5091	7501	10641	11838	12089	12340
12001	Temp TWT Coll. (DGC)	33.6	34.38	35.00	F	35.63	20.00	19.37	19.71	19.46
12101		31.2	30.00	37.14	32.16	26.69	18.40	21.35	23.58	21.40
12002	Cur. Helix (MA)	3.85	4.29	4.51	F	4.06	F	3.47	3.48	3.49
12102		4.56	4.41	4.48	4.59	4.63	4.61	4.69	4.65	4.71
12003	Cur. Cath (MA)	46.10	46.04	45.12	F	45.05	F	40.41	40.41	40.44
12103		46.78	46.42	45.24	46.00	44.66	44.07	45.68	45.06	44.91
12004	Fwd. Pwr. (DBM)	42.68	42.83	42.77	F	42.78	F	42.25	42.73	42.48
12104		43.71	43.81	43.69	43.61	43.56	43.51	43.70	43.65	43.64
12005	Refl. Pwr (DBM)	27.0	26.50	26.10	F	25.85	F	25.34	26.33	25.32
12105		36.45	37.50	37.14	37.08	36.50	36.90	37.37	37.18	37.23
12227	Con Volt Loop Stress (MHz) (2)	1.54	2.14	1.12	F	1.60	1.60	1.48	1.31	1.39
12228		2.53	1.51	-0.01	-0.22	0.41	0.28	-0.19	-0.24	-0.10
12229	Temp. Mod (DGC)	19.5	18.51	20.88	17.97	17.71	17.41	19.02	20.22	19.33
12232	+15 VDC Pwr Sply (TMV)	2.65	2.65	2.65	2.65	2.60	2.65	2.63	2.63	2.63
12234	-15 VDC Pwr Sud (TMV)	4.07	4.27	3.94	4.04	4.04	3.99	4.05	4.03	4.04
12236	+5 VDC Pwr Suply (TMV)	3.55	3.57	3.51	3.51	3.50	3.50	3.53	3.53	3.51
12238	-5 VDC Pwr Sud (TMV)	4.08	4.20	4.01	4.07	4.02	4.02	4.05	4.04	4.04
12240	-24 VDC Unreg Pwr (TMV)	5.86	6.20	5.66	5.90	5.91	5.92	5.87	5.82	5.86
12242	Temp. Inv. (DGC)	23.7	24.12	23.79	22.53	20.90	22.18	22.10	22.99	22.47
								5.48	5.42	5.46

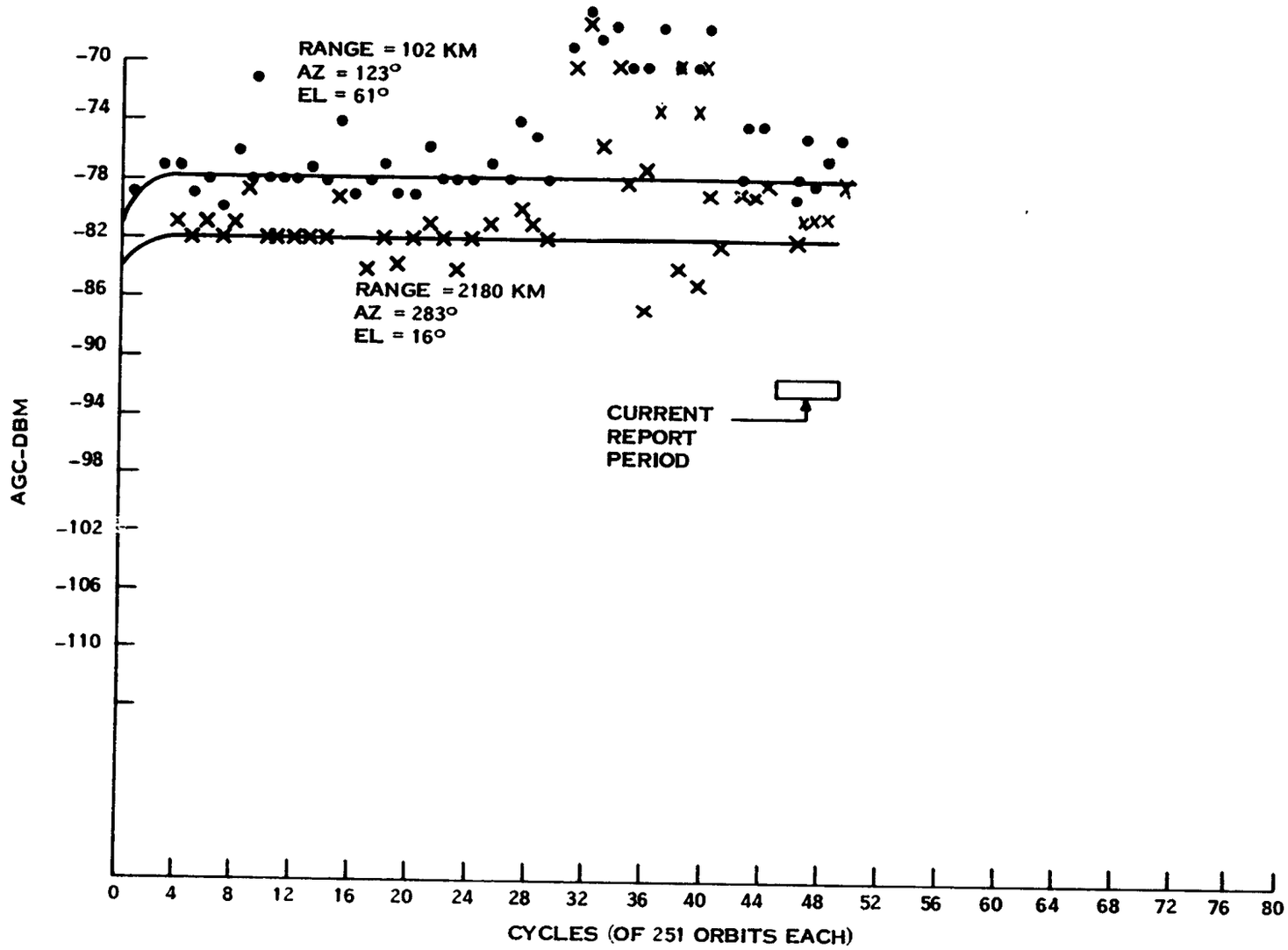

Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna, Landsat-2

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	Description	Units	Orbit Number							
			50	2532	5102	7641	10191	11840	12340	12720
3004	Case Temp 1	DGC	19.00	19.02	18.68	17.87	18.36	17.92	17.77	17.48
3005	Assembly-Temp-2	DGC	18.70	18.71	18.30	17.45	17.97	17.48	17.28	17.09

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)
LANDSAT-2

SECTION 15

WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

WBVTR-1 has not been in use during this reporting period because of failures of two of its Record/Playback heads (head 1, Orbit 2683, 3 August 1975; head 3, Orbit 10064 on 13 January 1977).

Twice in 1975, for an undetermined reason, WBVTR-2 stopped Rewind prematurely: once during Orbit 1913 on 9 June and again during Orbit 3854 on 26 October. This abnormality has not occurred since.

The power-supply frequency count-down chain of WBVTR-2 occasionally slips phase, increasing motor speed, resulting in high bit error counts and footage over-runs. Simple operational procedures correct this condition when it occurs and normal operation can be resumed.

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

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

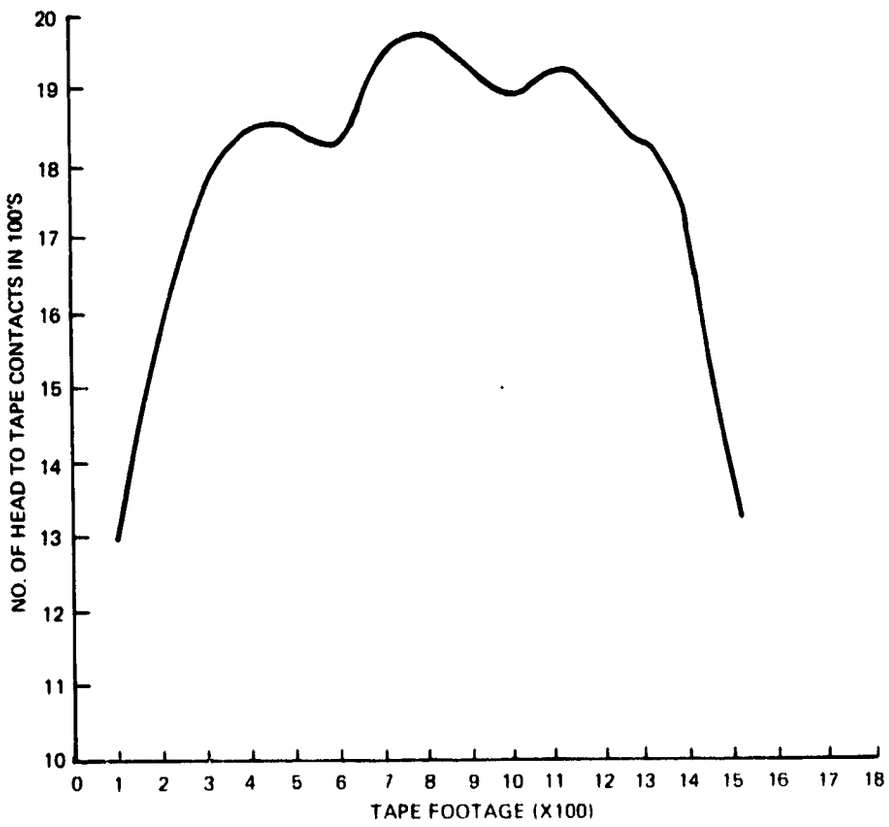

Figure 15-1. Landsat-2 WBR-2 Tape Usage thru Orbit 12722

Table 15-1. WBVTR Telemetry Values

WBVTR-1 Functions*		Telemetry Values In Orbits						
Number	Name	45/46	2642	4879 (ET)	7628	11871	1232	12720
13022	Pressure Trans	16.52	16.51	16.39	16.14	16.12	16.12	16.12
13023	Temp Trans	20.74	20.62	20.12	18.70	16.69	16.94	16.69
13024	Temp Elec	25.00	24.57	21.68	19.05	13.85	14.16	13.71
13032	Limiter Volt	1.48	1.51	1.41	1.48	*	*	*
13034	5.6 VDC Conv	5.70	5.54	5.67	5.67	0.00	0.00	0.00
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	27.29	26.44	26.36	26.22	26.19

*Unit not used since
Orbit 10248
26 January 1977

WBVTR-2 Functions		Telemetry Values In Orbits							
Number	Name	45/46	2642	5071	7621	10199	11858	12333	12722
13122	Pressure Trans	16.12	15.81	15.33	14.67	14.54	41.10	14.13	13.98
13123	Temp Trans	21.50	20.00	23.08	19.41	19.92	16.69	18.23	17.07
13124	Temp Elec	23.50	18.31	22.72	22.07	16.63	14.94	17.97	15.07
13132	Limiter Volt	1.30	1.32	1.28	1.35	1.34	1.34	1.33	1.33
13134	5.6 VDC Conv	5.71	5.69	5.85	5.87	5.66	5.69	5.78	5.81
13201	-12 VDC APU	2.44	2.45	2.45	2.45	2.45	2.45	2.45	2.45
13202	Temp APU	29.06	26.76	27.63	26.36	28.78	26.36	26.22	26.19

(ET) - Engineering Test of WBVTR-1

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

WBVTR-1 Function Description	Orbit						
	31/46	2642	4878(ET)	7628/7643	10050/10081	10249	*
13029 - Input P B Voltage							
Record	0.0	0.0	0.0	0.0	0.0	0.0	
Playback	0.60	0.32	0.30	0.32	0.35	0.35	
Rewind	0.0	0.0	0.0	0.0	0.0	0.0	
Standby	0.0	0.0	0.0	0.0	0.0	0.0	
13028 - Capstan Motor Current							
Record	0.31	0.33	0.31	0.33	0.31	0.32	
Playback	0.26	0.31	0.30	0.35	0.30	0.35	
Rewind	0.19	0.23	0.28	0.31	0.28	0.30	
Standby	0.0	0.0	0.0	0.0	0.0	0.0	
13030 - Headwheel Motor Current							
Record	0.50	0.50	0.53	0.50	0.56	0.52	
Playback	0.49	0.49	0.54	0.53	0.44	0.45	
Rewind	0.44	0.44	0.47	0.47	0.45	0.44	
Standby	0.45	0.45	[illegible]	0.44	0.44	0.44	
13031 - Recorder Input Current							
Record	3.69	3.69	3.62	3.62	3.62	3.52	
Playback	3.37	3.86	3.86	3.34	3.86	3.86	
Rewind	2.23	2.19	2.23	2.28	2.23	3.21	
Standby	1.78	1.95	1.95	1.81	1.95	1.86	
13033 - Servo Voltage							
Record	0.0	0.0	0.0	0.0	0.0	0.0	
Playback	50.01	50.08	50.07	50.04	49.61	50.05	
Rewind	0.0	0.0	0.0	0.0	0.0	0.0	
Standby	0.0	0.0	0.0	0.0	0.0	0.0	
13026 - Capstan Motor Speed							
Record	88.61	88.03	85.13	85.03	87.45	88.61	
Playback	88.35	86.87	85.13	87.45	94.90	88.87	
Rewind	100.2	98.48	96.73	98.48	96.00	96.52	
Standby	0.0	0.0	0.0	0.0	0.0	0.0	
13027 - Headwheel Motor Speed							
Record	96.72	95.07	93.96	94.07	94.16	94.28	
Playback	97.28	94.52	92.86	92.86	94.44	94.80	
Rewind	98.6	96.73	96.73	96.73	96.73	96.60	
Standby	98.39	95.62	95.07	93.96	95.07	93.96	

(ET) - Engineering Test of WBVTR-1

* Unit not used since Orbit 10248
26 January 1977

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

WBVTR-2 Function Description	Orbit 31/46	2642	4878	7626/7631	10198/10199	11858/9	12333/4	12722/3
13129 - Input P/B Voltage								
Record	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Playback	0.35	0.33	0.34	0.34	0.34	0.34	0.35	0.33
Rewind	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Standby	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
13128 - Capstan Motor Current								
Record	0.33	0.37	0.38	0.34	0.32	0.34	0.38	0.35
Playback	0.33	0.34	0.35	0.34	0.35	0.33	0.35	0.35
Rewind	0.20	0.18	0.15	0.19	0.18	0.18	0.19	0.18
Standby	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
13130 - Headwheel Motor Current								
Record	0.47	0.47	0.48	0.50	0.49	0.47	0.48	0.48
Playback	0.48	0.47	0.48	0.48	0.49	0.46	0.47	0.47
Rewind	0.44	0.42	0.41	0.49	0.43	0.42	0.42	0.41
Standby	0.43	0.43	0.41	0.42	0.44	0.43	0.44	0.42
13131 - Recorder Input Current								
Record	2.90	2.90	2.90	2.96	2.90	2.96	2.96	2.93
Playback	3.14	3.08	3.11	3.08	3.20	3.14	3.13	3.11
Rewind	1.80	1.80	1.80	1.83	1.80	1.79	1.81	1.78
Standby	1.51	1.48	1.62	1.53	1.49	1.50	1.51	1.48
13133 - Servo Voltage								
Record	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Playback	49.00	49.52	49.43	49.52	49.45	49.38	49.45	49.40
Rewind	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Standby	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
13126 - Capstan Motor Speed								
Record	112.10	105.33	105.33	105.33	105.30	105.02	105.20	105.00
Playback	112.10	105.33	103.96	105.33	105.07	105.17	105.17	105.33
Rewind	120.43	116.31	117.68	117.68	117.14	117.67	117.34	117.68
Standby	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00
13127 - Headwheel Motor Speed								
Record	98.08	96.52	95.48	94.44	95.01	95.01	94.94	95.12
Playback	97.04	94.44	94.44	94.44	94.80	94.96	94.78	94.47
Rewind	98.6	95.48	96.52	97.04	96.81	96.20	95.58	95.72
Standby	100.79	94.96	96.00	94.44	95.95	95.90	96.10	96.13

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SECTION 16

RETURN BEAM VIDICON (RBV)

LANDSAT-2

SECTION 16

RETURN BEAM VIDICON (RBV)

Throughout this report period RBV was used in the real-time mode only. All RBV operations during the report period were nominal, and telemetry data was normal.

Table 16-1 gives typical telemetry values for the RBV Subsystem. 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	54	2371	5662	7671	10157	11838	12089	12340
14001	CCC Board Temp. (DgC)	19.65	20.27	20.41	19.17	20.15	18.85	18.98	18.82
14002	CCC Pwr. Sup. Temp (DgC)	20.52	21.40	20.80	19.84	20.17	19.83	19.59	19.38
14003	15 VDC Sup. (TMV)	3.92	3.52	4.00	3.44	3.84	3.68	3.62	3.63
14004	+6V, -5.25 VDC Sup. (TMV)	2.92	3.07	3.13	2.69	3.03	2.87	2.83	2.82
14100	* VID Output V (TMV)	NA	0.70	0.70	1.20	1.95	1.02	1.05	1.20
14200		1.05	1.23	1.26	1.15	0.88	.95	.98	1.02
14300		1.03	1.27	1.31	1.05	1.10	.97	.98	.94
14102	* Comb. Align Cur. (TMV)	3.85	3.81	3.82	3.82	3.70	3.83	3.83	3.54
14202		3.91	3.92	3.88	3.92	3.92	3.90	3.91	3.90
14302		3.90	3.80	3.83	3.40	3.75	3.65	3.59	3.58
14103	* Elec Temp. (DgC)	24.24	24.49	26.51	22.41	23.00	22.13	22.28	22.10
14203		19.84	22.40	22.05	20.01	20.18	19.18	19.53	19.09
14303		25.05	24.15	29.42	22.46	23.42	21.72	21.80	21.54
14104	* LV Pwr Sup T. (DgC)	23.44	24.13	26.28	21.83	23.15	21.46	21.59	21.40
14204		18.14	20.87	20.61	18.32	18.90	17.56	17.76	17.42
14304		25.36	24.12	29.47	22.22	24.00	21.79	21.94	21.59
14105	* Defl. Pwr. Sup. +10 VDC (TMV)	4.00	3.94	3.96	3.50	3.84	3.99	3.68	3.68
14205		3.97	3.92	3.94	3.98	3.82	3.97	3.97	3.67
14305		4.00	3.95	3.96	4.00	3.96	4.00	4.00	3.70
14106	* L.V.P.S. +6V, -6.3 VDC (TMV)	3.67	3.59	3.63	3.23	3.26	3.67	3.39	3.39
14206		3.65	3.61	3.62	3.19	3.34	3.65	3.37	3.37
14306		3.70	3.66	3.68	3.71	3.42	3.70	3.70	3.42
14107	* Ther. Elec. Cur. (TMV)	2.61	2.54	2.61	2.53	2.60	2.60	2.60	2.58
14207		2.49	2.44	2.51	2.31	2.44	2.59	2.40	2.40
14307		2.57	2.52	2.57	2.85	2.71	2.73	3.95	2.55
14108	* Vid. Fil. Cur. (TMV)	2.43	2.48	2.50	2.23	2.46	2.39	2.36	2.35
14208		2.40	2.34	2.36	2.12	2.39	2.40	2.45	2.22
14308		2.58	2.54	2.54	2.27	2.59	2.58	2.39	2.38
14110	* Vid. Tgt. Volt (TMV)	2.98	2.95	2.96	2.98	2.98	2.98	2.98	2.75
14210		2.86	2.93	2.96	2.64	2.60	2.82	3.10	2.78
14310		2.63	2.56	2.58	2.31	2.37	2.46	2.43	2.43
14113	* Vert Def V (TMV)	2.92	2.79	2.81	3.22	2.98	3.08	2.42	2.99
14213		3.15	2.99	3.05	3.79	3.16	3.21	2.95	3.12
14313		3.59	3.48	3.44	3.09	3.04	3.71	3.46	3.82
14111	* Vid FPT (DgC)	19.87	20.67	19.21	16.32	19.85	16.32	16.52	16.27
14211		20.55	21.14	19.80	17.77	20.46	17.61	17.89	17.67
14311		20.65	21.12	20.56	18.05	20.38	18.05	18.24	17.97
14115	* Foc Coil T (DgC)	21.04	22.41	21.31	17.79	21.02	18.18	18.08	17.71
14215		20.67	22.22	21.26	18.16	19.17	17.96	18.21	18.00
14315		22.25	23.08	22.89	19.17	20.61	19.04	19.27	19.10

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

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

Function No.	Function Name	Mode	Orbit 054	2371	5663	7671	10157	11838	12089	12340
14101	Focus I	Hold	0.65	0.70	0.69	0.63	0.65	0.65	0.62	0.65
		Prep	1.68	1.75	1.74	1.67	1.67	1.68	1.67	1.67
		Read	2.80	2.90	2.85	2.80	2.80	2.80	2.77	2.80
14109	Grid V	Prep	0.80	0.80	0.78	0.77	0.80	0.77	0.77	0.77
		Read	2.42	2.44	2.42	2.45	2.45	2.45	2.42	2.45
		Hold	3.95	4.00	3.98	3.95	3.95	3.95	3.95	3.95
14111	Cath I	Hold	0.38	0.40	0.37	0.37	0.37	0.37	0.37	0.37
		Read	0.83	0.85	0.83	*	0.85	0.85	0.82	0.82
		Prep	3.05	3.10	3.02	3.02	3.05	3.02	3.02	3.02
14112	Hor Def	Hold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Prep	1.75	1.80	1.77	1.80	1.77	1.77	1.77	1.77
		Read	3.25	3.30	3.25	*	3.21	3.22	3.25	3.22
14120	+500 V	Prep	0.85	0.90	0.90	0.91	0.92	0.90	0.90	0.90
		Read	4.05	4.10	4.05	4.03	4.05	4.05	4.05	4.05

* No data due to slow TLM sample rate (1/16) which does not always get a sample for short "on time."

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

Function No.	Function Name	Mode	Orbit 054	2371	5663	7671	10157	11838	12089	12340
14201	Focus I	Hold	0.54	0.60	0.53	0.50	0.54	0.50	0.50	0.50
		Prep	1.56	1.60	1.54	1.50	1.50	1.50	1.50	1.50
		Read	2.65	2.70	2.65	2.62	2.65	2.65	2.62	2.62
14209	Grid V	Prep	0.75	0.85	0.80	0.77	0.80	0.75	0.77	0.77
		Read	2.25	2.30	2.22	2.25	2.25	2.25	2.25	2.25
		Hold	4.05	4.10	4.11	4.07	4.11	4.07	4.07	4.07
14211	Cath I	Hold	0.37	0.35	0.35	0.37	0.35	0.35	0.35	0.35
		Read	0.95	1.00	0.95	*	0.95	0.95	0.95	0.95
		Prep	3.05	3.10	3.05	3.05	3.05	3.05	3.05	3.05
14212	Hor Def	Hold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Prep	1.85	1.90	1.87	1.87	1.87	1.85	1.85	1.85
		Read	3.25	3.30	3.31	*	3.24	3.30	3.30	3.30
14220	+500 V	Prep	1.15	1.20	1.14	1.14	1.15	1.12	1.12	1.12
		Read	4.25	4.30	1.27	4.27	4.27	4.27	1.27	4.27

* No data due to slow TLM sample rate (1/16) which does not always get a sample for short "on time"

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

Function		Mode	Orbit							
No.	Name		054	2371	5663	7671	10157	11838	12089	12340
		Hold	0.65	0.70	0.72	0.65	0.69	0.65	0.65	0.65
14301	Focus I	Prep	1.79	1.83	1.85	1.77	1.77	1.75	1.75	1.75
		Read	2.85	2.90	2.93	2.85	2.85	2.87	2.85	2.85
		Prep	0.75	0.80	0.75	0.77	0.77	0.77	0.77	0.77
14309	Grid V	Read	2.65	2.70	2.66	2.71	2.66	2.70	2.72	2.72
		Hold	4.08	1.18	4.13	4.09	4.12	1.10	1.10	1.10
		Hold	0.39	0.40	0.40	0.40	0.40	0.10	0.40	0.10
14311	Cath I	Read	0.54	0.55	0.55	*	0.55	0.55	0.55	0.55
		Prep	3.25	3.30	3.22	3.23	3.23	3.22	3.22	3.22
		Hold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14312	Hor Def	Prep	2.05	2.10	2.07	2.06	2.07	2.02	2.02	2.02
		Read	3.35	3.45	3.42	*	3.42	3.40	3.40	3.40
14320	+500 V	Prep	1.15	1.20	1.15	1.15	1.15	1.15	1.15	1.15
		Read	4.25	4.30	4.27	4.27	4.27	2.12	4.25	4.25

* No Data due to slow TLM sample rate (1/16) which does not always get a sample for short "on time".

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SECTION 17

MULTISPECTRAL SCANNER SUBSYSTEM (MSS)

LANDSAT-2

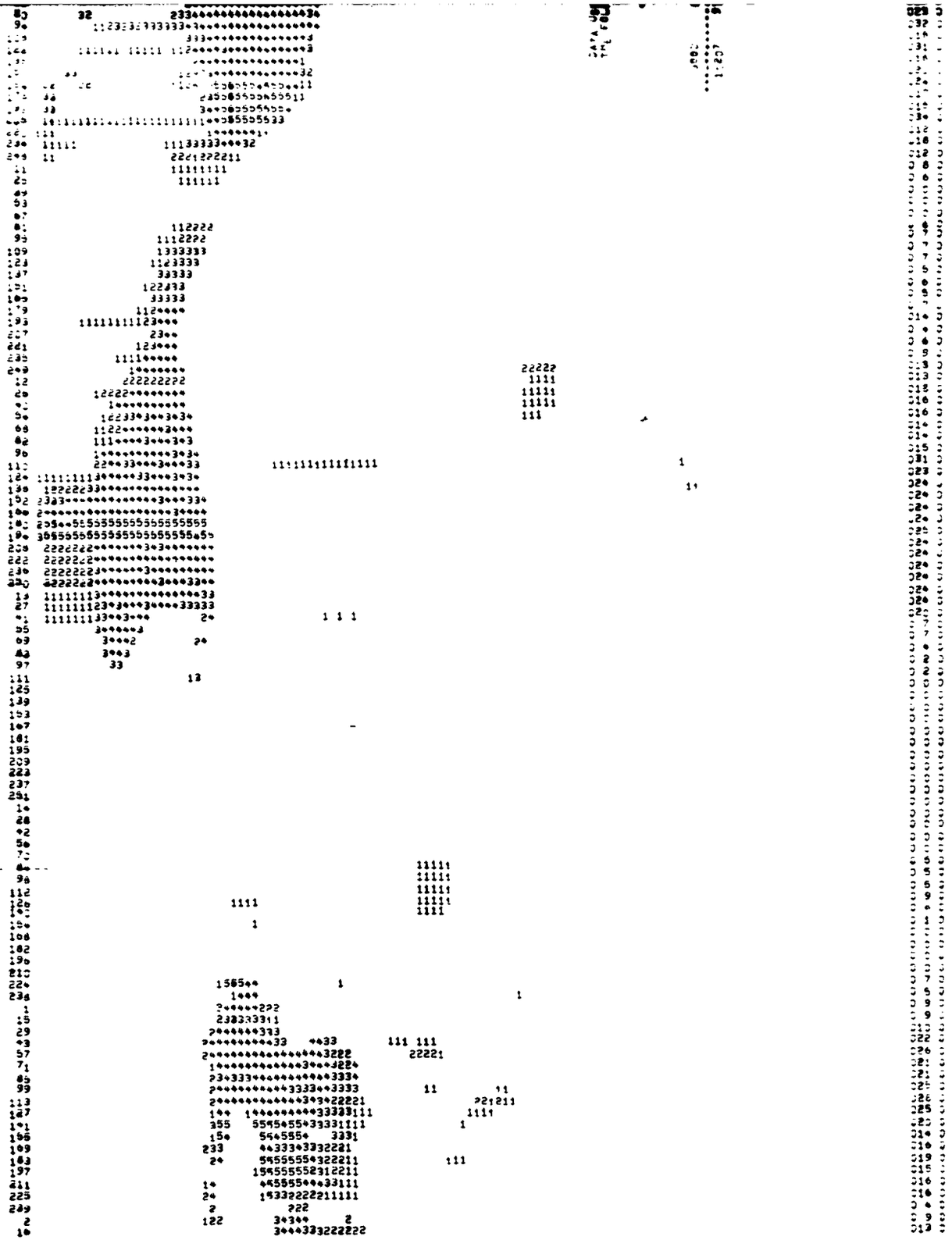
SECTION 17

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. and Pakistan ground stations are shown. Scenes transmitted to Canada, Brazil and Italy (46% 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.

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



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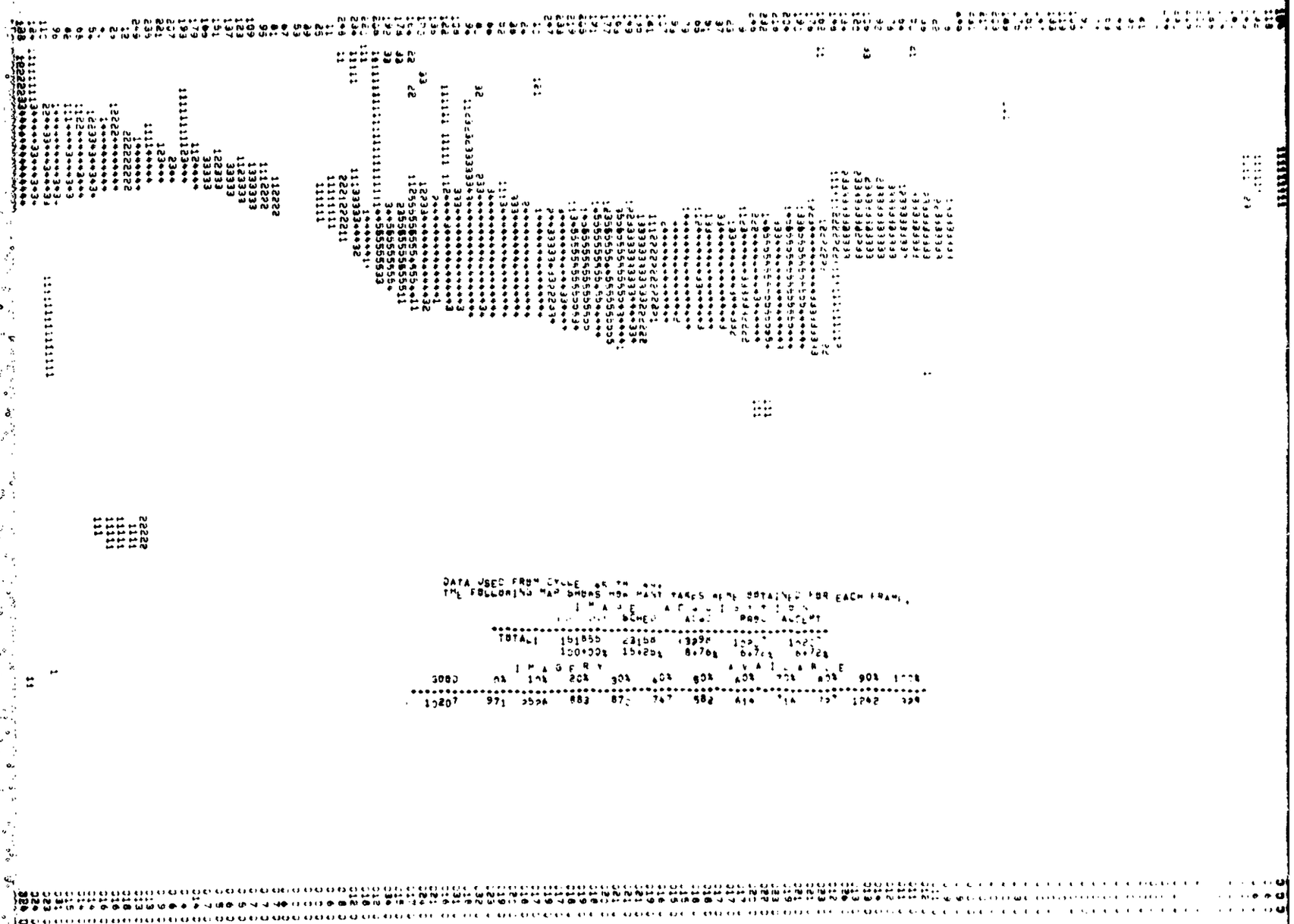

DATA USED FROM CYCLE [illegible]
THE FOLLOWING MAP SHOWS HOW MANY TAKES WERE OBTAINED FOR EACH FRAME.

	IMAGE ACQUISITION				
	[illegible]	SCHED	ACQ	PROC	ACCEPT
TOTAL	151855	23158	13998	[illegible]	[illegible]
	100+00%	15+25%	8+76%	6+7[illegible]%	6+72%

IMAGERY							AVAILABLE				
3000	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
10207	971	9596	883	87[illegible]	747	582	614	[illegible]	[illegible]	1242	[illegible]

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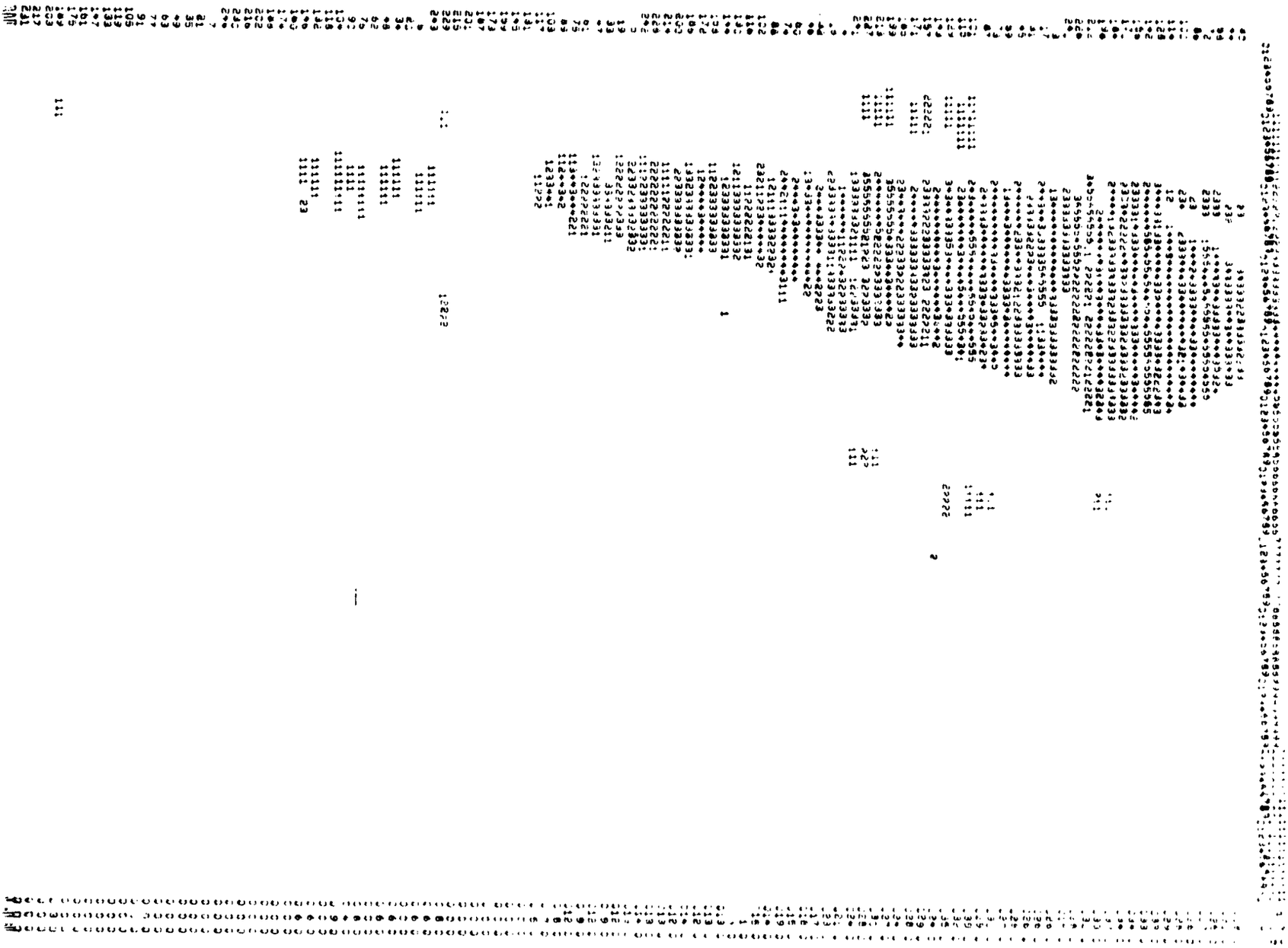

Figure 17-1. Computer Map of MSS Scene: The Quarter - Landsat 2

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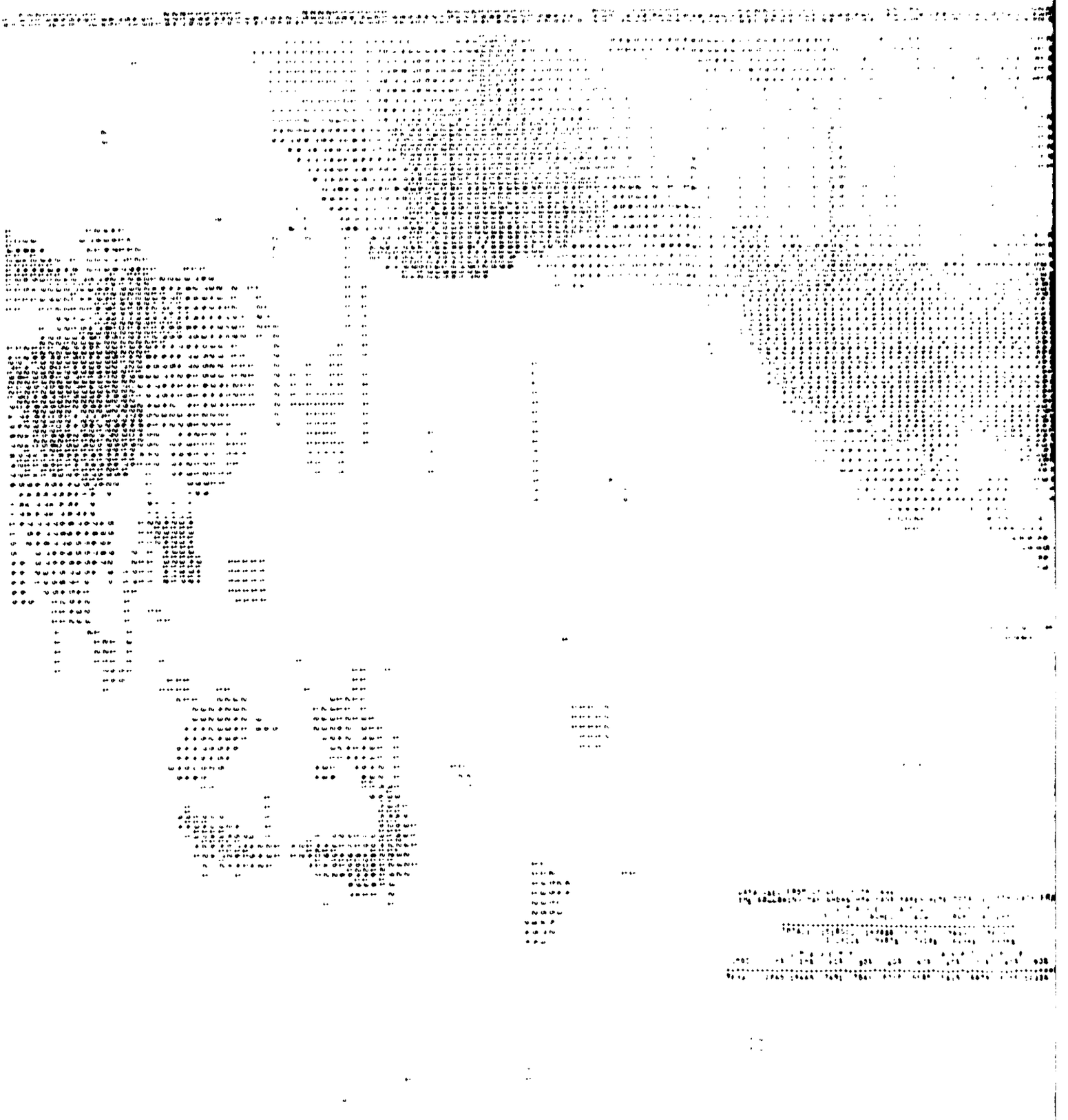

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Figure 17-2. Computer Map of MSS Scenes Since Launch Landsat-2

Table 17-1. MSS Telemetry - Landsat-2

Function	Name	*T.V. Norm	Orbit 27	2500	5091	7641	10192	11540	12340	12720
15040	MUX -6 VDC (TMV)	3.92	4.05	4.04	4.04	4.07	4.03	4.07	4.05	4.06
15041	A/D SUPPLY (TMV)	5.74	5.95	5.95	5.95	5.93	5.95	5.95	5.95	5.97
15042	AVERAGE DENSITY (TMV)	1.72	1.71	2.39	1.95	2.16	2.62	2.33	2.13	2.20
15043	FIBER OPTICS PLATE 1 TEMP (DGC)	22.30	18.13	20.41	21.75	17.21	20.15	18.23	17.01	18.07
15044	FIBER OPTICS PLATE 2 TEMP (DGC)	22.30	17.87	18.86	20.28	15.25	18.34	16.40	16.08	16.26
15045	MUX TEMP (DGC)	25.59	23.38	20.57	23.63	19.57	24.68	[illegible]	22.00	21.31
15046	ELEC COVER TEMP (DGC)	23.09	20.25	21.40	22.96	16.63	20.01	18.03	17.73	17.81
15047	PWR. SUP. TEMP (DGC)	23.85	19.45	19.83	21.62	16.51	20.66	18.34	18.30	18.14
15048	SCAN MIR REG. TEMP (DGC)	23.44	18.30	18.29	21.13	15.93	20.94	17.68	17.79	17.32
15049	SCAN MIR DRIVE ELEC. TEMP (DGC)	24.34	18.96	18.49	21.42	16.01	21.25	18.02	18.27	17.80
15050	SCAN MIR DRIVE COVER TEMP (DGC)	22.50	17.26	18.28	21.21	16.02	20.55	17.79	17.48	17.18
15051	SCAN MIR TEMP (DGC)	21.87	17.26	18.09	20.89	15.87	20.46	17.34	17.01	17.17
15052	ROT. SHUT HOUSING TEMP (DGC)	22.58	23.26	18.91	20.28	15.29	18.78	16.18	16.17	16.31
15053	SCAN MIR REG VOLT (TMV)	4.56	4.7	4.57	4.57	4.39	4.63	[illegible]	4.70	4.64
15054	CAL LAMP CURRENT (TMV)	1.18	1.17	1.20	1.17	1.17	1.17	1.17	1.17	1.17
15055	BAND 1 15 VDC (TMV)	4.97	4.98	4.97	4.97	4.97	4.97	4.97	4.97	4.97
15056	BAND 2 15 VDC (TMV)	5.00	5.00	5.00	5.00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15057	BAND 3 15 VDC (TMV)	4.88	4.95	4.95	4.95	4.95	4.97	4.97	4.97	4.95
15058	BAND 4 15 VDC (TMV)	4.83	5.00	5.00	5.00	5.00	[illegible]	[illegible]	[illegible]	[illegible]
15059	TLM 15 VDC (TMV)	5.04	5.06	5.07	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	5.01	5.03	[illegible]	[illegible]	[illegible]
15061	LOGIC +5 VDC (TMV)	4.86	4.81	4.80	4.83	4.83	[illegible]	[illegible]	[illegible]	[illegible]
15062	RECT. -19 VDC (TMV)	4.97	5.03	5.05	5.05	5.07	[illegible]	[illegible]	[illegible]	[illegible]
15063	RECT. -19 VDC (TMV)	3.54	3.60	3.60	3.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15064	BAND 1 HVA (TMV)	4.95	4.95	4.95	4.95	4.95	4.97	4.97	4.97	4.97
15065	BAND 1 HVB (TMV)	5.03	F	F	F	F	F	F	F	F
15066	BAND 2 HVA (TMV)	4.72	4.70	4.72	4.75	4.71	4.73	[illegible]	[illegible]	4.72
15067	BAND 2 HVB (TMV)	4.70	F	F	F	F	F	F	F	F
15068	BAND 3 HVA (TMV)	4.75	4.72	4.76	4.73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15069	BAND 3 HVB (TMV)	4.65	F	F	F	F	F	F	F	F
15070	SHUT MOT. CONTR. INTEG (TMV)	2.49	2.60	2.60	2.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15071	SCAN MIRROR DRIVE CLOCK (TMV)	1.93	2.0	2.00	2.00	2.00	[illegible]	[illegible]	[illegible]	[illegible]

*Thermal Vacuum Test Data at 20°C
F = Unit OFF

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

Quantum Level for Selected Work
(0 Black; 63 White)

Band	Sensor	Launch	Average Value 1st Year	2nd Year	9th Quar	The Quar	Change Since Launch
1	1	13	40	39	38	39	[illegible]
	2	11	40	39	37	37	10
	3	46	43	42	41	41	-11
	4	46	45	45	44	44	1
	5	44	40	39	38	38	11
	6	46	43	43	42	42	[illegible]
2	7	47	45	45	45	45	1
	8	41	40	41	40	41	[illegible]
	9	18	16	16	16	15	6
	10	50	48	48	47	46	-8
	11	48	47	47	47	47	-2
	12	47	44	44	43	42	-11
3	13	42	40	40	39	39	-7
	14	44	43	42	41	41	-7
	15	47	46	47	47	47	0
	16	47	45	46	45	45	-1
	17	48	46	46	46	46	-4
	18	46	44	45	44	45	-2
4	19	25	25	25	25	25	0
	20	26	27	27	26	26	0
	21	32	32	32	31	31	-3
	22	29	30	30	29	29	0
	23	32	33	33	32	32	0
	24	28	28	28	28	28	0
Line Length		3250	3249	3248	3246	3246	0.06

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SECTION 18

DATA COLLECTION SYSTEM (DCS)

LANDSAT-2

SECTION 18

DATA COLLECTION SUBSYSTEM (DCS)

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

Figure 18-1 shows the number of DCS messages received in each 18-day cycle at OCC. The large number of messages shown for cycle 21 (February 1975) was due to an accidental mode selection for one of the ground transmitters, DCS-6402. Active DCP's in the field remain about 90. The percentage of good messages are above 96%.

There are 48 users in the data base. 257 DCP's have been shipped with 255 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	2462	5091	7641	10192	00840	12320	12721
16001	Receiver 1 Sig Strength (DBM)*	-123.34	-124.81	-122.02	-123.16	-123.06	-121.67	-124.62	-124.99
16002	Receiver 1 Temp (DGC)	22.54	24.20	24.37	25.12	24.82	23.37	23.13	23.12
16003	Rec-1 Pwr Input Volt (VDC)	2.35	2.36	2.36	2.37	2.37	2.35	2.35	2.35
16004	Receiver 2 Sig Strength (DBM)	F	F	F	F	F	F	F	F
16005	Receiver 2 Temp (DGC)	F	F	F	F	F	F	F	F
16006	Receiver 2 Input Volt (VDC)	F	F	F	F	F	F	F	F

*This value [illegible] it is not valid during DCS message reception

F [illegible]

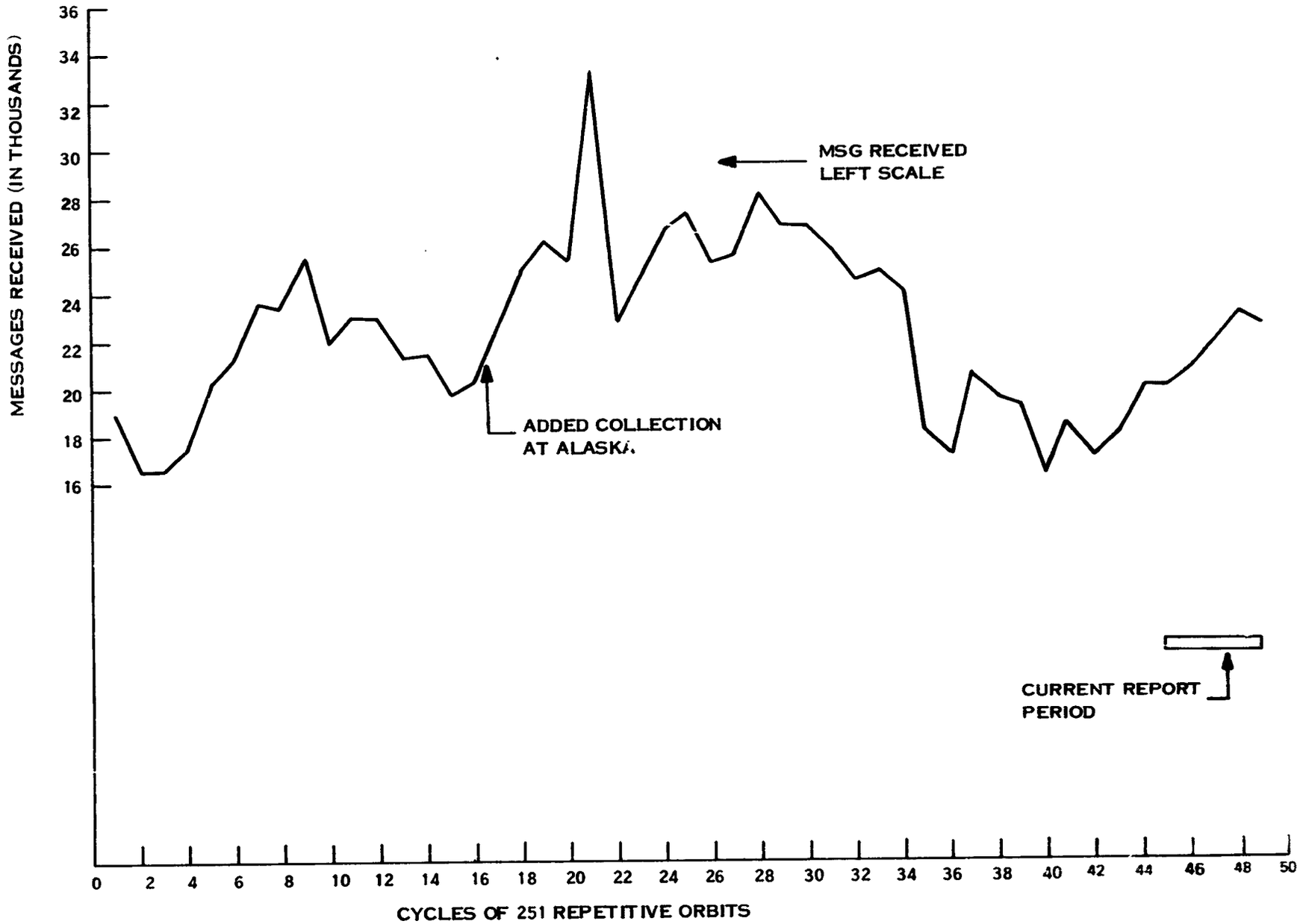

Figure 18-1. DCS Message History

APPENDIX A

LANDSAT-2 ANOMALY LIST

Appendix A. 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 measure non-critical temperatures. Sensors failed prior to launch. Mission unaffected
3/8/75	Unencoded command 781, CIU Channel B Off, received by spacecraft from RF Interference. Commands 782 or 786, switch comdecs; and commands 780 or 784, switch PWM regulator, received at other times.	On-Line	Non-Landsat OCC Authorized Unencoded commands received in Orbit 619, 640, 743, 1575, 1700, 2605, 3164, 4769, 5025, 7925, 8721, 8804, 9523, 9863, 10268, 10583
3/17/75	MMCA Pitch Flux Density TLM Drift	Off-Line	Telemetry decreased 5 counts and indicates increase flux density on charged magnet. Probable sensor drift. No apparent effect on S/C performance.
4/5/75	WBVTR-1 Rewind Failure (MDR E01252)	On-Line	WBVTR-1 failed to execute Rewind command or prematurely terminated rewinds due to false BOT signal. Subsequent commands or Fool-Logic techniques allowed return to operation. Investigation Committee report issued. Problems occurred Orbit 1021, 1532, 1568, 2238. Operation restricted to 300 thru 1500 feet.
6/9/75	WBVTR-2 had Short Rewind (MDR E01255)	On-Line	WBVTR-2 started rewind but stopped prematurely in Orbit 1919 and again in Orbit 3854. Investigation Committee did not define a probable cause but assigned a momentary False BOT as reason for short rewind. Unit remains operational.
8/3/75	WBVTR-1 data did not provide sync to ground station (MDR D04930)	On-Line	One head circuit of WBVTR-1 failed to operate. 25% of data lost in data stream. Operation discontinued until early 1976, when it was used with RBV only.
11/14/75	MSS False End-of-Line Codes (MDR D04940)	Off-Line	Occasional End-of-Line codes occurring in preamble or along video data. Creates 4 black and 4 white words in scene data. Occurs over magnetic anomalies with low incidence rate. Operation continued.
1/25/76	Solar Array Current Notch (MDR D04934)	On-Line	In Orbit 5123, abnormal drops in solar array current appeared for portion of satellite day. S/C operation unaffected because solar array has excess power to date.
7/20/76	Battery 6 Turned Off	On-Line & Off-Line	Battery 6 decreased in load share and rose in charge share thereby causing overcharge. Temperature increased and unit was turned off in Orbit 7601. (Returned to service in Orbit 7992.)
7/29/76	WBVTR-2 Automatic Shutdown by SMART	On-Line	SMART circuits detected high headwheel currents in Orbit 7720 and shutdown WBVTR-2. WBVTR-2 operation was normal; high headwheel current assigned to slipped phase. Normal operation resumed.
[illegible]	Battery 1 Turned Off	On-Line Off-Line	Battery 1 increased in load share and rose in charge share; thereby causing overcharge. Temperature increased and unit was turned off in Orbit 8028. Returned to service in Orbit 8509.

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FOLDOUT FRAME 1

			was turned off in Orbit 7601. (Returned to service in Orbit 7992.)
7/29/76	WBVTR-2 Automatic Shutdown by SMART	On-Line	SMART circuits detected high headwheel currents in Orbit 7720 and shutdown WBVTR-2. WBVTR-2 operation was normal; high headwheel current assigned to slipped phase. Normal operation resumed.
8/20/76	Battery 1 Turned Off	On-Line/ Off-Line	Battery 1 increased in load share and rose in charge share; thereby causing overcharge. Temperature increased and unit was turned off in Orbit 8028. Returned to service in Orbit 8509.
9/29/76	Battery 6 Turned Off	On-Line/ Off-Line	Battery 6 decreased in load share and rose to charge share; thereby causing overcharge. Temperature increased and unit was turned off in Orbit 8591. Returned to service in Orbit 9164.
12/7/76	Battery 6 Turned Off	On-Line/ Off-Line	Battery 6 turned off for restoration cycle in Orbit 9652. See 7/26/65 and 8/20/76 above. Returned to service in Orbit 10028, 10 Jan 77
12/21/76	WBVTR-2 had 30% high P/B speed (MDRD04936)	On-Line	Ground equipment would not synch on WBVTR-2 P/B data during Orbit 9738 P/B. Analysis showed P/B speed was 30% high. Toggling, record to P/B, restored normal operation. Recurred and cured by toggling in Orbits 9930 and 10199.
1/15/77	WBVTR-1 second head failed (MDR D04937)	On-Line	Observation of CRT trace during WBVTR-1 RBV P/B data in Orbit 10086 showed second head failed. Operation discontinued.
1/26/77	Battery 5 Turned Off	R/T & Off-Line	C/D and temperature abnormally high. Turned OFF for restore cycle until Orbit 10657 on 24 February 1977.
2/10/77	WBVTR-2 P/B yield high MFSE counts in MSS data in Orbit 10466.	R/T	Power Supply freq. countdown chain occasionally slips phase. Can be restored to normal by commanding Record followed by P/B
3/18/77	Battery 6 turned OFF in Orbit 10962	On-Line/ Off-Line	C/D and temperature abnormally high. Turned OFF for for restore cycle until Orbit 11311 on 12 April 1977.
4/20/77	Battery 1 turned OFF in Orbit 11420	R/T & Off-Line	High C/D Ratio and Temp. turned ON during Orbit 11947 on 28 May 1977
5/6/77	WBVTR-2 P/B had high MFSE counts in Orbit 11635	R/T	Repeat of anomalies of 12/21/76 and 2/10/77. Operational procedures correct.
5/31/77	Battery 6 turned OFF in Orbit 11993.	On-Line Off-Line	C/D and temperature abnormally high. Turned OFF for restoration cycle until Orbit 12077 on 6 June 1977.
6/6/77	Battery 2 turned OFF in Orbit 12078	R/T & Off-Line	High C/D ratio and temp. turned ON during Orbit 12273 on 20 June 1977.
6/14/77	WBVTR-2 P/B had high MFSE counts	R/T	Repeat of prior anomalies. Operational procedures correct.
6/20/77	Battery 6 turned OFF in Orbit 12271.	R/T & Off-Line	C/D and temperature abnormally high. Turned ON during Orbit 12532 on 9 July 1977.
7/11/77	Battery 1 turned OFF in Orbit 12562		High C/D ratio and temperature. Turned ON during Orbit 1977.

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APPENDIX B

LANDSAT-2 SPACECRAFT ORBIT REFERENCE TABLES

LANDSAT-2

SPACECRAFT ORBIT REFERENCE TABLES

FROM JANUARY 1977 THROUGH JUNE 1978

ORBITS 9890 THROUGH 17504

FLIGHT DAY 710 THROUGH 1255

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LANDSAT-2

JANUARY 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	1	710	9490- 9504	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	39
2	2	711	9514- 9516	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	39
3	3	712	9516- 9532	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	39
4	4	713	9534- 9546	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	39
5	5	714	9546- 9560	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	39
6	6	715	9560- 9574	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	39
7	7	716	9574- 9587	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	39
8	8	717	9587-10001	139-153	94,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	39
9	9	718	10001-10015	153-167	95,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	39
10	10	719	10015-10029	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	39
11	11	720	10029-10043	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	39
12	12	721	10043-10057	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	39
13	13	722	10057-10071	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	39
14	14	723	10071-10085	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	39
15	15	724	10085-10099	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	39
16	16	725	10099-10113	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	40
17	17	726	10113-10127	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	40
18	18	727	10127-10141	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	40
19	19	728	10141-10155	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	40
20	20	729	10155-10169	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	40
21	21	730	10169-10183	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	40
22	22	731	10183-10197	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	40
23	23	732	10197-10211	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	40
24	24	733	10211-10225	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	40
25	25	734	10225-10239	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	40
26	26	735	10239-10253	139-153	94,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	40
27	27	736	10253-10267	153-167	95,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	40
28	28	737	10267-10281	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	40
29	29	738	10281-10294	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	40
30	30	739	10294-10308	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	40
31	31	740	10308-10322	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	40

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FEB. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	32	741	[illegible]	223-237	[illegible]	17	[illegible]
2	33	742	[illegible]	237-251	[illegible]	18	[illegible]
3	34	743	[illegible]	251- 14	[illegible]	1	-1
4	35	744	[illegible]	[illegible]	[illegible]	2	-1
5	36	745	[illegible]	[illegible]	[illegible]	3	-1
6	37	746	[illegible]	[illegible]	[illegible]	4	-1
7	38	747	[illegible]	56- 70	[illegible]	5	-1
8	39	748	[illegible]	[illegible]	[illegible]	6	-1
9	40	749	[illegible]	[illegible]	[illegible]	7	-1
10	41	750	[illegible]	[illegible]	[illegible]	8	-1
11	42	751	[illegible]	[illegible]	[illegible]	9	-1
12	43	752	[illegible]	[illegible]	[illegible]	10	-1
13	44	753	[illegible]	[illegible]	[illegible]	11	-1
14	45	754	[illegible]	153-167	[illegible]	12	-1
15	46	755	[illegible]	167-181	[illegible]	13	-1
16	47	756	[illegible]	[illegible]	[illegible]	14	-1
17	48	757	[illegible]	[illegible]	[illegible]	15	-1
18	49	758	[illegible]	[illegible]	[illegible]	16	-1
19	50	759	[illegible]	223-237	[illegible]	17	-1
20	51	760	[illegible]	237-251	[illegible]	18	-1
21	52	761	[illegible]	251- 14	[illegible]	1	-2
22	53	762	[illegible]	[illegible]	[illegible]	2	-2
23	54	763	[illegible]	[illegible]	[illegible]	3	-2
24	55	764	[illegible]	[illegible]	[illegible]	4	-2
25	56	765	[illegible]	[illegible]	[illegible]	5	-2
26	57	766	[illegible]	[illegible]	[illegible]	6	-2
27	58	767	[illegible]	[illegible]	[illegible]	7	-2
28	59	768	[illegible]	96-112	[illegible]	8	-2

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MAR. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	60	700	10713-10727	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	42
2	61	701	10727-10740	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	42
3	62	702	10740-10754	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	42
4	63	703	10754-10768	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	42
5	64	704	10768-10782	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	42
6	65	705	10782-10796	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	42
7	66	706	10796-10810	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	42
8	67	707	10810-10824	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	42
9	68	708	10824-10838	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	42
10	69	709	10838-10852	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	42
11	70	710	10852-10866	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	43
12	71	711	10866-10880	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	43
13	72	712	10880-10894	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	43
14	73	713	10894-10908	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	43
15	74	714	10908-10922	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	43
16	75	715	10922-10936	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	43
17	76	716	10936-10950	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	43
18	77	717	10950-10964	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	43
19	78	718	10964-10978	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	43
20	79	719	10978-10991	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	43
21	80	720	10991-11005	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	43
22	81	721	11005-11019	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	43
23	82	722	11019-11033	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	43
24	83	723	11033-11047	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	43
25	84	724	11047-11061	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	43
26	85	725	11061-11075	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	43
27	86	726	11075-11089	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	43
28	87	727	11089-11103	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	43
29	88	728	11103-11117	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	44
30	89	729	11117-11131	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	44
31	90	730	11131-11145	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	44

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APRIL 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	[illegible] DAY	[illegible]
1	91	[illegible]	[illegible]	42- 56	[illegible]	[illegible]	[illegible]
2	92	[illegible]	[illegible]	56- 70	[illegible]	[illegible]	[illegible]
3	93	[illegible]	[illegible]	70- 84	[illegible]	[illegible]	[illegible]
4	94	[illegible]	[illegible]	84- 98	[illegible]	[illegible]	[illegible]
5	95	[illegible]	[illegible]	98-112	[illegible]	[illegible]	[illegible]
6	96	[illegible]	[illegible]	112-126	[illegible]	[illegible]	[illegible]
7	97	[illegible]	[illegible]	126-140	[illegible]	[illegible]	[illegible]
8	98	[illegible]	[illegible]	140-153	[illegible]	[illegible]	[illegible]
9	99	[illegible]	[illegible]	153-167	[illegible]	[illegible]	[illegible]
10	100	[illegible]	[illegible]	167-181	[illegible]	[illegible]	[illegible]
11	101	[illegible]	[illegible]	181-195	[illegible]	[illegible]	[illegible]
12	102	[illegible]	[illegible]	195-209	[illegible]	[illegible]	[illegible]
13	103	[illegible]	[illegible]	209-223	[illegible]	[illegible]	[illegible]
14	104	[illegible]	[illegible]	223-237	[illegible]	[illegible]	[illegible]
15	105	[illegible]	[illegible]	237-251	[illegible]	[illegible]	[illegible]
16	106	[illegible]	[illegible]	251- 14	[illegible]	[illegible]	[illegible]
17	107	[illegible]	[illegible]	14- 28	[illegible]	[illegible]	[illegible]
18	108	[illegible]	[illegible]	28- 42	[illegible]	[illegible]	[illegible]
19	109	[illegible]	[illegible]	42- 56	[illegible]	[illegible]	[illegible]
20	110	[illegible]	[illegible]	56- 70	[illegible]	[illegible]	[illegible]
21	111	[illegible]	[illegible]	70- 84	[illegible]	[illegible]	[illegible]
22	112	[illegible]	[illegible]	84- 98	[illegible]	[illegible]	[illegible]
23	113	[illegible]	[illegible]	98-112	[illegible]	[illegible]	[illegible]
24	114	[illegible]	[illegible]	112-126	[illegible]	[illegible]	[illegible]
25	115	[illegible]	[illegible]	126-139	[illegible]	[illegible]	[illegible]
26	116	[illegible]	[illegible]	139-153	[illegible]	[illegible]	[illegible]
27	117	[illegible]	[illegible]	153-167	[illegible]	[illegible]	[illegible]
28	118	[illegible]	[illegible]	167-181	[illegible]	[illegible]	[illegible]
29	119	[illegible]	[illegible]	181-195	[illegible]	[illegible]	[illegible]
30	120	[illegible]	[illegible]	195-209	[illegible]	[illegible]	[illegible]

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LANDSAT-2

MAY, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE DAY
1	121	830	11063-11077	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	45
2	122	831	11077-11091	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	45
3	123	832	11091-11105	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	45
4	124	833	11105-11119	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	46
5	125	834	11119-11133	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	46
6	126	835	11133-11147	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	46
7	127	836	11147-11161	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	46
8	128	837	11161-11175	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	46
9	129	838	11175-11189	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	46
10	130	839	11189-11203	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	46
11	131	840	11203-11217	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	46
12	132	841	11217-11231	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	46
13	133	842	11231-11245	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	46
14	134	843	11245-11259	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	46
15	135	844	11259-11273	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	46
16	136	845	11273-11286	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	46
17	137	846	11286-11300	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	46
18	138	847	11300-11314	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	46
19	139	848	11314-11328	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	46
20	140	849	11328-11342	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	46
21	141	850	11342-11356	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	46
22	142	851	11356-11370	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	47
23	143	852	11370-11384	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	47
24	144	853	11384-11398	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	47
25	145	854	11398-11412	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	47
26	146	855	11412-11426	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	47
27	147	856	11426-11440	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	47
28	148	857	11440-11454	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	47
29	149	858	11454-11468	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	47
30	150	859	11468-11482	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	47
31	151	860	11482-11496	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	47

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JUNE 1977

DATE	JET DAY	FLIGHT DAY	GROUNDTRACK ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	152	8/1	1[illegible]-1[illegible]	1[illegible]-153	[illegible]	11	47
2	153	[illegible]	1[illegible]-1[illegible]	153-167	[illegible]	12	47
3	154	[illegible]	1[illegible]-1[illegible]	167-181	[illegible]	13	47
4	155	[illegible]	1[illegible]-1[illegible]	181-195	[illegible]	14	47
5	156	[illegible]	1[illegible]-1[illegible]	195-209	[illegible]	15	47
6	157	[illegible]	1[illegible]-1[illegible]	209-223	[illegible]	16	47
7	158	[illegible]	1[illegible]-1[illegible]	223-237	[illegible]	17	47
8	159	[illegible]	1[illegible]-1[illegible]	237-251	[illegible]	18	47
9	160	[illegible]	1[illegible]-1[illegible]	251- 1[illegible]	[illegible]	1	48
10	161	[illegible]	1[illegible]-1[illegible]	1[illegible]- 28	[illegible]	2	48
11	162	8/1	1[illegible]-1[illegible]	28- 42	[illegible]	3	48
12	163	8/2	1[illegible]-1[illegible]	42- 56	[illegible]	4	48
13	164	8/3	1[illegible]-1[illegible]	56- 70	[illegible]	5	48
14	165	8/4	1[illegible]-1[illegible]	70- 84	[illegible]	6	48
15	166	8/5	1[illegible]-1[illegible]	84- 98	[illegible]	7	48
16	167	[illegible]	1[illegible]-1[illegible]	98-112	[illegible]	8	48
17	168	8/7	1[illegible]-1[illegible]	112-126	[illegible]	9	48
18	169	8/8	1[illegible]-1[illegible]	126-140	[illegible]	10	48
19	170	8/9	1[illegible]-1[illegible]	140-153	[illegible]	11	45
20	171	[illegible]	1[illegible]-1[illegible]	153-167	[illegible]	12	45
21	172	[illegible]	1[illegible]-1[illegible]	167-181	[illegible]	13	48
22	173	[illegible]	1[illegible]-1[illegible]	181-195	[illegible]	14	48
23	174	[illegible]	1[illegible]-1[illegible]	195-209	[illegible]	15	48
24	175	[illegible]	1[illegible]-1[illegible]	209-223	[illegible]	16	48
25	176	[illegible]	1[illegible]-1[illegible]	223-237	[illegible]	17	48
26	177	[illegible]	1[illegible]-1[illegible]	237-251	[illegible]	18	48
27	178	[illegible]	1[illegible]-1[illegible]	251- 1[illegible]	[illegible]	1	49
28	179	[illegible]	1[illegible]-1[illegible]	1[illegible]- 28	[illegible]	2	49
29	180	[illegible]	1[illegible]-1[illegible]	28- 42	[illegible]	3	49
30	181	[illegible]	1[illegible]-1[illegible]	42- 56	[illegible]	4	49

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LANDSAT-2

JULY 1977

DATE	SAT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	182	891	12414-12426	56- 70	110,126,142,158,174,190,206,218,236, 3, 21, 39, 57, 75, 93,111	5	49
2	183	892	12426-12442	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	49
3	184	893	12442-12458	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	49
4	185	894	12458-12470	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	49
5	186	895	12470-12484	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	49
6	187	896	12484-12497	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	49
7	188	897	12497-12511	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	49
8	189	898	12511-12525	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	49
9	190	899	12525-12539	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	49
10	191	900	12539-12553	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	49
11	192	901	12553-12567	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	49
12	193	902	12567-12581	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	49
13	194	903	12581-12595	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	49
14	195	904	12595-12609	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	49
15	196	905	12609-12623	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	50
16	197	906	12623-12637	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	50
17	198	907	12637-12651	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	50
18	199	908	12651-12665	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	50
19	200	909	12665-12679	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	50
20	201	910	12679-12693	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	50
21	202	911	12693-12707	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	50
22	203	912	12707-12721	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	50
23	204	913	12721-12735	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	50
24	205	914	12735-12748	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	50
25	206	915	12748-12762	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	50
26	207	916	12762-12776	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	50
27	208	917	12776-12790	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	50
28	209	918	12790-12804	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	50
29	210	919	12804-12818	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	50
30	211	920	12818-12832	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	50
31	212	921	12832-12846	223-237	104,122,140,158,176,194,212,230,246, 15, 33, 51, 69, 87,105	17	50

LANDSAT-2

AUG. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	213	922	12946-12950	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	50
2	214	923	12950-12974	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	51
3	215	924	12974-12998	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	51
4	216	925	12998-13022	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	51
5	217	926	13022-13046	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	51
6	218	927	13046-13070	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	51
7	219	928	13070-13094	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	51
8	220	929	13094-13118	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	51
9	221	930	13118-13142	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	51
10	222	931	13142-13166	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	51
11	223	932	13166-13193	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	51
12	224	933	13193-13213	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	51
13	225	934	13213-13237	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	51
14	226	935	13237-13261	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	51
15	227	936	13261-13285	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	51
16	228	937	13285-13309	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	51
17	229	938	13309-13333	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	51
18	230	939	13333-13357	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	51
19	231	940	13357-13111	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	51
20	232	941	13111-13125	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	52
21	233	942	13125-13139	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	52
22	234	943	13139-13153	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	52
23	235	944	13153-13167	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	52
24	236	945	13167-13181	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	52
25	237	946	13181-13195	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	52
26	238	947	13195-13209	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	52
27	239	948	13209-13223	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	52
28	240	949	13223-13237	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	52
29	241	950	13237-13250	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	52
30	242	951	13250-13264	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	52
31	243	952	13264-13278	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	52

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LANDSAT-D

SEP, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	244	953	13476-13492	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	52
2	245	954	13492-13506	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	52
3	246	955	13506-13520	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	52
4	247	956	13520-13534	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	52
5	248	957	13534-13548	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	52
6	249	958	13548-13562	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	52
7	250	959	13562-13576	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	53
8	251	960	13576-13590	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	53
9	252	961	13590-13604	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	53
10	253	962	13604-13618	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	53
11	254	963	13618-13632	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	53
12	255	964	13632-13646	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	53
13	256	965	13646-13660	84- 96	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	53
14	257	966	13660-13674	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	53
15	258	967	13674-13688	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	53
16	259	968	13688-13701	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	53
17	260	969	13701-13715	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	53
18	261	970	13715-13729	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	53
19	262	971	13729-13743	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	53
20	263	972	13743-13757	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	53
21	264	973	13757-13771	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	53
22	265	974	13771-13785	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	53
23	266	975	13785-13799	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	53
24	267	976	13799-13813	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	53
25	268	977	13813-13827	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	54
26	269	978	13827-13841	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	54
27	270	979	13841-13855	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	54
28	271	980	13855-13869	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	54
29	272	981	13869-13883	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	54
30	273	982	13883-13897	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	54

LANDSAT-2

OCT. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE No.
1	274	963	13697-13711	84- 98	112,135,148,165,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	54
2	275	964	13711-13725	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	54
3	276	965	13725-13739	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	54
4	277	966	13739-13752	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	54
5	278	967	13752-13766	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	54
6	279	968	13766-13780	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	54
7	280	969	13780-13794	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	54
8	281	970	13794-13808	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	54
9	282	971	13808-13822	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	54
10	283	972	13822-13836	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	54
11	284	973	13836-13850	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	54
12	285	974	13850-13864	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	54
13	286	975	13864-13878	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	55
14	287	976	13878-13892	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	55
15	288	977	13892-13906	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	55
16	289	978	13906-13920	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	55
17	290	979	13920-13934	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	55
18	291	1000	13934-13948	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	55
19	292	1001	13948-13962	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	55
20	293	1002	13962-13976	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	55
21	294	1003	13976-13990	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	55
22	295	1004	13990-14003	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	55
23	296	1005	14003-14017	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	55
24	297	1006	14017-14031	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	55
25	298	1007	14031-14045	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	55
26	299	1008	14045-14059	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	55
27	300	1009	14059-14073	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	55
28	301	1010	14073-14087	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	55
29	302	1011	14087-14101	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	55
30	303	1012	14101-14115	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	55
31	304	1013	14115-14129	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	56

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NOV. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE No.
1	305	1014	14-128	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	56
2	306	1015	142-157	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	56
3	307	1016	156-171	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	56
4	308	1017	170-185	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	56
5	309	1018	184-199	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	56
6	310	1019	198-213	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	56
7	311	1020	212-227	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	56
8	312	1021	226-241	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	56
9	313	1022	240-254	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	56
10	314	1023	254-268	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	56
11	315	1024	268-282	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	56
12	316	1025	282-296	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	56
13	317	1026	296-310	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	56
14	318	1027	310-324	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	56
15	319	1028	324-338	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	56
16	320	1029	338-352	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	56
17	321	1030	352-366	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	56
18	322	1031	366-380	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	57
19	323	1032	380-394	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	57
20	324	1033	394-408	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	57
21	325	1034	408-422	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	57
22	326	1035	422-436	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	57
23	327	1036	436-450	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	57
24	328	1037	450-464	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	57
25	329	1038	464-478	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	57
26	330	1039	478-492	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	57
27	331	1040	492-505	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	57
28	332	1041	505-519	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	57
29	333	1042	519-533	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	57
30	334	1043	533-547	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	57

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LANDSAT-2

DEC. 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	355	1094	14047-14061	181-195	101,114,127,155,174,191,203,227,245, 12, 30, 46, 66, 84,102	14	57
2	356	1095	14062-14075	195-209	102,125,138,156,175,192,210,228,246, 13, 31, 49, 67, 85,103	15	57
3	357	1096	14076-14089	209-223	103,121,139,157,176,194,211,229,247, 14, 32, 50, 68, 86,104	16	57
4	358	1097	14090-14103	223-237	104,122,140,158,177,195,212,230,248, 15, 33, 51, 69, 87,105	17	57
5	359	1098	14104-14117	237-251	105,123,141,159,178,196,213,231,249, 16, 34, 52, 70, 88,106	18	57
6	360	1099	14118-14131	251- 14	106,124,142,160,179,197,214,232,250, 17, 35, 53, 71, 89,107	1	58
7	361	1100	14132-14145	14- 28	107,125,143,161,180,198,215,233,251, 18, 36, 54, 72, 90,108	2	58
8	362	1101	14146-14159	28- 42	108,126,144,162,180,199,216,234, 1, 19, 37, 55, 73, 91,109	3	58
9	363	1102	14160-14173	42- 56	109,127,145,163,181,200,217,235, 2, 20, 38, 56, 74, 92,110	4	58
10	364	1103	14174-14187	56- 70	110,128,146,164,182,201,218,236, 3, 21, 39, 57, 75, 93,111	5	58
11	365	1104	14188-14201	70- 84	111,129,147,165,183,202,219,237, 4, 22, 40, 58, 76, 94,112	6	58
12	366	1105	14202-14215	84- 98	112,130,148,166,184,203,220,238, 5, 23, 41, 59, 77, 95,113	7	58
13	367	1106	14216-14229	98-112	113,131,149,167,185,204,221,239, 6, 24, 42, 60, 78, 96,114	8	58
14	368	1107	14230-14243	112-126	114,132,150,168,186,205,222,240, 7, 25, 43, 61, 79, 97,115	9	58
15	369	1108	14244-14256	126-139	115,133,151,169,187,206,223,241, 8, 26, 44, 62, 80, 98	10	58
16	370	1109	14257-14270	139-153	98,114,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	58
17	371	1110	14271-14284	153-167	99,115,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	58
18	372	1111	14285-14298	167-181	100,116,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	58
19	373	1112	14299-14312	181-195	101,117,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	58
20	374	1113	14313-14326	195-209	102,118,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	58
21	375	1114	14327-14340	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	58
22	376	1115	14341-14354	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	58
23	377	1116	14355-14368	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	58
24	378	1117	14369-14382	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	59
25	379	1118	14383-14396	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	59
26	380	1119	14397-14410	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	59
27	381	1120	14411-14424	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	59
28	382	1121	14425-14438	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	59
29	383	1122	14439-14452	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	59
30	384	1123	14453-14466	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	59
31	385	1124	14467-14480	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	59

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LANDSAT-2

July 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	1	1075	14993-15004	112-123	114,130,146,163,180,194,222,240, 7, 25, 43, 61, 79, 97,115	9	59
2	2	1076	15004-15017	123-139	115,131,147,163,179,195,223,241, 8, 26, 44, 62, 80, 98	10	59
3	3	1077	15017-15031	139-153	96,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	59
4	4	1078	15031-15045	153-167	97,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	59
5	5	1079	15045-15059	167-181	98,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	59
6	6	1080	15059-15073	181-195	99,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	59
7	7	1081	15073-15087	195-209	100,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	59
8	8	1082	15087-15101	209-223	101,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	59
9	9	1083	15101-15115	223-237	102,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	59
10	10	1084	15115-15129	237-251	103,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	59
11	11	1085	15129-15143	251- 14	104,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	60
12	12	1086	15143-15147	14- 28	105,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	60
13	13	1087	15147-15161	28- 42	106,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	60
14	14	1088	15161-15175	42- 56	107,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	60
15	15	1089	15175-15189	56- 70	108,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	60
16	16	1090	15189-15203	70- 84	109,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	60
17	17	1091	15203-15217	84- 98	110,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	60
18	18	1092	15217-15231	98-112	111,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	60
19	19	1093	15231-15245	112-126	112,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	60
20	20	1094	15245-15259	126-139	113,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	60
21	21	1095	15259-15272	139-153	94,114,132,150,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	60
22	22	1096	15272-15286	153-167	95,115,133,151,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	60
23	23	1097	15286-15300	167-181	96,116,134,152,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	60
24	24	1098	15300-15314	181-195	97,117,135,153,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	60
25	25	1099	15314-15328	195-209	98,118,136,154,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	60
26	26	1100	15328-15342	209-223	99,119,137,155,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	60
27	27	1101	15342-15356	223-237	100,120,138,156,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	60
28	28	1102	15356-15370	237-251	101,121,139,157,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	60
29	29	1103	15370-15384	251- 14	102,122,140,158,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	61
30	30	1104	15384-15398	14- 28	103,123,141,159,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	61
31	31	1105	15398-15412	28- 42	104,124,142,160,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	61

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LANDSAT-2

FEB, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	32	1106	15412-15426	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	61
2	33	1107	15427-15440	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	61
3	34	1108	15441-15454	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	61
4	35	1109	15455-15468	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	61
5	36	1110	15469-15482	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	61
6	37	1111	15482-15496	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	61
7	38	1112	15497-15509	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	61
8	39	1113	15509-15523	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	61
9	40	1114	15523-15537	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	61
10	41	1115	15537-15551	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	61
11	42	1116	15551-15565	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	61
12	43	1117	15565-15579	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	61
13	44	1118	15579-15593	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	61
14	45	1119	15593-15607	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	61
15	46	1120	15607-15621	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	61
16	47	1121	15621-15635	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	62
17	48	1122	15635-15649	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	62
18	49	1123	15649-15663	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	62
19	50	1124	15663-15677	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	62
20	51	1125	15677-15691	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	62
21	52	1126	15691-15705	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	62
22	53	1127	15705-15719	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	62
23	54	1128	15719-15733	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	62
24	55	1129	15733-15747	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	62
25	56	1130	15747-15760	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	62
26	57	1131	15760-15774	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	62
27	58	1132	15774-15788	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	62
28	59	1133	15788-15802	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	62

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LANDSAT-2

MAR, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	60	1154	15010-15016	181-195	101,117,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	62
2	61	1155	15016-15030	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	62
3	62	1156	15030-15044	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	62
4	63	1157	15044-15058	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	62
5	64	1158	15058-15072	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	62
6	65	1159	15072-15086	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	63
7	66	1160	15086-15100	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	63
8	67	1161	15100-15114	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	63
9	68	1162	15114-15128	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	63
10	69	1163	15128-15142	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	63
11	70	1164	15142-15156	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	63
12	71	1165	15156-15170	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	63
13	72	1166	15170-15184	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	63
14	73	1167	15184-15198	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	63
15	74	1168	15198-16011	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	63
16	75	1169	16011-16025	139-153	96,114,132,150,168,186,204,222, 9, 27, 45, 63, 81, 99	11	63
17	76	1170	16025-16039	153-167	97,115,133,151,169,187,205,223,244, 10, 28, 46, 64, 82,100	12	63
18	77	1171	16039-16053	167-181	98,116,134,152,170,188,206,224,245, 11, 29, 47, 65, 83,101	13	63
19	78	1172	16053-16067	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	63
20	79	1173	16067-16081	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	63
21	80	1174	16081-16095	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	63
22	81	1175	16095-16109	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	63
23	82	1176	16109-16123	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	63
24	83	1177	16123-16137	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	64
25	84	1178	16137-16151	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	64
26	85	1179	16151-16165	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	64
27	86	1180	16165-16179	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	64
28	87	1181	16179-16193	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	64
29	88	1182	16193-16207	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	64
30	89	1183	16207-16221	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	64
31	90	1184	16221-16235	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	64

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APR, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	91	1165	[illegible]	112-126	[illegible]	9	64
2	92	[illegible]	[illegible]	126-139	[illegible]	10	64
3	93	1167	[illegible]	139-153	[illegible]	11	64
4	94	1168	[illegible]	153-167	[illegible]	12	64
5	95	[illegible]	[illegible]	167-181	[illegible]	13	64
6	96	[illegible]	[illegible]	181-195	[illegible]	14	64
7	97	1171	[illegible]	195-209	[illegible]	15	64
8	98	1172	[illegible]	[illegible]	[illegible]	16	64
9	99	1173	[illegible]	[illegible]	[illegible]	17	64
10	100	1174	[illegible]	237-251	[illegible]	18	64
11	101	1175	[illegible]	251- 14	[illegible]	1	65
12	102	1176	[illegible]	14- 28	[illegible]	2	65
13	103	1177	[illegible]	28- 42	[illegible]	3	65
14	104	1178	[illegible]	42- 56	[illegible]	4	65
15	105	1179	[illegible]	56- 70	[illegible]	5	65
16	106	1180	[illegible]	70- 84	[illegible]	6	65
17	107	1181	[illegible]	84- 98	[illegible]	7	65
18	108	1182	[illegible]	98-112	[illegible]	8	65
19	109	1183	[illegible]	112-126	[illegible]	9	65
20	110	1184	[illegible]	[illegible]	[illegible]	10	65
21	111	[illegible]	[illegible]	139-153	[illegible]	11	65
22	[illegible]	[illegible]	[illegible]	153-167	[illegible]	12	65
23	113	1187	[illegible]	167-181	[illegible]	13	65
24	114	1188	[illegible]	181-195	[illegible]	14	65
25	115	1189	[illegible]	195-209	[illegible]	15	65
26	116	1190	[illegible]	[illegible]	[illegible]	16	65
27	117	1191	[illegible]	[illegible]	[illegible]	17	65
28	118	1192	[illegible]	237-251	[illegible]	18	65
29	119	1193	[illegible]	251- 14	[illegible]	1	66
30	120	1194	[illegible]	14- 28	[illegible]	2	66

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OF POOR QUALITY

LANDSAT-2

MAY, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	121	1195	16053-16067	28- 42	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 1, 19, 37, 55, 73, 91,109	3	66
2	122	1196	16067-16081	42- 56	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 2, 20, 38, 56, 74, 92,110	4	66
3	123	1197	16081-16095	56- 70	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 3, 21, 39, 57, 75, 93,111	5	66
4	124	1198	16095-16109	70- 84	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 4, 22, 40, 58, 76, 94,112	6	66
5	125	1199	16109-16123	84- 98	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 5, 23, 41, 59, 77, 95,113	7	66
6	126	1200	16123-16137	98-112	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 6, 24, 42, 60, 78, 96,114	8	66
7	127	1201	16137-16151	112-126	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 7, 25, 43, 61, 79, 97,115	9	66
8	128	1202	16151-16165	126-140	10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 8, 26, 44, 62, 80, 98	10	66
9	129	1203	16165-16179	140-153	98,106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234, 9, 27, 45, 63, 81, 99	11	66
10	130	1204	16179-16192	153-167	99,107,115,123,131,139,147,155,163,171,179,187,195,203,211,219,227,235,243, 10, 28, 46, 64, 82,100	12	66
11	131	1205	16192-16206	167-181	100,108,116,124,132,140,148,156,164,172,180,188,196,204,212,220,228,236,244, 11, 29, 47, 65, 83,101	13	66
12	132	1206	16206-16220	181-195	101,109,117,125,133,141,149,157,165,173,181,189,197,205,213,221,229,237,245, 12, 30, 48, 66, 84,102	14	66
13	133	1207	16220-16234	195-209	102,110,118,126,134,142,150,158,166,174,182,190,198,206,214,222,230,238,246, 13, 31, 49, 67, 85,103	15	66
14	134	1208	16234-16248	209-223	103,111,119,127,135,143,151,159,167,175,183,191,199,207,215,223,231,239,247, 14, 32, 50, 68, 86,104	16	66
15	135	1209	16248-16262	223-237	104,112,120,128,136,144,152,160,168,176,184,192,200,208,216,224,232,240,248, 15, 33, 51, 69, 87,105	17	66
16	136	1210	16262-16276	237-251	105,113,121,129,137,145,153,161,169,177,185,193,201,209,217,225,233,241,249, 16, 34, 52, 70, 88,106	18	66
17	137	1211	16276-16290	251- 14	106,114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234,242,250, 17, 35, 53, 71, 89,107	1	67
18	138	1212	16290-16304	14- 28	107,115,123,131,139,147,155,163,171,179,187,195,203,211,219,227,235,243,251, 18, 36, 54, 72, 90,108	2	67
19	139	1213	16304-16318	28- 42	108,116,124,132,140,148,156,164,172,180,188,196,204,212,220,228,236,244, 1, 19, 37, 55, 73, 91,109	3	67
20	140	1214	16318-16332	42- 56	109,117,125,133,141,149,157,165,173,181,189,197,205,213,221,229,237,245, 2, 20, 38, 56, 74, 92,110	4	67
21	141	1215	16332-16346	56- 70	110,118,126,134,142,150,158,166,174,182,190,198,206,214,222,230,238,246, 3, 21, 39, 57, 75, 93,111	5	67
22	142	1216	16346-16360	70- 84	111,119,127,135,143,151,159,167,175,183,191,199,207,215,223,231,239,247, 4, 22, 40, 58, 76, 94,112	6	67
23	143	1217	16360-16374	84- 98	112,120,128,136,144,152,160,168,176,184,192,200,208,216,224,232,240,248, 5, 23, 41, 59, 77, 95,113	7	67
24	144	1218	16374-16388	98-112	113,121,129,137,145,153,161,169,177,185,193,201,209,217,225,233,241,249, 6, 24, 42, 60, 78, 96,114	8	67
25	145	1219	16388-17002	112-126	114,122,130,138,146,154,162,170,178,186,194,202,210,218,226,234,242,250, 7, 25, 43, 61, 79, 97,115	9	67
26	146	1220	17002-17015	126-139	115,123,131,139,147,155,163,171,179,187,195,203,211,219,227,235,243,251, 8, 26, 44, 62, 80, 98	10	67
27	147	1221	17015-17029	139-153	99,107,115,123,131,139,147,155,163,171,179,187,195,203,211,219,227,235,243, 9, 27, 45, 63, 81, 99	11	67
28	148	1222	17029-17043	153-167	99,107,115,123,131,139,147,155,163,171,179,187,195,203,211,219,227,235,243, 10, 28, 46, 64, 82,100	12	67
29	149	1223	17043-17057	167-181	100,108,116,124,132,140,148,156,164,172,180,188,196,204,212,220,228,236,244, 11, 29, 47, 65, 83,101	13	67
30	150	1224	17057-17071	181-195	101,109,117,125,133,141,149,157,165,173,181,189,197,205,213,221,229,237,245, 12, 30, 48, 66, 84,102	14	67
31	151	1225	17071-17085	195-209	102,110,118,126,134,142,150,158,166,174,182,190,198,206,214,222,230,238,246, 13, 31, 49, 67, 85,103	15	67

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DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE No.
1	152	1266	17066-17099	209-225	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	67
2	153	1267	17100-17113	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	67
3	154	1268	17114-17127	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	67
4	155	1269	17128-17141	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	68
5	156	1270	17142-17155	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	68
6	157	1271	17156-17169	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	68
7	158	1272	17170-17183	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	68
8	159	1273	17184-17197	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	68
9	160	1274	17198-17211	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	68
10	161	1275	17212-17225	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	68
11	162	1276	17226-17239	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	68
12	163	1277	17240-17253	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	68
13	164	1278	17254-17266	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	68
14	165	1279	17267-17280	139-153	116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	68
15	166	1280	17281-17294	153-167	117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	68
16	167	1281	17295-17308	167-181	118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	68
17	168	1282	17309-17322	181-195	119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	68
18	169	1283	17323-17336	195-209	120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	68
19	170	1284	17337-17350	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	68
20	171	1285	17351-17364	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	68
21	172	1286	17365-17378	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	68
22	173	1287	17379-17392	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	69
23	174	1288	17393-17406	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	69
24	175	1289	17407-17420	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	69
25	176	1290	17421-17434	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	69
26	177	1291	17435-17448	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	69
27	178	1292	17449-17462	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	69
28	179	1293	17463-17476	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	69
29	180	1294	17477-17490	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	69
30	181	1295	17491-17504	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	69

APPENDIX C

LANDSAT-2 DOCUMENTS ISSUED THIS REPORT PERIOD

APPENDIX C

LANDSAT-2 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title and Data
1	PIR-U-14N5-203	Tentative Comparison of Uplinks, Goldstone vs. Santiago, using Landsat 1/2 Receivers, dated 4/29/77.