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LANDSAT-1 AND LANDSAT-2

FLIGHT EVALUATION REPORT

23 JULY 1977 TO 23 OCTOBER 1977

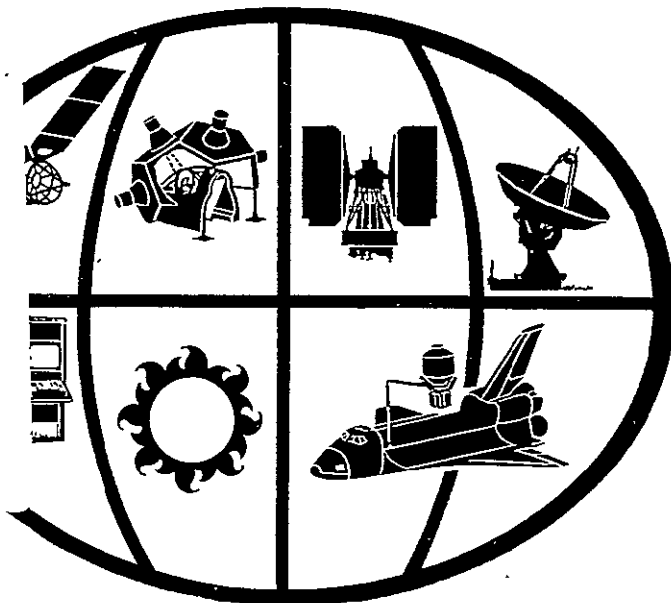
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Prepared By
GE LANDSAT OPERATIONS CONTROL CENTER

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

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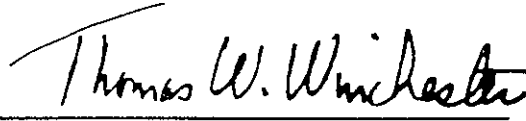
GENERAL  ELECTRIC

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**For
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Contract NAS5-21808

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GENERAL  ELECTRIC

LANDSAT-1

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INTRODUCTION

This is the 22nd 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
77SDS4244	Landsat-1 and Landsat-2 Flight Evaluation Report 23 April 1977 to 23 July 1977	22 August 1977

This report contains analyses of performance for Orbits 25465 to 26745.

SECTION 1
SUMMARY
LANDSAT-1 OPERATIONS

SECTION 1

SUMMARY LANDSAT-1 OPERATIONS

Landsat-1 continues to perform its mission nominally, and has completed 63 months 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 comply when commanded off. The RBV was commanded off via alternate channels. Landsat-1 continued to perform its imaging mission with the Multi-spectral 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 July 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 during Orbit 14780, 18 June 1975. When it was turned back on during Orbit 15467, 6 August 1975, high current transients occurred. The battery turn-on command has been prohibited from use in Landsat-1 ever since. Battery 6 was turned off again during orbit 23832, 28 March 1977, due to high temperature and will not be returned to service because of the battery "ON" command problem. Seven batteries remained 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 Orbit 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 remained on-line.

The rear ACS scanner had intermittent electrical failures beginning in Orbit 19078, 21 April 1976, and it failed to 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 was 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 remained on line.

The position of the sun with respect to the Landsat-1 orbit after over 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.

Battery 7 was turned off during Orbit 26024 on 1 September 1977 due to high temperatures and C/D ratio. It will not be returned to service because of the battery "ON" command problem. Four batteries are now on line.

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

Table 1-1. In-Orbit Payload System Performance Launch Thru Orbit 26784 (10-26-77) 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	270,849
	Avg. Scenes/Day	159
	Total Area Imaged (millions of sq. n. mi.)	2,360
	ON TIME (hr.)	2,793
	ON/OFF Cycles	18,942
	% Real Time Images	83
	% Recorded Images	17
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	80
	% P/B Mode	20
	ON TIME (hr.)	2,696
	ON/OFF Cycles	16,694
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.)	733
	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	

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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 unplanned 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.

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		915.28	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
23 October 1977		913.47	900.97	98.847	7285.386	0.000857	103.142	103.259	45.423	335.165	134.388

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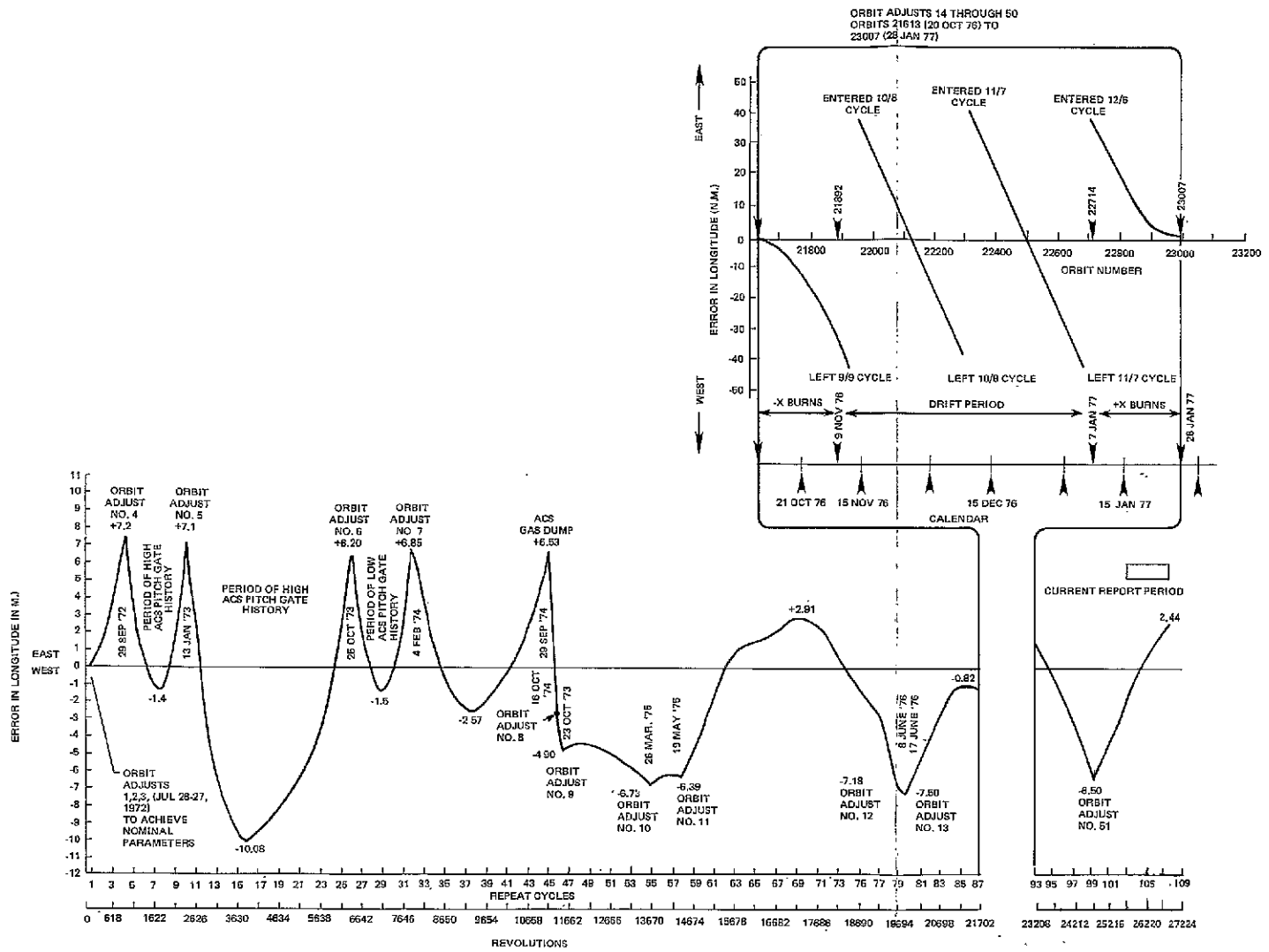


Figure 2-1. Effect of Orbit Adjusts on Landsat-1's Ground Track

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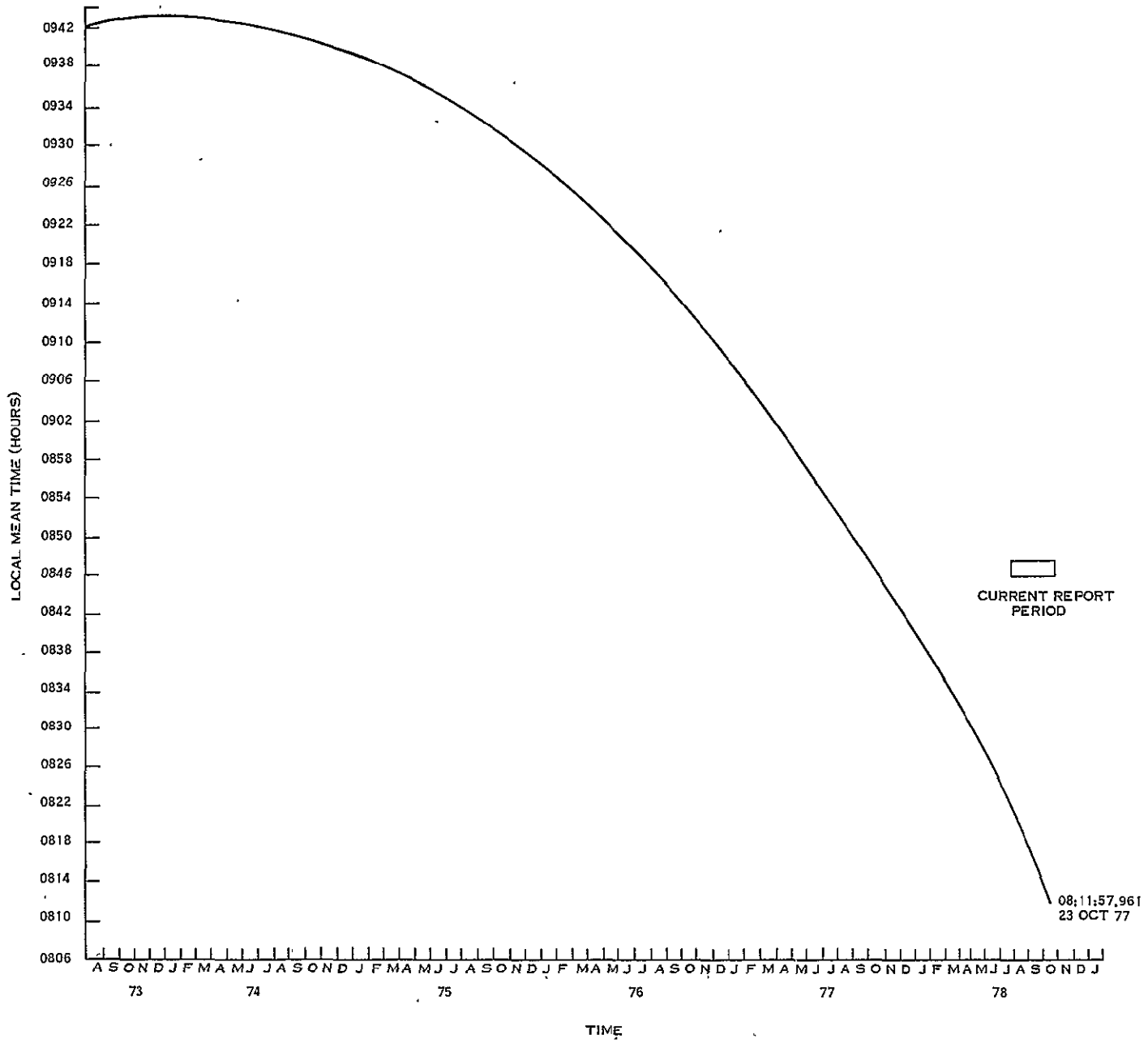


Figure 2-2. Local Mean Time of Descending Node

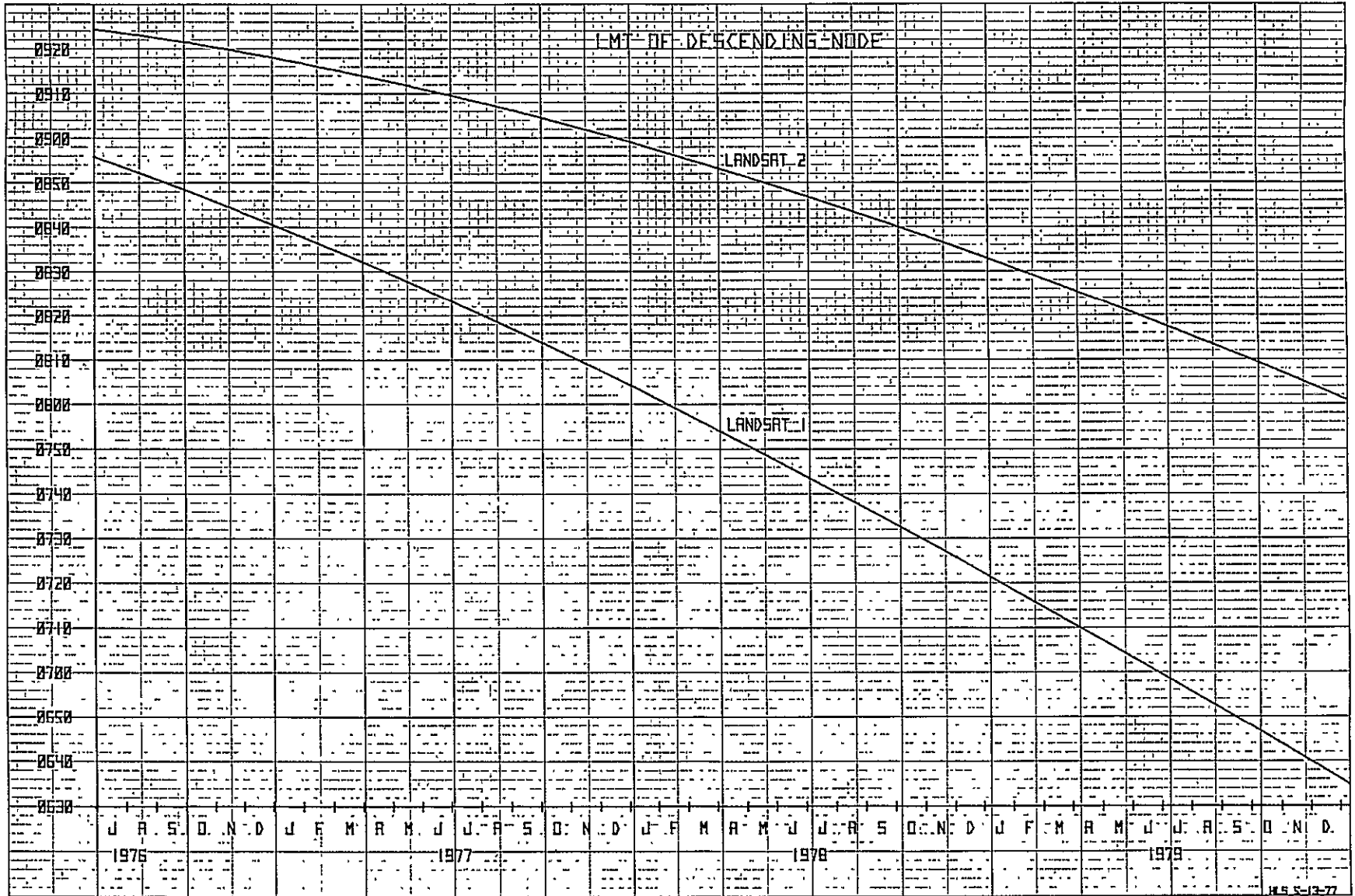


Figure 2-3. Predicted Local Mean Time of Descending Node for LS1 and LS2, 1976, 1977, 1978, 1979

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 degradation was 36.1% at the end of 63 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. The increasing angle between the sun line and the orbital plane positions the right solar panel sun sensor so that it can no longer control the right solar panel position. The same condition occurred from December 1976 thru April 1977. Now, however, orbital deterioration will make this condition permanent. For the remaining life of Landsat-1 command adjustments (paddle stop, or speed-up) must be made to maintain optimum panel position. Sufficient solar power is still being accumulated, however, and barring catastrophic component failure, adequate power should be available thru early 1978 to maintain payload activity in Landsat-1 at its current level.

Since 30 August 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. Battery 7 was turned off during Orbit 26024 on 1 September 1977, because of high temperature and C/D ratio. These batteries will remain off because of the "All Battery ON" command restriction resulting from the anomaly reported previously. Four 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 10.3% Depth of Discharge (DOD) throughout this report period. Table 3-3 is a history of Landsat-1 Battery restoration cycles and turn-off.

Landsat-1 passed thru the penumbra of a total eclipse during Orbits 26593 and 26595 on 12 October 1977 without affecting scheduled operations, or S/C performance.

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.

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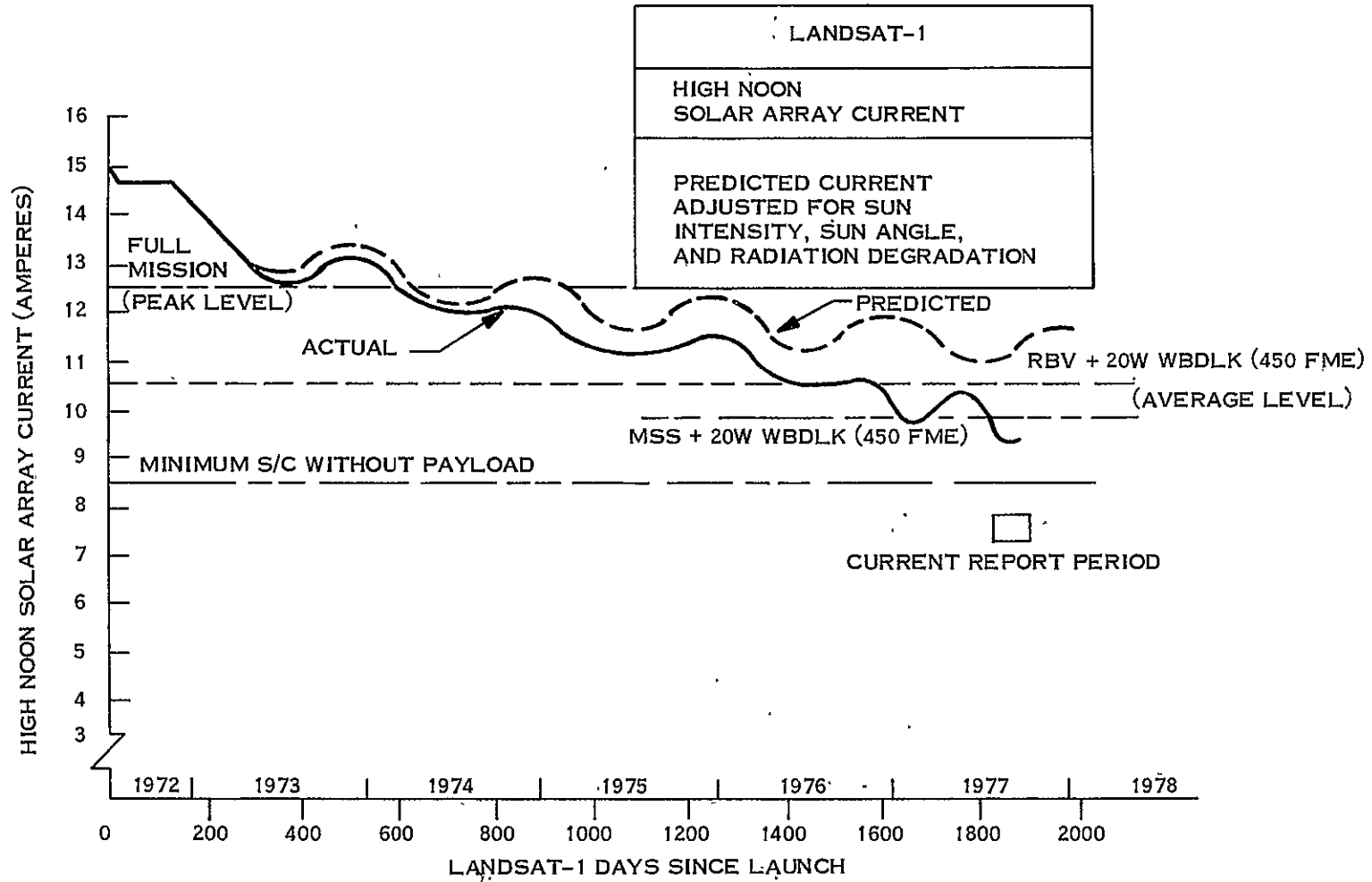


Figure 3-1. Midday Solar Array Current

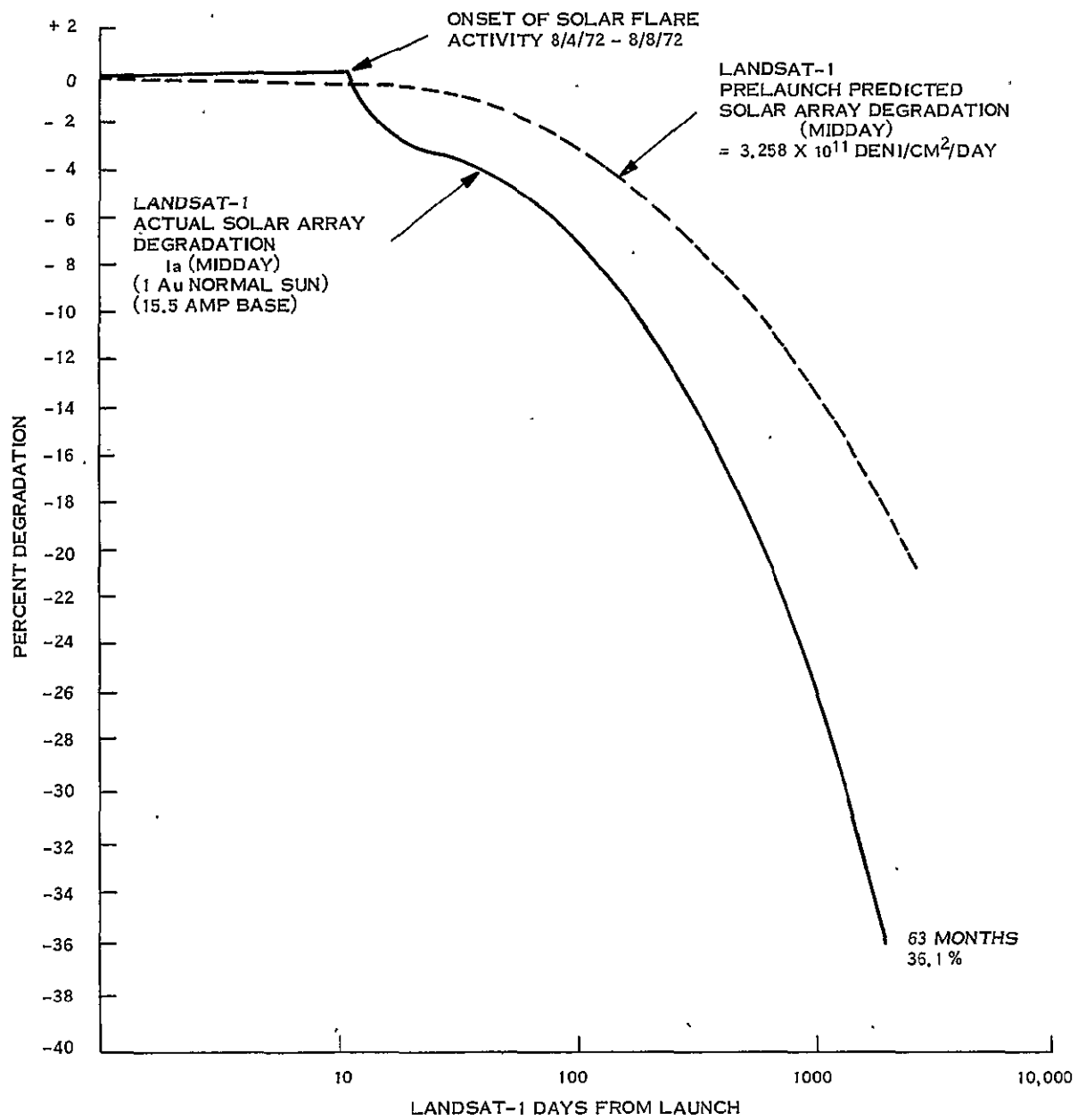


Figure 3-2. I_A (Midday) Degradation vs. Days

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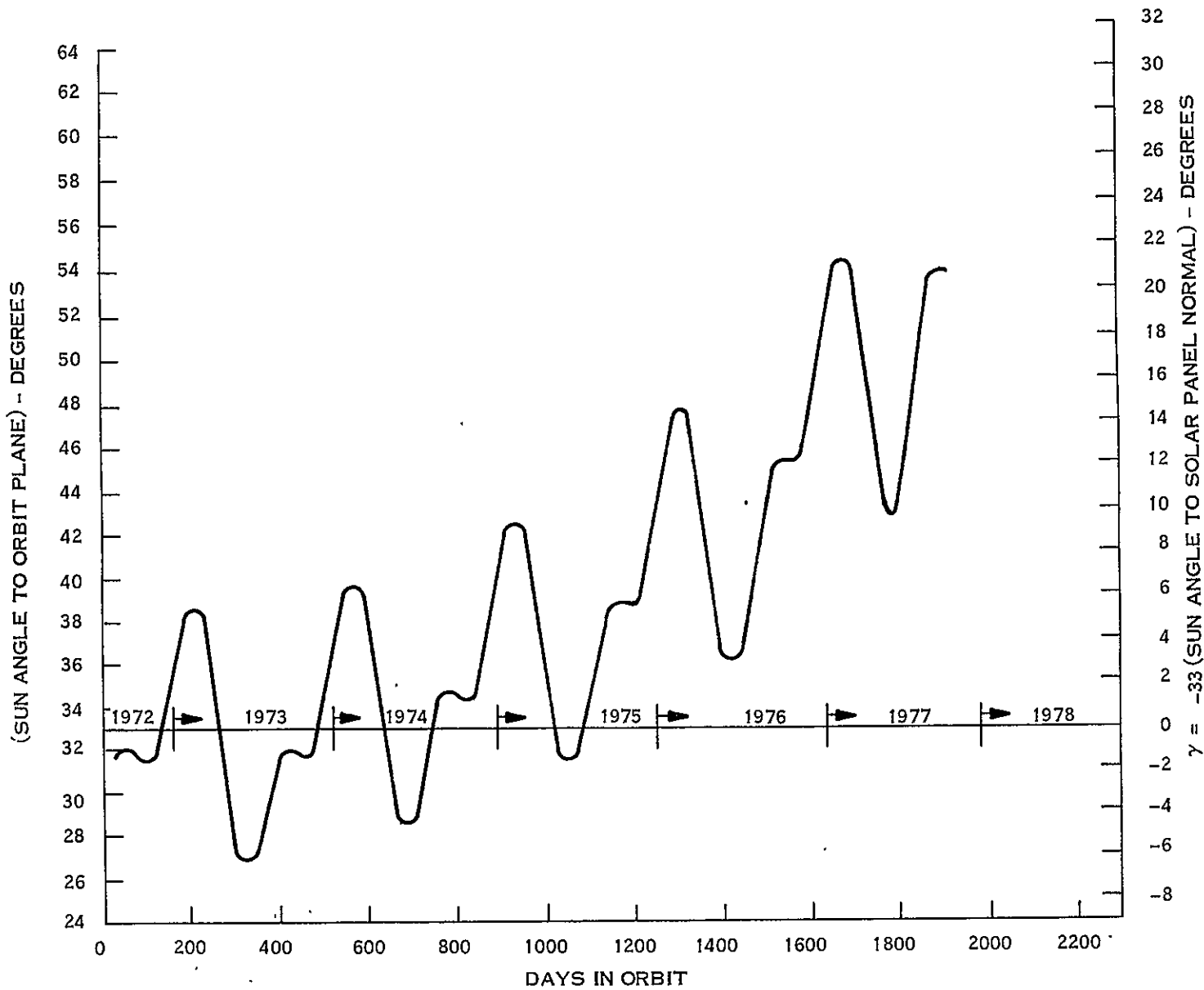
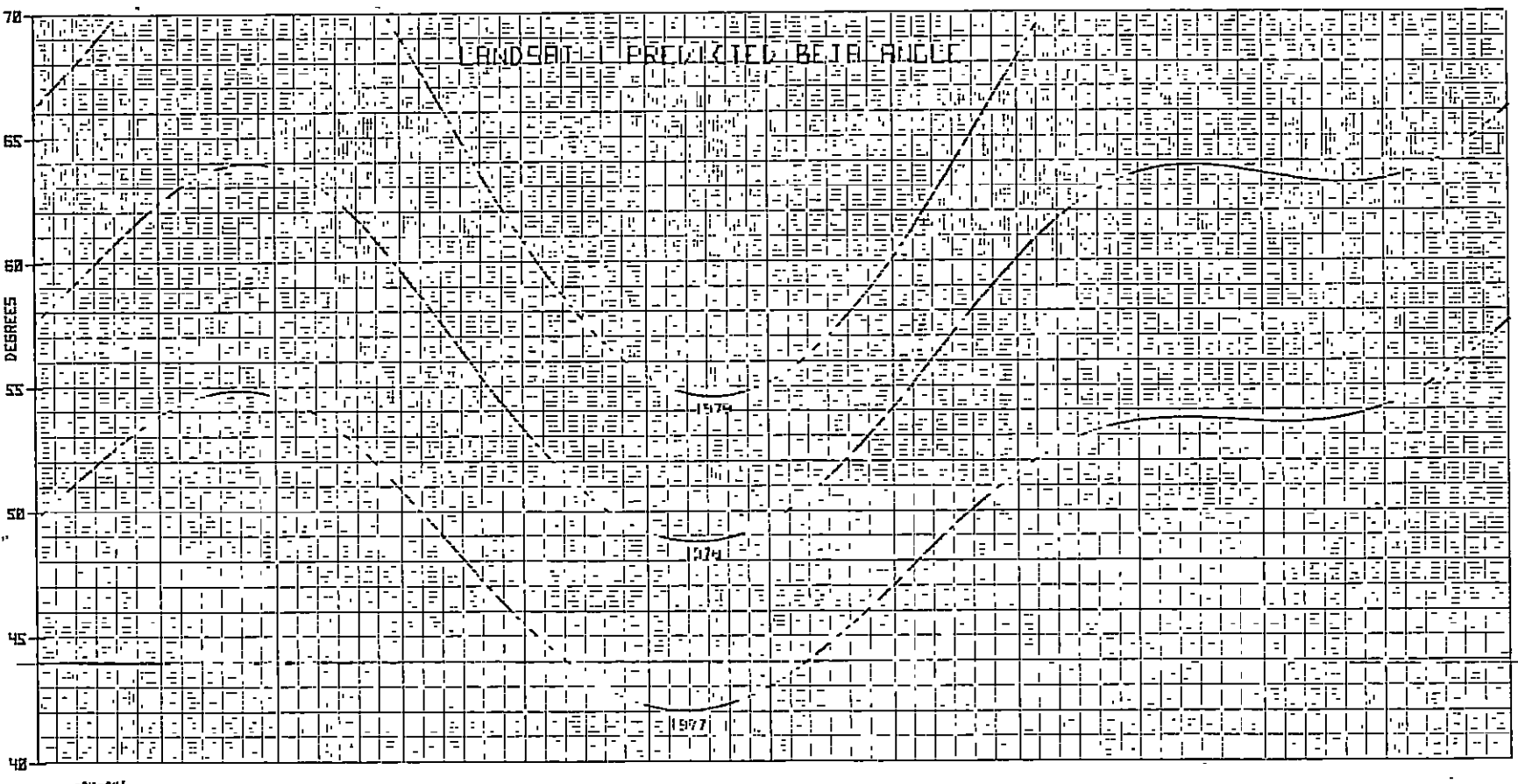


Figure 3-3. Actual β and α (Paddle) Sun Angles, Landsat-1

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

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

ORBIT NO.	26	5098	10178	15254	20363	25455	25886	26332	26667
BATT 1 MAX	32.48	32.91	33.25	33.16	32.48	32.99	32.39	32.99	33.08
2 CHGE	32.48	32.91	33.16	33.16	32.48	32.99	32.39	32.99	33.08
3 -VOLTS	32.48	32.99	33.25	33.16	32.48	33.08	32.39	33.08	33.08
4	32.48	32.99	33.25	33.16	32.48	33.08	32.48	33.08	33.16
5	32.48	32.99	33.33	33.25	32.57	(3)	(3)	(3)	(3)
6	32.31	32.91	33.25	(1)	32.48	(4)	(4)	(4)	(4)
7	32.22	32.91	33.25	33.16	32.48	33.08	32.39	(5)	(5)
8	32.14	32.91	33.25	33.16	(2)	(2)	(2)	(2)	(2)
AVERAGE-	32.38	32.92	33.25	33.17	32.49	33.04	32.41	33.04	33.10
BATT 1 END	28.81	28.30	28.98	29.15	29.23	29.15	28.81	28.89	28.89
2 OF	28.81	28.30	28.98	29.15	29.23	29.15	28.89	28.89	28.98
3 NIGHT	28.81	28.30	28.98	29.15	29.23	29.15	28.81	28.89	28.89
4 -VOLTS	28.89	28.38	28.98	29.15	29.32	29.15	28.89	28.98	28.98
5	28.89	28.38	29.06	29.23	29.32	(3)	(3)	(3)	(3)
6	28.81	28.30	28.98	(1)	29.23	(4)	(4)	(4)	(4)
7	28.81	28.30	28.98	29.15	29.23	29.15	28.81	(5)	(5)
8	28.81	28.30	28.98	29.15	(2)	(2)	(2)	(2)	(2)
AVERAGE	28.84	28.32	28.99	29.16	29.26	29.15	28.85	28.91	28.93
BATT 1	13.11	13.58	13.95	15.27	14.45	20.73	19.25	26.60	26.90
2* SHARE	12.93	13.58	13.95	15.27	15.06	21.32	20.02	27.26	27.53
3 (%)	11.38	11.38	11.95	13.59	13.26	17.97	17.24	22.76	22.90
4	12.39	11.95	12.28	14.06	14.19	19.18	17.91	23.34	22.63
5	12.32	11.85	11.93	13.63	14.32	(3)	(3)	(3)	(3)
6	12.80	12.35	11.79	(1)	14.59	(4)	(4)	(4)	(4)
7	12.62	12.42	12.13	13.69	14.11	20.81	25.69	(5)	(5)
8	12.45	12.10	11.98	14.54	(2)	(2)	(2)	(2)	(2)
BATT 1 LOAD	12.71	12.44	12.58	14.67	14.32	20.15	20.96	24.67	24.40
2 SHARE	12.90	13.62	13.70	15.88	14.89	21.27	21.79	26.11	26.39
3 (%)	11.43	11.91	12.23	13.85	13.54	19.62	20.14	23.88	23.75
4	12.77	13.01	13.12	14.91	14.81	21.05	21.12	25.32	25.44
5	12.54	12.42	12.60	14.02	14.31	(3)	(3)		(3)
6	12.53	12.21	11.30	(1)	13.73	(4)	(4)	(4)	(4)
7	12.80	12.41	12.50	13.77	14.36	17.87	15.95	(5)	(5)
8	12.32	11.98	11.97	12.88	(2)	(2)	(2)	(2)	(2)
BATT 1 TEMP	21.11	24.65	24.76	23.12	21.47	23.37	24.47	25.94	26.57
2 IN	18.74	21.42	20.89	19.32	17.81	17.86	18.28	19.51	19.45
3 (°C)	18.77	20.29	20.16	18.77	17.25	16.97	17.11	18.20	18.70
4	21.57	23.17	23.32	22.71	21.64	21.27	21.90	23.49	23.91
5	21.82	23.65	24.09	23.69	24.40	28.49	33.89	36.85	37.46
6	21.21	24.37	24.78	22.10	23.52	27.21	32.11	33.76	34.32
7	21.41	25.01	24.96	23.75	23.23	27.92	33.27	31.11	31.59
8	21.82	25.14	25.24	24.59	22.15	24.66	27.42	28.06	28.54
AVERAGE	20.81	23.49	23.53	22.26	21.43	23.47	26.06	27.12	27.57
S/C REG BUS PWR (W)	176.8	153.4	165.0	137.9	123.49	106.0	105.4	104.8	105.4
COMP LOAD PWR (W) (P/O S/C REG BUS PWR)	49.0	34.8	41.9	29.4	17.4	0	0	0	0
P/L REG BUS PWR (W)	16.2	13.7	8.9	8.9	9.13	8.9	9.1	8.9	8.8
C/D RATIO	1.06	1.13	1.21	1.18	1.04	1.14	1.15	1.29	1.33
TOTAL CHARGE (A-M)	309.2	290.21	258.3	229.29	172.42	158.68	136.56	144.72	149.78
TOTAL DISCHARGE (A-M)	290.9	256.28	214.2	194.13	168.31	138.72	118.76	111.93	111.53
SOLAR ARRAY (A-M)	1044.0	908.0	832.0	876.0	754	718.0	719.0	741.0	745.8
S.A. PEAK 1 (AMP)	15.8	13.68	12.44	11.60	10.88	10.68	10.08	10.00	10.08
MIDDAY ARRAY 1 (AMP)	15.01	12.80	N/A	11.04	10.56	9.76	9.44	9.28	9.44
SUN ANGLE (DEG)	-3.33	-3.54	-1.82	1.49	6.4	13.9	16.9	19.9	20.2
MAX R PAD TEMP (°C)	+62.00	+68.00	63.20	62.0	58.40	55.12	52.50	53.37	54.25
MIN R PAD TEMP (°C)	-62.00	-59.00	-42.79	-42.18	-38.54	-35.50	-31.86	-28.82	-27.00
MAX L PAD TEMP (°C)	+67.90	+60.50	56.00	56.00	55.12	55.12	55.12	55.12	57.20
MIN L PAD TEMP (°C)	-67.00	-64.00	-47.00	-46.25	-42.18	-37.32	-32.46	-27.00	-24.87

* 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.

- (1) Battery 6 turned off in Orbit 14780 and was returned to service in Orbit 15467
- (2) Battery 8 was turned off in Orbit 15588 and remained off through this report period.
- (3) Battery 5 was turned off in Orbit 23805 and remained off through this report period.
- (4) Battery 6 was turned off in Orbit 23932 and remained off through this report period.
- (5) Battery 7 was turned off in Orbit 26024 and remained off through this report period.

FOUNDRY FRAME

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

Function	Description	Unit	Orbits									
			26	6089	10182	15254	20304	25455	25872	26380	26667	
6001	BATT 1 DISC	AMP	0.94	0.81	0.81	0.91	0.81	0.96	0.96	0.56	1.13	
6002	2		0.95	*	*	*	*	*	*	*	*	
6003	3		0.84	0.78	0.80	0.86	0.76	0.94	0.93	0.87	1.08	
6004	4		0.53	0.68	0.86	0.92	0.84	1.08	0.97	0.55	1.17	
6006	5		0.32	0.82	0.82	0.87	0.79	(3)	(3)	(3)	(3)	
6006	6		0.91	0.78	0.72	(1)	0.78	(4)	(4)	(4)	(4)	
6007	7		0.94	0.62	0.80	0.85	0.80	0.89	0.75	(6)	(6)	
6008	8		0.81	0.77	0.78	0.80	(2)	(2)	(2)	(2)	(2)	
6011	BATT 1 CHG	AMP	0.59	0.58	0.69	0.52	0.35	0.46	0.45	0.47	0.58	
6012	2		0.87	*	*	*	*	*	*	*	*	
6013	3		0.50	0.48	0.60	0.46	0.33	0.40	0.41	0.45	0.50	
6014	4		0.64	0.51	0.60	0.48	0.35	0.42	0.41	0.45	0.50	
6015	5		0.64	0.50	0.58	0.46	0.35	(3)	(3)	(3)	(3)	
6016	6		0.87	0.62	0.66	(1)	0.35	(4)	(4)	(4)	(4)	
6017	7		0.55	0.53	0.60	0.46	0.35	0.46	0.57	(5)	(5)	
6018	8		0.55	0.52	0.58	0.49	(2)	(2)	(2)	(2)	(2)	
6021	BATT 1 VOLT	VDC	30.87	31.24	31.64	31.62	31.20	31.53	29.72	30.18	31.54	
6022	2		30.87	31.26	31.66	31.62	31.19	31.52	31.26	30.17	31.56	
6023	3		30.87	31.28	31.66	31.62	31.18	31.52	31.26	30.17	31.55	
6024	4		30.90	31.28	31.70	31.65	31.23	31.55	31.29	30.20	31.59	
6026	5		30.85	31.33	31.75	31.71	31.28	(3)	(3)	(3)	(3)	
6026	6		30.86	31.24	31.65	(1)	31.18	(4)	(4)	(4)	(4)	
6027	7		30.89	31.27	31.68	31.64	31.21	31.53	31.24	(5)	(5)	
6028	8		30.89	31.27	31.68	31.63	(2)	(2)	(2)	(2)	(2)	
6031	BATT 1 TEMP	DGC	21.17	24.48	26.09	23.08	21.48	23.30	24.38	25.47	26.60	
6032	2		18.80	21.29	22.81	19.28	17.80	17.84	18.24	19.89	19.40	
6033	3		18.76	20.17	21.26	16.76	17.21	18.95	17.07	18.20	18.54	
6034	4		21.57	23.04	23.83	22.69	21.60	21.25	21.81	23.26	23.73	
6035	5		21.84	23.77	24.76	23.64	24.36	26.49	28.61	27.81	27.54	
6036	6		21.24	24.27	25.78	22.08	23.51	27.21	31.85	34.72	34.57	
6037	7		21.48	24.88	26.09	23.67	23.18	27.87	32.80	32.28	31.85	
6038	8		21.86	25.02	26.21	24.51	22.14	24.64	27.31	28.54	28.76	
6040	RT PAD TEMP	DGC	25.82	27.22	27.16	27.29	28.24	25.93	29.37	35.13	35.06	
6041	R PAD V N	VDC	33.40	33.88	34.36	34.18	33.06	32.50	31.79	31.81	30.98	
6042	R PAD V M	VDC	33.29	33.50	33.60	32.92	31.75	31.57	31.17	31.83	32.18	
6044	LT PAD TEMP	DGC	14.14	16.61	19.11	19.84	22.62	24.81	28.62	31.39	35.66	
6045	L PAD V F	VDC	33.69	34.16	34.67	34.63	33.84	34.23	33.92	32.04	34.20	
6046	L PAD V G	VDC	33.68	34.18	34.72	34.68	33.88	34.27	33.85	32.08	34.23	
6050	S/C UR BUS V	VDC	31.24	31.08	32.60	32.07	31.61	31.99	31.68	30.50	32.09	
6051	S/C RG BUS V	VDC	24.54	24.55	24.55	24.54	24.65	24.54	24.54	24.58	24.54	
6052	AUX REG A V	VDC	23.41	23.48	23.47	23.49	23.49	23.50	23.49	23.47	23.49	
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	9.58	9.06	9.59	9.20	
6055+	S/C RG BUS I	AMP	7.11	6.27	6.80	5.83	5.04	4.34	4.31	6.86	4.31	
6056+	S/C RG BUS I	AMP	7.11	6.27	6.79	5.62	5.02	4.33	4.29	6.88	4.30	
6058	PG MOD T 1	DGC	21.82	22.28	23.22	20.63	19.64	18.65	18.87	19.95	19.69	
6059	PG MOD T 2	DGC	21.68	22.58	23.00	21.17	20.14	19.38	19.68	20.13	20.44	
6070	E/L RG BUS V	VDC	24.66	24.68	24.68	24.68	24.87	24.65	24.68	24.62	24.69	
6071	E/L UR BUS V	VDC	31.08	31.53	31.92	31.92	31.46	31.63	31.33	30.30	31.92	
6072+	E/L RG BUS I	AMP	0.57	0.56	0.36	0.36	0.37	0.37	0.37	0.41	0.36	
6073	P AUX A V	VDC	23.51	23.51	23.60	23.50	23.50	23.50	23.50	23.49	23.50	
6074	P AUX B V	VDC	23.51	23.51	23.50	23.50	23.50	23.50	23.50	23.50	23.50	
6075	PR MOD T 1	DGC	21.80	22.13	23.62	21.44	20.89	20.20	20.54	21.24	21.10	
6076	PR MOD T 2	DGC	20.34	21.45	21.84	19.88	19.36	18.96	19.29	20.00	19.83	
6079	FUSE BLOW V	VDC	24.66	24.67	24.60	24.59	24.58	24.58	24.57	24.59	24.58	
6080	SHUNT 1 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6081	SHUNT 2 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6082	SHUNT 3 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6083	SHUNT 4 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6084	SHUNT 5 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6085	SHUNT 6 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6086	SHUNT 7 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6087	SHUNT 8 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6100	E/L RG BUS I	AMP	0.58	0.56	0.36	0.36	0.37	0.36	0.37	0.39	0.36	
Total No.	MAJOR FRAMES	FRM	764.0	889.0	354.0	785	768	795	870	488	456	

* Function 6002, 6012; missing data.

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

- (1) Battery 6 turned off in Orbit 14780 and was returned to service in Orbit 15467
- (2) Battery 8 was turned off in Orbit 15536 and remained off through this report period.
- (3) Battery 5 was turned off in Orbit 22805 and remained off through this report period.
- (4) Battery 6 was turned off in Orbit 33832 and remained off through this report period.
- (5) Battery 7 was turned off in Orbit 26024 and remained off through this report period.

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FOUNDRY FRAME

Table 3-3. Landsat-1 Battery Restoration Cycles

Restoration Cycle		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	15100	15467*	*
		Date	4-30-75	8-6-75	
Batt 7	Off	Orbit	26024		
		Date	9-1-77		
	On	Orbit	*		
		Date	-		
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.

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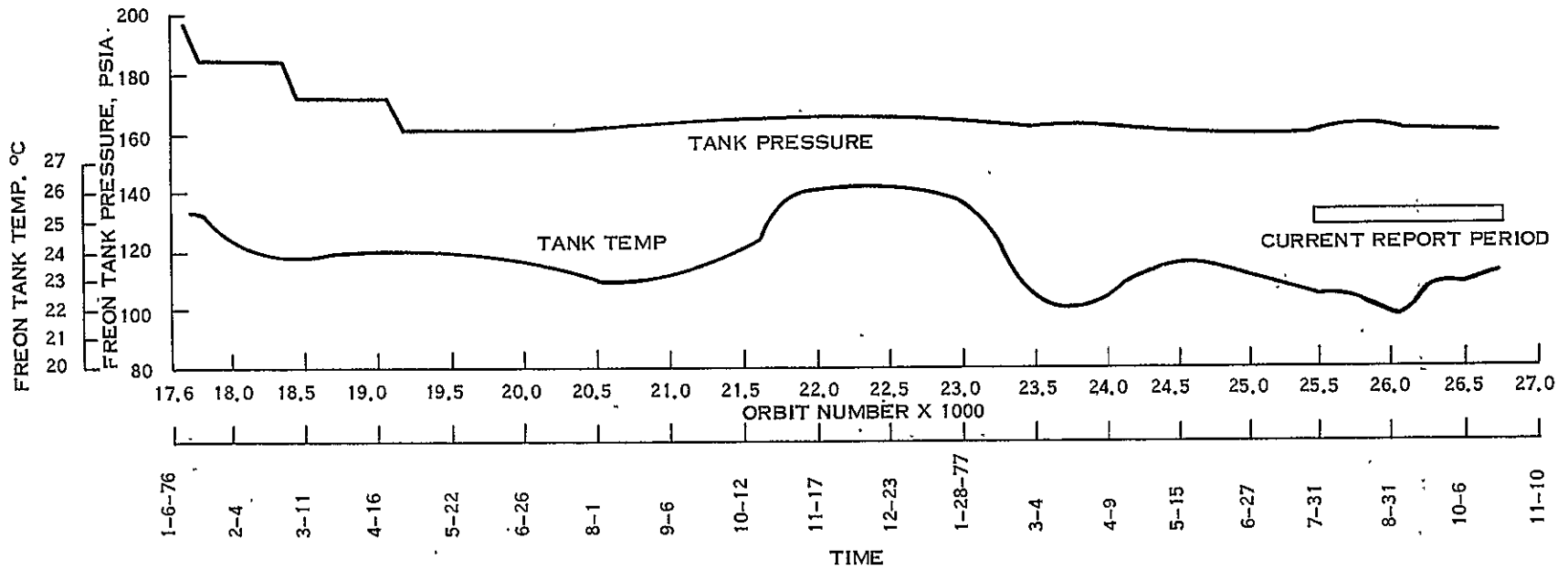


Figure 4-1. Landsat-1 Freon History (Telemetry Values)

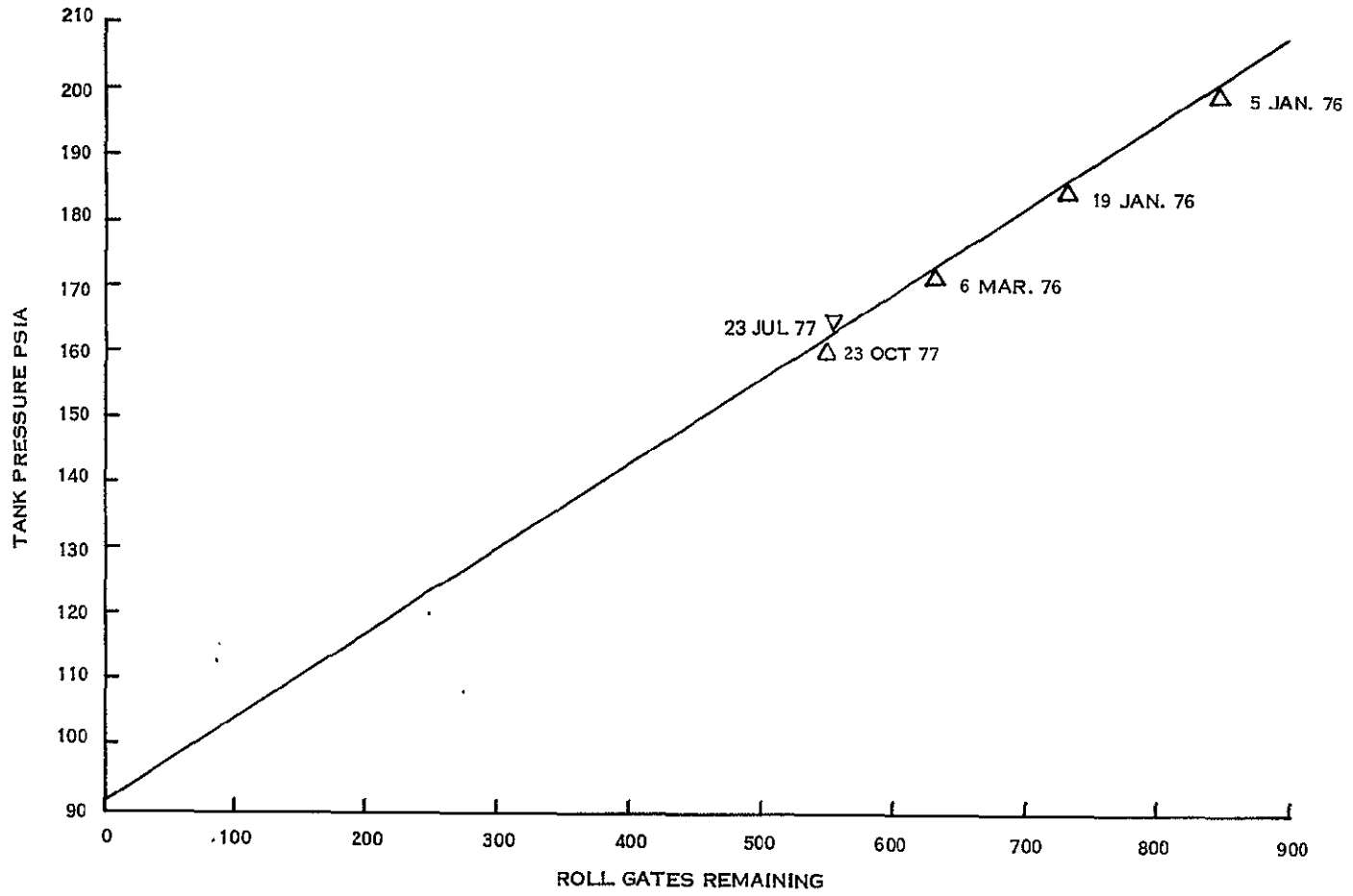


Figure 4-2. Landsat-1 Pressure - Roll Gate Prediction

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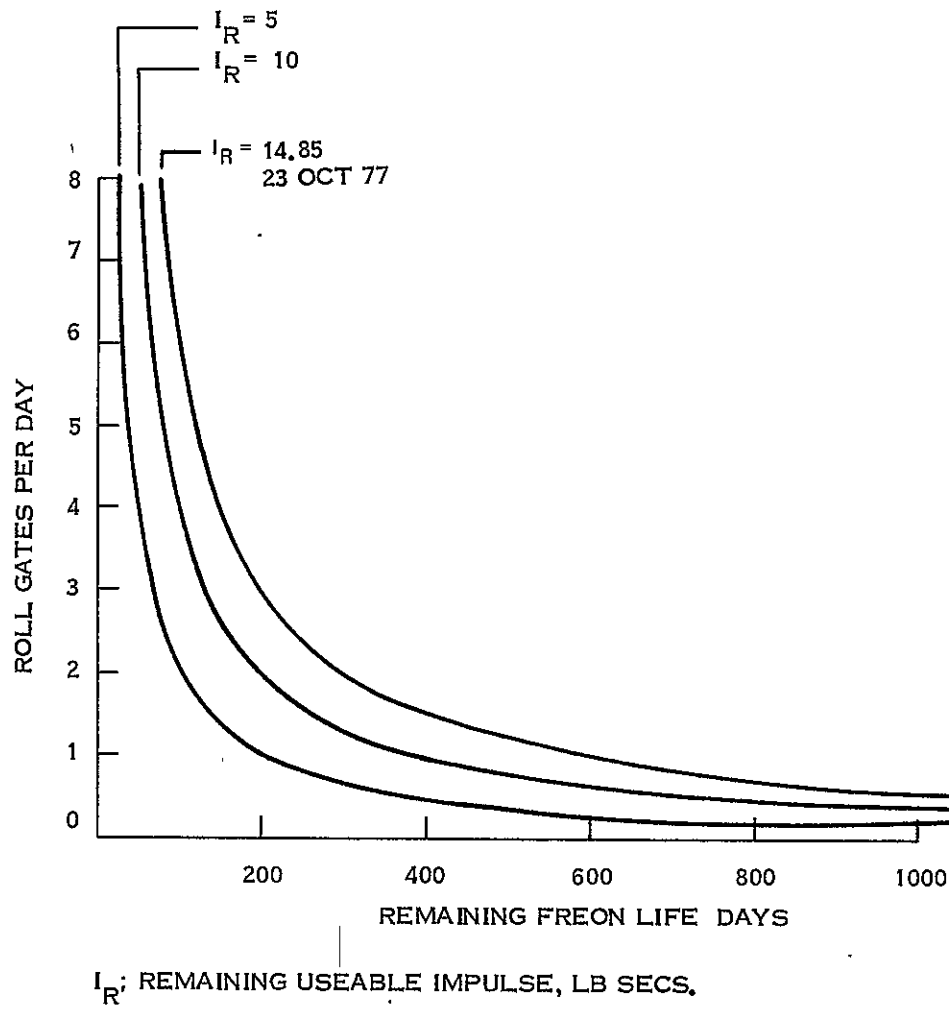


Figure 4-3. Landsat-1 Remaining Freon Life vs Gating Frequency

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

Function	Units	Orbit								
		31	5099	10182	15254	20364	25455	25886	26332	26753
1084 RMP 1 Gyro Temperature	DGC	44.5	23.06	21.22	42.40	41.47	40.71	40.19	40.42	41.04
1094 RMP 2 Gyro Temperature	DGC	74.3	75.10	43.45	24.05	23.49	23.15	22.98	23.53	21.30
1222 SAD RT MTR HSING Temp	DGC	21.1	22.00	20.55	22.89	21.70	20.73	19.95	20.29	20.76
1242 SAD LT MTR HSING Temp	DGC	27.0	30.38	28.18	29.53	28.88	28.32	28.23	28.95	29.82
1223 SAD RT MTR WNDNG Temp	DGC	25.3	26.54	24.63	27.06	25.74	24.15	23.09	23.32	23.71
1243 SAD LT MTR WNDNG Temp	DGC	28.7	32.92	30.32	31.98	31.40	30.72	30.57	31.30	32.48
1228 SAD RT HSG Pressure	PSI	7.6	7.35	7.12	6.88	6.70	6.45	6.39	6.35	6.39
1248 SAD LT HSG Pressure	PSI	7.0	6.86	6.47	6.18	5.90	5.64	5.61	5.55	5.55
1007 FWD Scanner MTR Temp	DGC	19.8	19.88	18.46	20.36	19.16	18.20	17.90	18.22	19.03
1016 Rear Scanner MTR Temp	DGC	20.5	19.83	17.86	19.24	18.87	17.94	17.66	17.98	18.90
1003 FWD Scanner Pressure	PSI	4.6	4.02	3.50	3.00	2.60	2.00	2.00	2.00	2.00
1012 Rear Scamer Pressure	PSI	7.8	7.87	7.44	6.97	6.74	6.28	6.28	6.28	6.28
1212 Gas Tank Pressure	PSI	1988.0	1702.34	1454.19	235.44	162.92	163.20	162.63	161.08	161.08
1210 Gas Tank Temperature	DGC	22.6	24.30	22.56	24.36	23.22	22.56	22.23	22.56	23.30
1213 Manifold Pressure	PSI	56.7	57.44	58.73	61.67	61.66	61.66	61.66	61.90	61.69
1211 Manifold Temperature	DGC	21.9	23.62	21.77	23.82	22.69	21.83	21.50	21.89	22.71
1059 CLB Power Supply Card Temp	DGC	37.1	40.54	38.83	40.58	39.55	38.99	38.89	39.44	40.48
1260 ACS Baseplate 1	DGC	25.4	27.93	25.36	26.54	26.01	25.61	25.53	26.31	27.18
1261 ACS Baseplate 2	DGC	22.9	24.73	23.00	25.05	24.21	23.58	23.30	23.95	24.85
1262 ACS Baseplate 3	DGC	23.4	23.69	21.97	24.95	23.89	23.01	22.38	22.86	23.60
1263 THO1 STS	DGC	-6.8	-0.97	-3.41	1.22	1.86	1.57	1.12	2.89	5.08
1264 THO2 STS	DGC	-14.6	-9.42	-8.27	-4.50	-3.17	-2.93	-1.18	0.36	-0.28
1265 THO3 STS	DGC	-3.1	9.31	7.58	12.92	15.02	16.80	16.94	18.84	20.14
1266 THO4 STS	DGC	-13.9	2.85	-1.85	2.40	3.05	3.15	-0.12	2.21	7.21
1267 THO5 STS	DGC	-8.9	-1.16	-5.17	2.92	4.80	4.61	3.16	7.06	12.40
1224 SAD R FSST	DGC	39.5	60.21	63.25	64.74	62.86	56.55	56.06	54.04	39.91
1244 SAD L FSST	DGC	27.1	51.11	53.21	54.69	53.22	52.90	54.60	56.51	57.56

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

Function	Units	Orbit								
		31	5099	10182	15254	20364	25455	25886	26332	26753
1057 CLB Power Supply Volts	TMV	2.8	2.78	2.78	2.78	2.77	2.77	2.77	2.77	2.77
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	-30.14	-30.14	-30.14	-30.14	-30.14	-30.14
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	.11	.11	0.11	0.11	0.11	0.11
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	-23.78	-23.79	-23.80	-23.81	-23.81	023.79
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	-3.68	-3.75	-3.67	-3.74
1240 SAD LT MTR WNDNG Volts	VDC	-4.8	-4.09	-3.36	-3.43	-3.65	-3.35	-3.23	-3.25	-3.35
1227 SAD RT -15 VDC Conv.	VDC	14.9	14.88	14.89	14.87	14.87	14.87	14.87	14.87	14.87
1247 SAD LT -15 VDC Conv.	VDC	15.2	15.13	15.14	15.06	15.11	15.10	15.09	15.09	15.09
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	2.73	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	25455	25886	26332	26753
1141 Pitch Fine-Error *	DEG	- 0.40	- 0.08	- 0.02	- 2.13	- 11	- 0.06	- 0.45	- 0.46	- 0.06
1143 Pitch Flywheel Speed	RPM	- 10.49	- 26.86	- 1.21	12.92	-76.17	- 58.01	- 51.68	- 68.40	- 48.19
1038 Pitch MTR DRVR CCW	PCT	4.96	5.81	4.55	3.28	2.69	1.73	2.13	1.88	1.57
1039 Pitch MTR DRVR CW	PCT	2.29	2.17	5.10	19.65	1.04	0.26	0.29	0.29	0.42
1030 Roll Fine Error **	DEG	- 2.25	- 0.20	- 0.20	- 2.52	-2.70	- 2.68	- 2.77	- 2.78	- 1.94
1127 Roll Rear Flywheel Speed	RPM	715.78	756.92	782.08	714.05	720.23	718.42	724.40	732.89	774.20
1126 Roll Fwd Flywheel Speed	RPM	641.82	674.47	693.31	641.32	640.80	640.29	641.14	643.51	670.98
1022 Roll Rear MTR DRVR CCW	PCT	0.01	0.68	0.90	.13	.96	0.00	0.00	0.00	0.05
1025 Roll Rear MTR DRVR CW	PCT	4.26	5.22	5.52	4.17	5.61	4.83	5.26	4.78	5.67
1023 Roll Fwd MTR DRVR CCW	PCT	0.01	0.66	0.72	.08	.99	0.02	0.01	0.00	0.04
1024 Roll Fwd MTR DRVR CW	PCT	4.15	4.94	5.35	4.24	5.16	4.32	4.36	4.18	5.05
1035 Yaw Tach	RPM	-206.08	-116.50	- 93.72	-169.52	-200.01	-225.26	-195.78	-199.20	-438.01
1033 Yaw MTR DRVR CW	PCT	0.04	1.53	1.84	.09	.05	0.00	0.05	0.05	0.12
1034 Yaw MTR DRVR CCW	PCT	0.07	1.60	1.76	.68	.67	0.73	0.62	0.64	1.10
1221 SAD Right Tach	DEG/MIN	3.37	3.37	2.81	3.37	3.40	3.46	3.48	3.46	3.26
1241 SAD Left Tach	DEG/MIN	2.80	2.81	2.81	2.79	2.79	2.82	2.80	2.78	2.74

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, 17.121 seconds slower in 63 months, and Figure 5-3 gives the drift rate of the S/C clock, an average of 0.640 msec slow per orbit. In this period, the drift rate is at the average rate of 0.176 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.

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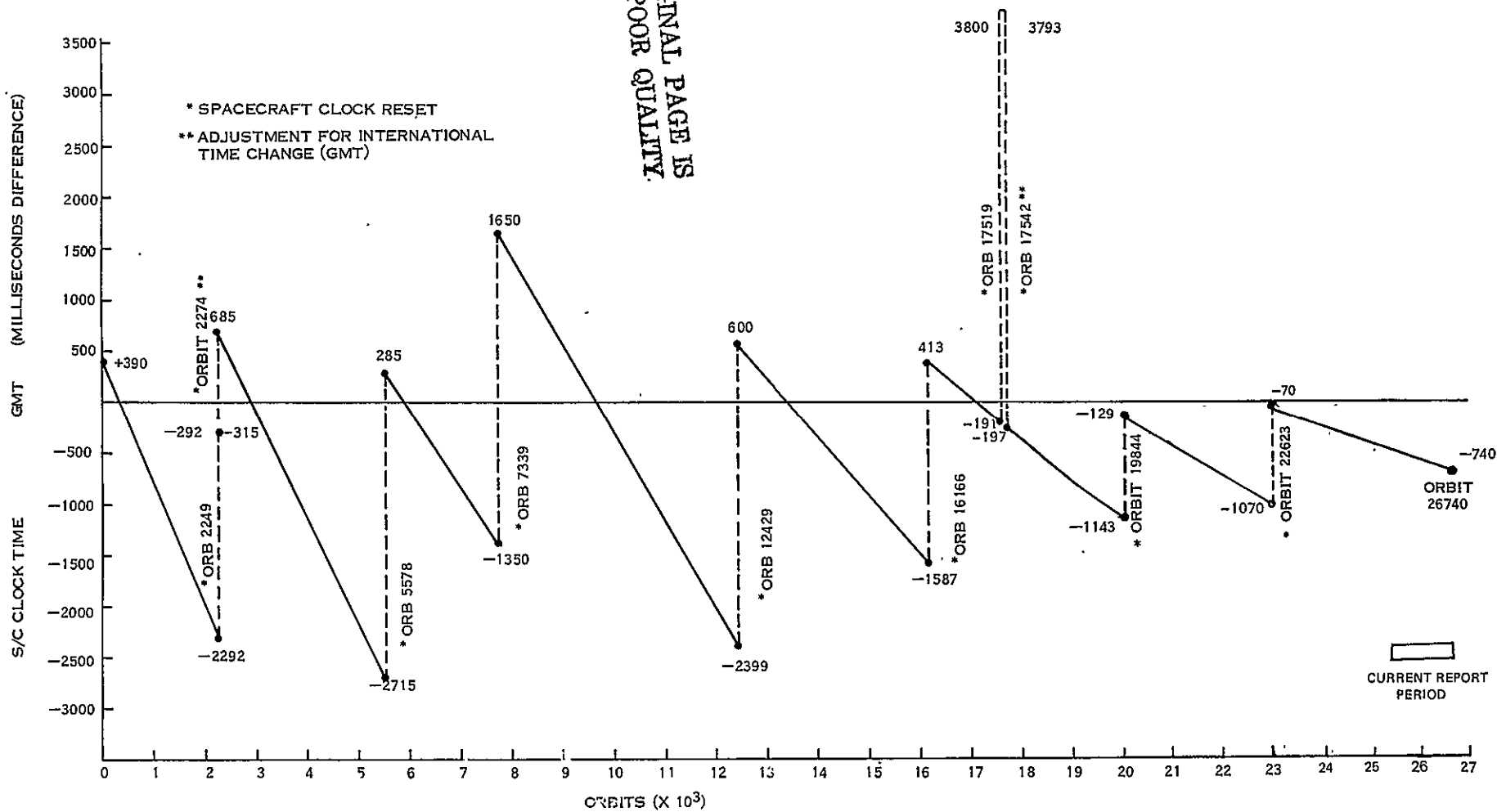


Figure 5-1. Landsat-1 Spacecraft Clock Drift History

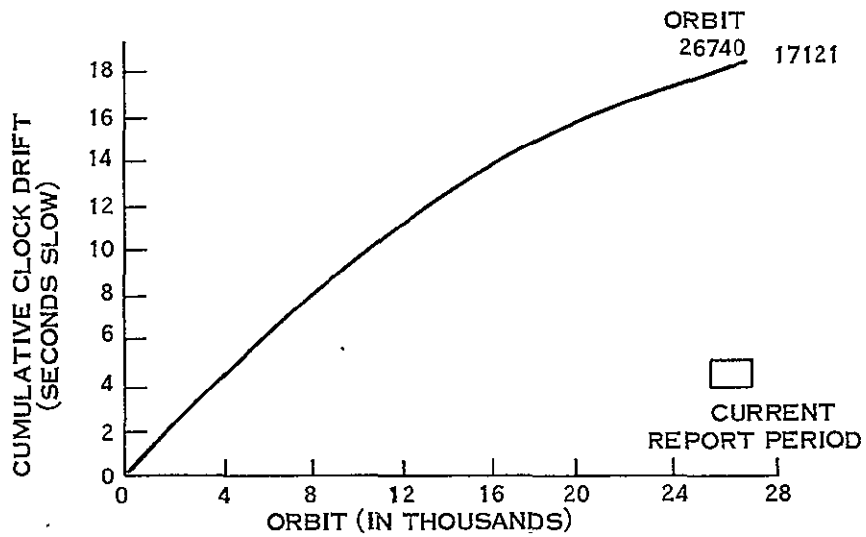


Figure 5-2. Cumulative Clock Drift

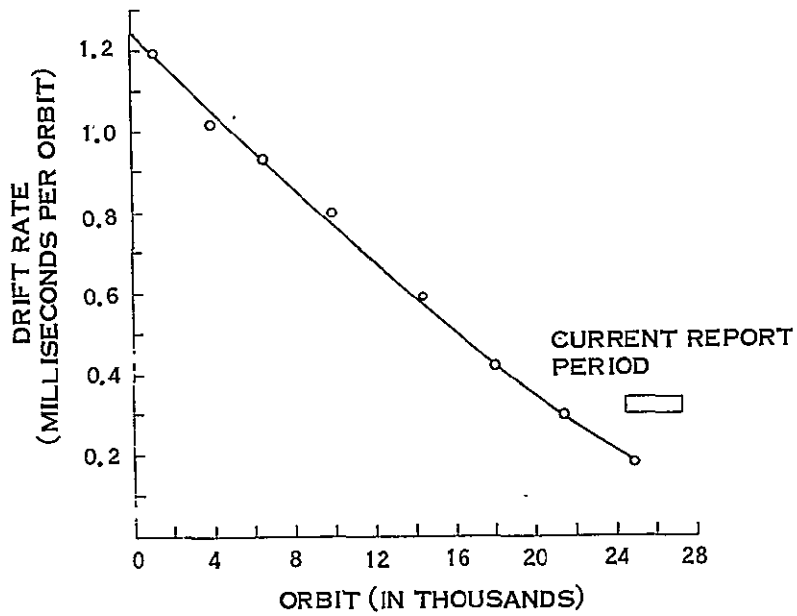


Figure 5-3. Drift Rate of Spacecraft Clock

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

Function No.	Name	Mode	Units	Orbit									
				35	3099	10182	15233	20364	25455	25898	26330	25872	
8005	Pri. Power Supply Temp	-	°C	37.31	39.37	39.50	38.26	38.06	36.96	36.82	36.89	36.98	
8006	Red. Power Supply Temp	-	°C	35.73	38.08	38.38	37.06	37.33	36.05	35.51	36.19	36.20	
8007	Pri. Osc. Temp	-	°C	31.14	31.98	32.11	31.14	31.04	29.61	30.24	31.06	30.25	
8008	Red. Osc. Temp	-	°C	30.47	31.39	31.42	30.48	30.18	28.70	29.41	29.92	29.54	
8009	Pri. Osc. Output	-	TMV	0.95	0.96	0.97	0.97	0.95	0.95	0.96	0.97	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	3.12	3.12	3.10	
8012	10 kHz	Pri.-Red	TMV	3.10	3.07	3.08	3.08	3.08	3.07	3.08	3.08	3.07	
8013	2.5 kHz	Pri.-Red	TMV	2.95	2.95	2.95	2.96	2.95	2.95	2.95	2.96	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	4.06	4.10	4.09	4.06	
8016	Red. +4 V Power Supply	Red. Clk ON	VDC	3.95	3.95	3.95	3.95	3.92	3.91	3.95	3.94	3.91	
8017	Pri. +6 V Power Supply	Pri. Clk ON	VDC	6.06	6.07	6.07	6.11	6.06	6.06	6.11	6.11	6.06	
8018	Red. +6 V Power Supply	Red. Clk ON	VDC	6.00	5.94	5.94	5.97	5.93	5.93	5.95	5.95	5.93	
8019	Pri. -6 V Power Supply	Pri. Clk ON	VDC	-6.02	-6.02	-6.03	-6.04	-6.02	-6.02	-6.03	-6.03	-6.02	
8020	Red. -6 V Power Supply	Red. Clk ON	VDC	-5.99	-6.00	-6.00	-6.01	-5.99	-5.99	-6.01	-6.01	-5.99	
8021	Pri. -23 V Power Supply	Pri. Clk ON	VDC	-22.88	-22.89	-22.89	-22.95	-22.88	-22.88	-22.96	-22.96	-22.88	
8022	Red. -23 V Power Supply	Red. Clk ON	VDC	-22.98	-23.00	-23.01	-23.06	-22.99	-22.98	-23.07	-23.06	-22.98	
8023	Pri. -29 V Power Supply	Pri. Clk ON	VDC	-29.13	-29.16	-29.15	-29.15	-29.16	-29.15	-29.12	-29.11	-29.14	
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	-12.34	-12.35	-12.35	-12.34	
8102	CIU B -12 V	CIU B ON	VDC	-12.26	-12.23	-12.23	-12.20	-12.24	-12.24	-12.26	-12.27	-12.24	
8103	CIU A -5 V	CIU A ON	VDC	-5.32	-5.34	-5.34	-5.34	-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	-5.31	-5.31	
8105	CIU A Temp	CIU A ON	°C	24.47	34.77	25.04	24.09	24.11	23.79	23.94	24.89	24.40	
8106	CIU B Temp	CIU B ON	°C	24.96	25.31	25.45	24.48	24.44	24.01	24.28	25.16	24.51	
8201	Receiver RF-A Temp	-	°C	**	**	28.67	27.53	26.88	25.89	25.87	26.71	26.26	
8202	Receiver RF-B Temp	-	°C	27.98	28.22	**	**	17.47	16.22	16.20	17.31	16.73	
8203	D MOD A Temp	-	°C	25.41	25.73	37.98	37.31	36.40	35.62	35.85	36.71	35.92	
8204	D MOD B Temp	-	°C	35.03	35.61	26.12	25.27	24.10	22.83	23.29	24.20	23.39	
8205	Receiver A AGC	Receiver A ON	DBM	**	**	-96.77	-85.62	-95.73	-92.73	-82.54	-70.20	-95.49	
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	2.66	3.10	3.41	2.53	
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	1.10	1.14	1.12	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	1.11	1.16	1.17	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	4.98	4.99	4.99	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	5.38	5.38	5.38	5.38	
8218	Regulator B -10 V	Receiver B ON	TMV	5.50	5.50	**	**	**	**	**	**	**	

**Units not in use

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SECTION 6
TELEMETRY SUBSYSTEM (TLM)
LANDSAT-1

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. Total performance has been excellent except for one integrated circuit chip failure, containing four functions (6012, 7011, 12238, 7010) in Orbit 4396.

Table 6-1 shows typical telemetry values since launch. Components are rising in temperature reflecting rotation of the Landsat-1 orbit plane causing these components to be closer to the earth-sun line.

Table 6-1. TLM Telemetry Summary

Function No.	Function Name	Unit	Orbit								
			35.	5099	10592	15233	20364	25455	25898	26330	26753
9001	Memory Sequencer A Converter	VDC	6.35	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.34
9002	Memory Sequencer B Converter	VDC	**	**	**	**	**	**	**	**	**
9003	Memory Sequencer Temp	°C	19.59	21.06	21.30	21.94	20.78	21.60	24.02	24.34	23.96
9004	Formatter A Converter	VDC	5.99	5.99	5.99	5.99	5.99	6.00	6.02	6.02	6.02
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	10.07
9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**	**	**
9008	Formatter/Dig. Mux Temp	°C	22.50	24.89	25.00	23.55	25.00	29.96	35.00	36.23	37.95
9009	Analog Mux A Converter	VDC	26.01	21.18	26.20	26.32	26.35	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	10.07
9012	A/D Converter B Voltage	VDC	**	**	**	**	**	**	**	**	**
9013	Analog Mux Aux	°C	25.00	26.83	27.49	25.63	26.56	28.49	30.22	30.71	32.61
9014	Preregulator A Voltage	VDC	19.93	19.95	19.94	19.98	19.90	19.93	19.99	19.99	19.99
9015	Preregulator B Voltage	VDC	**	**	**	**	**	**	**	**	**
9016	Reprogrammer Temp	°C	22.00	22.50	22.53	22.50	22.50	25.93	30.00	30.66	32.31
9017	Memory A Converter	VDC	6.00	5.99	6.00	5.97	5.97	5.97	5.98	6.00	5.99
9018	Memory A Temp	°C	17.51	17.50	17.50	17.50	17.47	17.50	17.50	17.74	18.43
9019	Memory B Converter	VDC	**	**	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.68	17.63	17.51	17.50	16.93	17.51	19.78	20.00	20.41
9100	Reflected Power (Xmtr A)	dBm	11.95	12.32	12.38	11.37	11.45	12.50	13.92	14.09	13.82
9101	Xmtr A -20 VDC	VDC	-19.75	-19.76	-19.75	-19.84	-19.75	-19.75	-19.85	-19.84	-19.75
9102	Xmtr B -20 VDC	VDC	**	**	**	**	**	**	**	**	**
9103	Xmtr A Temp	°C	20.95	21.14	22.01	21.98	23.02	29.58	36.98	41.12	40.44
9104	Xmtr B Temp	°C	21.69	21.95	22.76	22.91	23.92	30.88	38.26	42.44	41.55
9105	Xmtr A Power Output	dBm	25.12	25.35	25.24	25.00	24.57	24.62	24.88	25.00	25.08
9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**	**	**

** Units not used since prelaunch

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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.

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	60%	2.15	540	76	-X
44	2	28 Jul 72 21:44:46	250.0	1975	103.4%		U ²	U ²	-X
60	3	27 Jul 72 23:34:43	318.0	2391	101.3%		616	73.9	-X
698	4	23 Sep 72 00:36:00	12.8	98	110.0%	0.030	U ²	U ²	-X
2216	5	13 Jun 73 00:21:30	20.4	164	108.0%	0.071	486.4	75.4	-X
6390	6	23 Oct 73 00:04:10.3	14.8	110	100.0%	0.048	480.8	73.9	-X
7826	7	4 Feb 74 23:27:10.4	14.7	112	101.3%	0.018	490.60	75.4	-X
13367	8	18 Oct 74 22:42:10.6	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	28 Mar 75 19:30:00.5	2.3	-22.5	101.3%	0.01	490.09	72.3	+X
14365	11	19 May 1975 21:19:00.8	1.8	-13	102.4%	0.01	486.84	71.6	+X
19747	12	8 Jun 76 15:56:00.4	2.4	-10.3	102.1%	0.01	490.39	70.1	+X
18971	13	17 Jun 76 17:22:00.4	2.4	-15.0	105.3%	0.01	486.84	69.4	+X
21613	14*	29 Oct 76 15:28:01.2	2.4	-16.2	85.3%	0.01	494.34	73.2	+X
21616	15*	29 Oct 76 20:34:01.2	2.4	16.3	86.0%	0.01	494.34	73.2	-X
21627	16	21 Oct 76 13:33:01.2	5.2	39.2	102.2%	0.02	494.34	73.2	-X
21641	17	22 Oct 76 15:38:01.2	5.2	33.0	105.0%	0.02	494.34	72.4	-X
21655	18	23 Oct 76 18:47:01.2	5.2	40.0	105.3%	0.02	494.34	72.4	-X
21669	19	24 Oct 76 15:50:01.2	5.2	35.0	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 16:08:01.2	5.2	37.8	100.3	.02	490.59	72.4	-X
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	36.6	105.0	.02	490.59	72.4	-X
21738	24	29 Oct 76 14:35:01.2	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	106.0	.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	48.0	112.0	.02	486.84	73.2	-X
21808	29	3 Nov 76 15:07:01.2	5.2	36.6	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 15:15:01.2	5.2	40.3	107.6	.02	486.84	73.2	-X
21850	32	6 Nov 76 15:24:01.2	5.2	30.7	105.0	.02	486.84	73.2	-X
21864	33	9 Nov 76 16:46:01.2	5.2	37.9	101.1	.02	486.84	73.2	-X
22714	34	7 Jan 77 14:35:01.2	5.2	-40.7	100.7	.02	490.59	76.9	+X
22728	35	10 Jan 77 14:50:01.2	5.2	-31.2	102.0	.02	490.59	76.9	+X
22742	36	11 Jan 77 15:02:01.2	5.2	-31.4	102.5	.02	490.59	77.9	+X
22756	37	13 Jan 77 10:02:00	5.2	-41.0	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
22826	39	15 Jan 77 15:13:41.2	5.2	-40.2	99.6	.02	490.59	77.8	+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	-30.6	100.5	.02	490.59	78.1	+X
22868	42	18 Jan 77 15:36:01.2	5.2	-41.3	102.6	.02	490.59	78.1	+X
22882	43	19 Jan 77 15:42:01.2	6.0	-48.6	104.1	.02	490.59	78.1	+X
22896	44	20 Jan 77 15:48:01.2	6.0	-45.7	104.6	.02	490.59	78.1	+X
22910	45	21 Jan 77 15:53:01.2	6.0	-47.0	100.9	.02	490.59	78.1	+X
22924	46	22 Jan 77 14:17:01.2	6.0	-48.2	105.4	.02	486.84	75.1	+X
22938	47	23 Jan 77 14:22:01.2	6.0	-47.3	102.0	.02	486.84	75.1	+X
22952	48	24 Jan 77 14:31:01.2	6.0	-47.4	102.4	.02	486.84	75.1	+X
22966	49	25 Jan 77 14:34:01.2	6.0	-47.6	102.8	.02	486.84	75.1	+X
23007	50	26 Jan 77 14:51:01.2	1.2	-9.9	103.1	.00	486.84	73.9	+X
24622	51	7 June 77 16:25:01.2	4.3	-55.5	98.1	.02	478.21	68.6	+X

*Test Burns
 1 Initial Fuel Capacity - 67 lbs.
 2 Unavailable

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Table 7-1. Landsat-1 Orbit Adjust Summary

Table 7-2. Landsat-1 OAS Telemetry Values

Function No.	Name	Units	Orbit								
			35	5099	10182	15254	20364	25455	25886	26332	26753
2001	Prop. Tank Temp.	°C	22.03	22.86	23.28	21.62	21.20	21.61	23.80	25.36	25.77
2003	Thrust Chamber No. 1 (-x) Temp. **	°C	29.57	29.93	30.55	30.52	27.32	22.62	21.17	20.99	25.42
2004	Thrust Chamber No. 2 (+x) Temp. **	°C	38.76	40.28	38.91	36.25	35.20	32.93	31.73	32.08	33.42
2005	Thrust Chamber No. 3 (-y) Temp. **	°C	34.55	34.41	36.09	38.45	43.88	53.63	62.05	73.79	69.74
2006	Line Pressure	psia	539.29	486.87	490.61	486.87	489.66	475.66	483.05	486.86	490.42

**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	25455	25886	26332	26753
4001	A1 Board Temp	°C	19.77	19.03	19.11	17.59	16.69	16.14	16.77	17.41	17.31
4002	A2 Board Temp	°C	23.58	23.05	23.13	21.83	21.05	20.60	21.02	21.66	21.57
4003	Hall Current	TMV	3.48	3.48	3.48	3.47	3.48	3.48	3.47	3.47	3.47
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	3.29	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. Higher temperatures reflect rotation of the Landsat-1 orbit plane so that components are now closer to direct earth-sun line.

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	25455	25898	26330	26753
11001	USB Rcvr AGC	DBM	-122.78	-131.99	-129.81	-105.41	-132.06	-126.09	-103.93	-129.43	-126.29
11002	USB Xmtr Pwr	WTS	1.60	0.29	1.54	1.53	1.55	1.44	1.60	1.60	1.54
11003	USB Rcvr Error	KHZ	21.79	-21.32	-23.25	-18.01	-21.76	-23.02	-13.90	-21.59	-22.88
11004	USB Xpond Temp	DGC	22.92	22.64	25.64	25.11	25.37	28.59	33.12	37.18	36.28
11005	USB Xpond Press	PSI	15.91	15.91	15.92	15.94	15.90	16.19	16.53	16.74	16.76
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	-14.60	-14.59	-14.58
11101	PMP Pwr A Volt	VDC	-15.12	-15.18	**	**	**	**	**	**	**
11102	PMP Pwr B Volt	VDC	**	**	-15.12	-15.12	-15.12	-15.12	-14.79	-14.78	-15.11
11103	PMP Temp A	DGC	30.44	30.23	26.60	26.09	26.62	32.67	40.10	43.12	42.95
11104	PMP Temp B	DGC	**	**	31.64	31.67	31.12	37.04	44.60	48.11	46.81

**Units Not in Use

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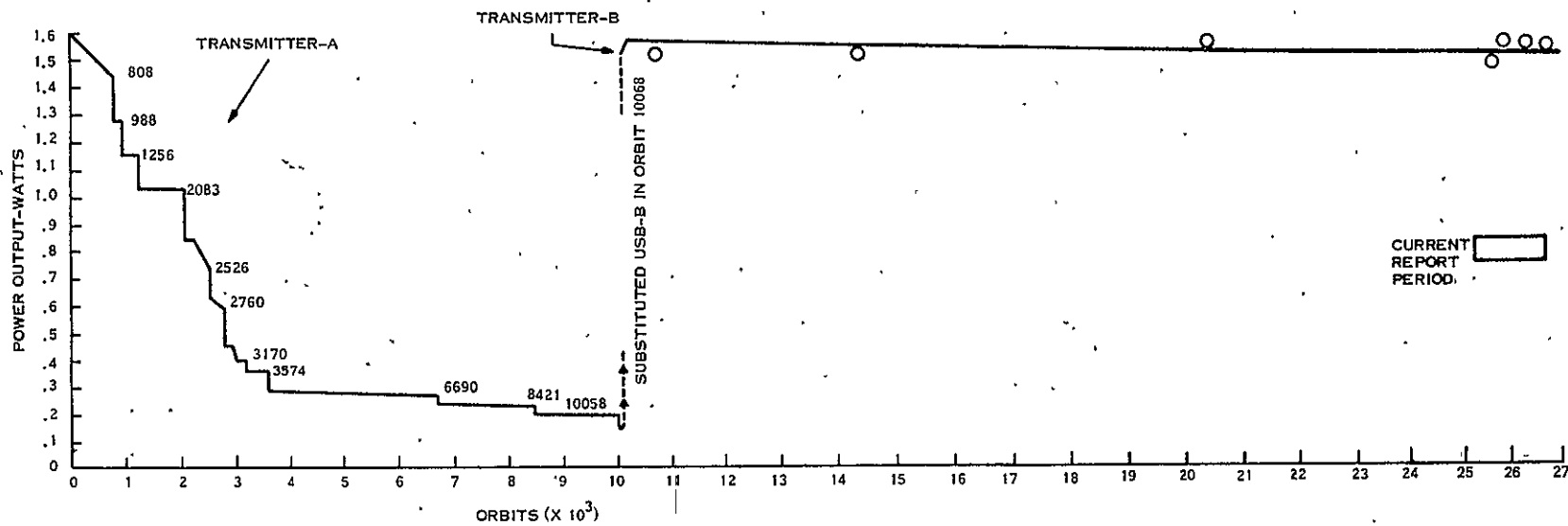


Figure 9-1. USB Power Output History (Landsat-1)

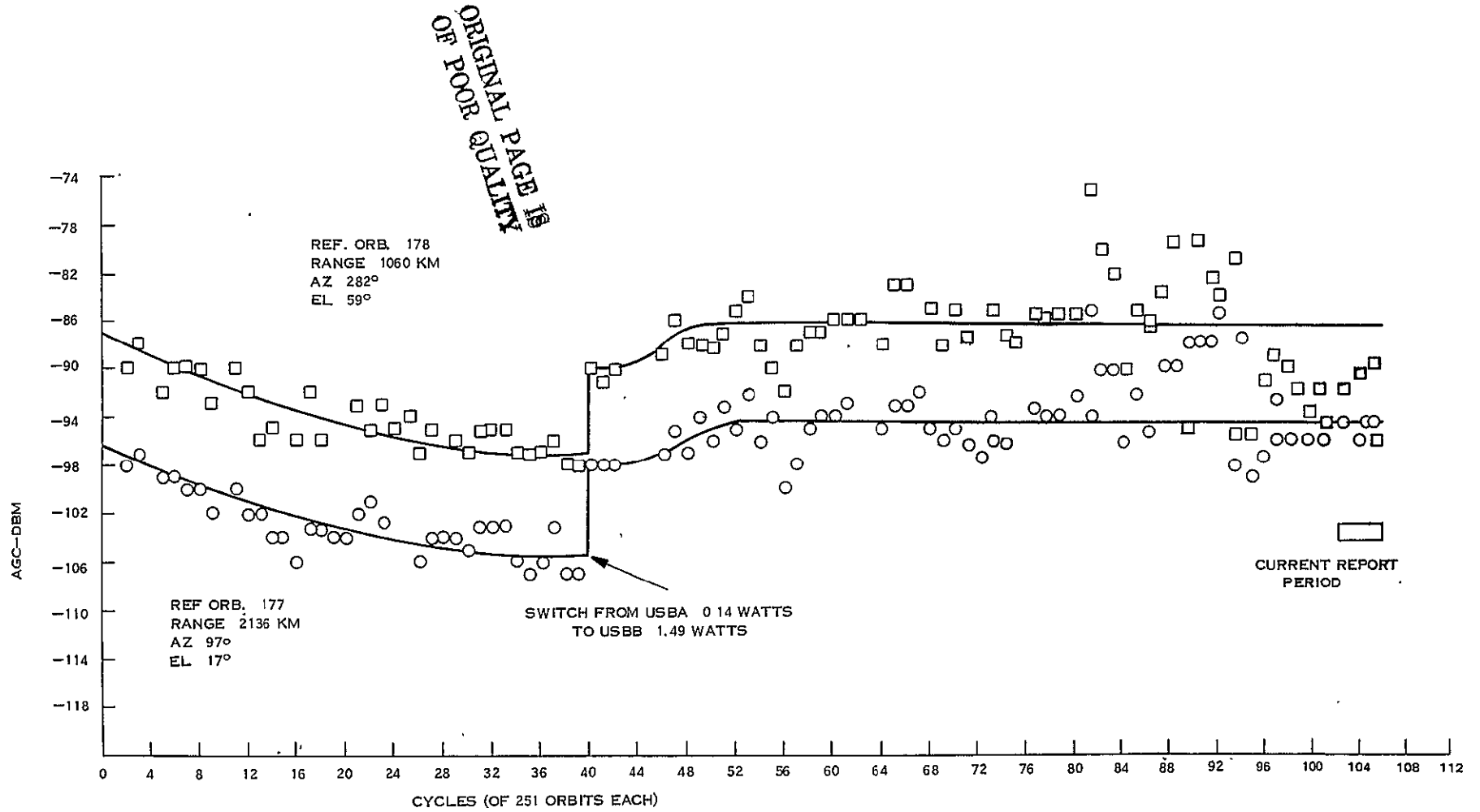


Figure 9-2. USB (Link 4) AGC Readings at Goldstone with 30' Antenna, Landsat-1

SECTION 10
ELECTRICAL INTERFACE SUBSYSTEM (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

Functions	Description	Unit	Orbit								
			7	5098	10182	15254	20364	25455	25800	26374	26734
13200	APU, -24.5 VDC	VDC	-24.90	-24.90	-24.91	-24.90	-24.90	-24.89	-24.90	-24.90	24.90
13201	APU, -12 Volts	VDC	-12.08	-12.08	-12.07	-12.06	-12.05	-12.04	-12.05	-12.05	-12.03
13202	APU Temp.	DGC	25.49	26.95	27.15	26.82	27.31	28.93	30.40	34.94	35.13

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 0.969 and 1.010 times the mean annual value and the spacecraft temperatures increased. 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.

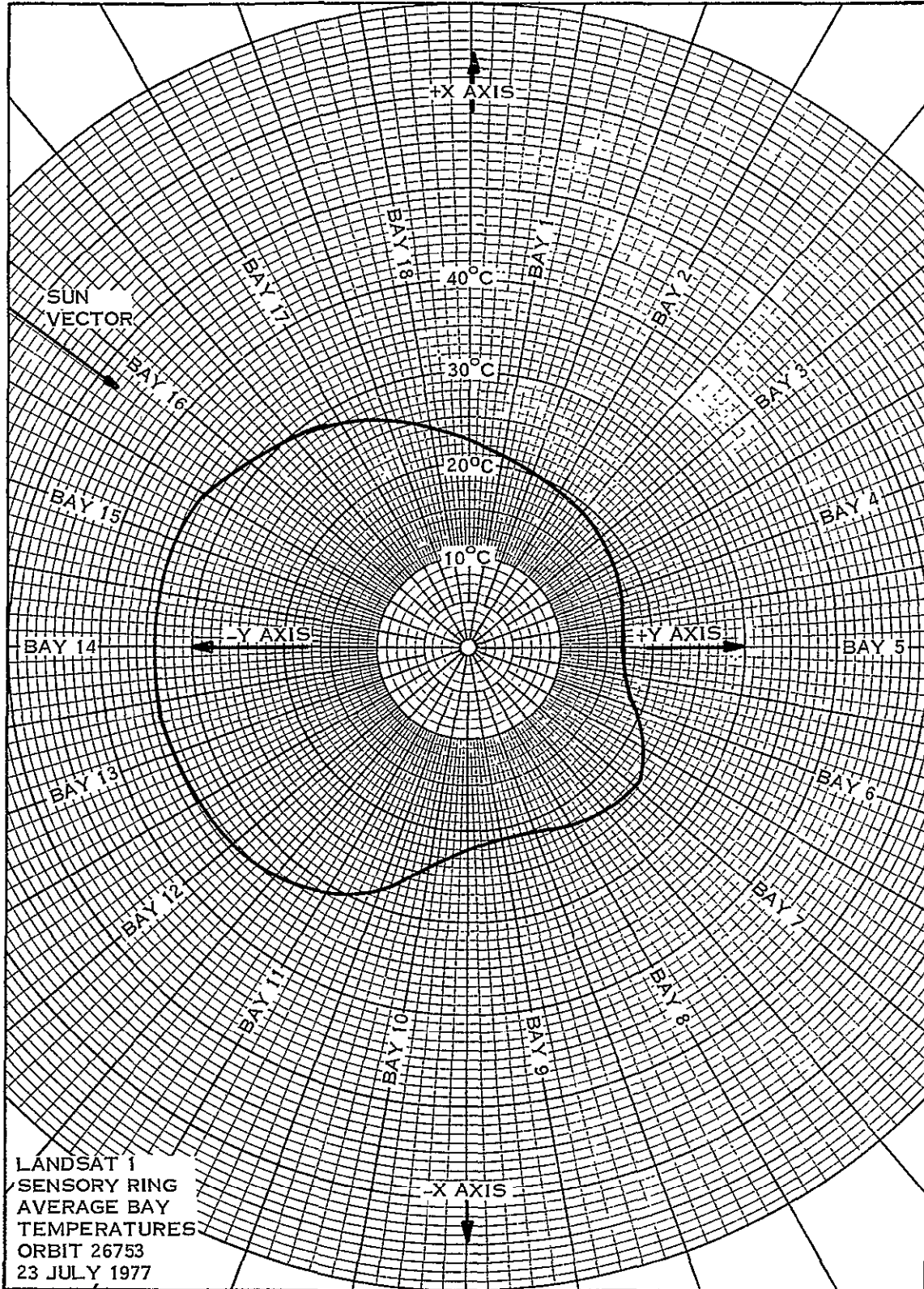


Figure 11-1. Landsat-1 Sensory Ring Thermal Profile

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

Function			Orbit								
No.	Description	Unit	20	5098	10182	15254	20364	25455	25886	26132	26753
7001	THM TH01 ST1	DGC	19.52	20.85	21.65	19.48	18.72	19.37	20.80	21.55	21.59
7002	THM TH02 SBO	DGC	19.60	19.95	20.60	18.62	17.87	17.68	18.07	18.50	18.44
7003	THM TH03 ST1	DGC	18.48	20.16	20.87	18.11	17.20	16.79	17.73	18.32	18.15
7004	THM TH10 TCB	DGC	19.47	20.25	20.36	19.76	19.75	20.65	21.99	23.88	24.27
7005	THM TH04 ST1	DGC	18.39	19.71	20.35	17.86	17.08	16.45	17.08	17.53	17.36
7006	THM TH05 SBO	DGC	17.57	18.89	18.81	17.20	16.47	16.12	16.34	16.67	16.43
7007	QA-X THRUSTER	DGC	21.95	22.95	22.90	22.25	21.33	20.02	20.44	21.11	21.98
7008	THM TH06 STO	DGC	15.95	16.61	16.90	15.34	14.52	13.94	14.16	14.56	14.44
7009	THM TH06 SEI	DGC	19.38	20.35	20.93	18.98	17.86	17.34	17.81	18.54	18.29
7010	THM TH07 ST1	DGC	18.61	*	*	*	*	*	*	*	*
7011	THM TH08 STO	DGC	21.78	22.77	22.68	22.03	21.17	19.88	20.05	20.54	21.37
7012	THM TH09 SEI	DGC	21.81	22.87	23.08	22.20	21.66	20.53	21.36	22.47	22.93
7013	THM TH10 SBO	DGC	18.73	19.53	19.64	19.00	18.56	18.14	19.22	20.48	20.79
7014	THM TH11 ST1	DGC	22.37	23.35	23.57	22.80	22.88	23.52	25.99	28.16	28.44
7015	THM TH12 SBO	DGC	22.37	23.17	23.03	22.86	23.71	26.48	30.97	34.01	33.60
7016	THM TH13 ST1	DGC	20.95	22.02	22.47	22.00	22.89	26.80	31.72	34.82	34.50
7017	RBV BEAM CTR LN	DGC	21.58	22.62	22.84	21.88	21.33	20.98	22.55	24.22	24.60
7018	THM TH14 STO	DGC	20.38	21.40	21.93	21.83	23.19	23.89	35.85	39.67	38.42
7019	NBR RAD OUTBD B4	DGC	5.09	5.88	6.00	4.37	3.31	3.00	3.64	4.32	4.86
7020	THM TH15 SEI	DGC	21.14	23.24	23.99	22.18	23.05	27.64	33.45	36.13	35.24
7021	THM TH16 ST1	DGC	20.73	22.90	23.68	21.64	21.88	25.14	30.11	32.05	31.79
7022	THM TH17 SEI	DGC	30.22	22.76	23.56	21.47	20.88	23.89	28.04	28.69	28.56
7023	THM TH18 SBO	DGC	21.90	24.29	25.19	23.47	22.56	24.63	26.46	27.44	28.05
7030	THM TH03 BUR	DGC	16.05	17.07	17.43	15.36	14.62	14.10	14.42	14.59	14.43
7031	THM TH06 BUR	DGC	13.59	14.17	14.28	12.87	12.07	11.32	11.46	11.83	11.96
7032	THM TH09 BUR	DGC	19.92	20.76	20.74	20.17	19.64	18.88	19.48	20.23	20.88
7033	THM TH12 BUR	DGC	21.51	22.18	22.76	22.65	23.67	27.16	32.60	36.10	35.23
7034	THM TH15 BUR	DGC	19.70	21.67	22.38	21.33	22.23	27.22	32.37	35.90	35.62
7035	THM TH18 BUR	DGC	20.11	21.86	22.02	20.54	20.07	21.15	21.94	22.55	23.83
7040	THM TH01 TCB	DGC	19.27	20.46	21.26	19.19	18.59	18.86	19.56	20.04	20.21
7041	THM TH02 TCB	DGC	17.99	19.23	19.69	17.30	17.11	16.99	17.44	17.81	17.57
7042	THM TH03 TCB	DGC	18.34	19.94	20.82	17.79	17.16	16.26	16.75	16.19	16.73
7043	THM TH04 TCB	DGC	18.95	19.94	20.26	18.60	18.00	17.62	17.92	18.13	17.95
7044	THM TH05 TCB	DGC	16.27	16.98	17.32	15.90	15.22	14.88	15.11	15.39	15.24
7045	THM TH07 TCB	DGC	18.41	19.21	19.45	18.25	17.46	16.56	16.81	17.32	17.55
7046	THM TH09 TCB	DGC	19.38	20.37	20.64	19.85	19.17	18.69	19.17	20.37	20.61
7048	THM TH11 TCB	DGC	21.98	22.94	23.15	22.30	23.18	24.50	27.46	29.92	30.03
7049	THM TH12 TCB	DGC	21.92	22.46	22.35	22.30	23.35	27.37	32.62	35.88	35.46
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	22.26	23.62	29.14	35.73	39.43	38.46
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	22.74	23.83	29.19	36.17	39.75	38.33
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	22.68	23.00	27.04	32.69	33.98	33.70
7053	THM TH17 TCB	DGC	21.73	24.03	25.02	23.33	21.89	24.18	27.08	27.99	28.41
7064	THM TH18 TCB	DGC	20.02	22.20	23.35	21.04	20.10	21.42	22.34	23.34	23.15
7080	THM SHUTTER BY 1	DEG	25.85	33.12	33.62	24.41	18.19	21.17	29.27	32.70	32.46
7061	THM SHUTTER BY 2	DEG	8.62	8.65	13.28	1.73	0.00	0.00	0.00	0.58	0.86
7062	THM SHUTTER BY 3	DEG	10.96	23.68	30.24	17.30	12.44	8.27	9.98	11.05	9.62
7063	THM SHUTTER BY 4	DEG	30.60	35.71	37.92	29.50	25.00	20.20	21.50	25.23	23.00
7064	THM SHUTTER BY 5	DEG	15.03	16.25	15.00	8.08	4.82	3.31	2.81	4.62	4.67
7065	THM SHUTTER BY 7	DEG	17.14	24.64	21.96	14.50	8.00	4.50	4.50	4.50	4.50
7067	THM SHUTTER BY 9	DEG	33.26	38.44	39.50	38.24	37.50	36.56	37.97	45.02	45.37
7068	THM SHUTTER BY 10	DEG	24.68	28.68	27.31	26.03	24.26	0.00	0.00	0.00	0.00
7069	THM SHUTTER BY 11	DEG	39.66	45.89	48.96	46.97	48.40	54.66	63.06	63.74	63.75
7070	THM SHUTTER BY 12	DEG	43.81	46.63	45.68	45.95	52.19	60.55	66.66	66.56	66.56
7071	THM SHUTTER BY 13	DEG	40.39	46.38	44.79	42.34	44.43	62.25	62.33	62.61	62.68
7072	THM SHUTTER BY 14	DEG	34.20	39.70	41.91	34.28	34.65	42.35	42.35	42.35	42.35
7073	THM SHUTTER BY 15	DEG	45.40	58.74	64.79	55.15	63.60	79.59	80.00	80.00	80.00
7074	THM SHUTTER BY 16	DEG	24.50	48.46	53.54	38.76	40.06	60.09	64.87	65.04	65.22
7075	THM SHUTTER BY 17	DEG	39.06	54.96	61.88	51.06	39.95	57.03	73.87	77.41	77.29
7076	THM SHUTTER BY 18	DEG	29.70	43.15	51.20	35.12	28.03	38.26	45.28	51.17	48.50
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	8.31	8.33	8.35	8.35
7084	THM Q2 S ZENER V	VDC	8.19	8.19	8.20	8.19	8.19	8.19	8.19	8.21	8.21
7085	THM Q3 S ZENER V	VDC	8.15	8.15	8.15	8.15	8.15	8.15	8.15	8.15	8.15
7090	THM PSM MOUNT	DGC	21.60	22.54	22.99	21.43	20.98	21.40	23.79	25.71	25.93
7091	THM IND ATTITUDE	DGC	19.40	20.42	20.89	19.13	18.23	17.48	18.06	18.92	18.79
7092	THM RBV RADIATOR	DGC	15.65	17.28	17.47	16.55	16.52	13.53	15.25	16.71	16.88
7093	THM RBVC CTR BM	DGC	20.30	21.61	21.87	20.73	20.69	18.71	20.59	22.31	22.59
7094	THM WBVTR ROOT	DGC	12.96	16.71	16.07	13.77	12.00	12.74	14.66	15.80	15.93
7095	THM WBVTR RAD CT	DGC	4.81	8.17	8.68	6.99	5.99	6.18	6.49	7.20	8.01
7096	THM WBVTR STRAP	DGC	16.62	19.32	19.66	17.29	14.72	15.46	17.35	18.42	18.50
7097	THM WB MTR BAY 1	DGC	20.56	19.52	21.37	16.97	16.35	16.57	18.06	18.91	19.18
7098	THM WB MAT BAY 1	DGC	20.22	18.90	20.39	17.12	16.65	17.28	19.07	20.05	20.41
7099	THM WBVTR SEP 3	DGC	18.60	20.55	21.05	18.45	17.09	17.02	18.25	18.98	18.82
7100	THM WBVTR SEP 17	DGC	21.31	23.66	24.23	22.02	20.96	23.36	27.05	27.96	27.86
7101	THM WBVTR 1 CENT	DGC	21.49	23.73	24.01	21.63	18.23	19.20	21.41	22.36	22.36
7102	THM WBVTR 2 BAY	DGC	17.46	18.92	19.32	17.23	16.31	16.11	17.06	17.76	17.66
7103	THM WBVTR 2 BY 15	DGC	21.00	23.16	23.82	21.73	21.83	24.48	29.10	31.18	30.82
7104	THM WBVTR 2 CTR	DGC	19.35	21.61	21.81	19.54	17.53	18.67	21.39	22.88	22.97
7105	THM NBTR B SEP 6	DGC	18.06	19.30	19.79	17.82	16.74	16.47	17.72	18.78	18.78
7106	THM NBTR B SEP 1	DGC	20.82	22.85	22.89	21.61	22.04	25.47	30.43	33.23	32.86
7107	THM NBTR BM CTR	DGC	19.97	21.04	21.34	19.51	18.94	19.52	22.05	23.73	23.86
7108	THM MSS MOUNT 14	DGC	19.18	21.15	21.70	20.06	20.70	24.29	29.29	31.94	31.42
7109	THM OA -Y THRUSTER	DGC	22.21	23.80	24.69	24.40	26.22	32.05	38.37	42.43	41.83
7110	THM MSS WBVTR BM	DGC	18.14	20.06	20.63	18.18	17.38	17.43	19.31	20.57	20.66
7111	THM OA +X THRUSTER	DGC	20.30	19.82	21.22	16.07	17.57	17.93	19.27	20.09	20.47
7130	THM AUX P1 T	DGC	15.69	8.49	-18.90	9.68	10.29	13.92	14.76	17.56	16.22
7131	THM AUX P2 T	DGC	10.63	1.59	.41	5.64	25.61	28.79	32.29	36.67	29.41

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

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LS-1
FOLDOUT FRAME
11-3/4

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	18,400	27,752	739	17,661
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	343.24	343.20	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	345.75	*	*	*	*	*
	P/B	570.78	553.63	567.50	580.51	*	*	*	*	*
10003	A - Rec. Temp. (DGC)	25.47	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)	-24.47	-24.44	-24.62	-24.62	-24.60	-24.56	-24.56	-24.57	-24.58
10104	B - Supply (VDC)	-24.44	-24.51	-24.29	-24.57	-24.70	-24.71	-24.71	-24.71	-24.72

N.A. - Data not available

* - No data. NBR-B out of service

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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

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WBPA-2

Function			Orbits								
Number	Name		33	4096	10602	15233	20358	25452	25898	26330	26734
12101	Temp TWT Coll. (Max)	(DgC)	35.38	34.24	35.96	29.77	33.90	29.61	33.65	29.04	29.19
12102	Helix Current	(Ma)	7.32	7.70	7.67	7.90	7.82	7.90	7.90	7.76	7.90
12103	TWT Cath. Cur.	(Ma)	44.30	43.85	42.72	43.70	42.83	43.84	43.68	43.84	43.65
12104	Forward Pwr	(DBM)	43.57	43.57	43.47	43.52	43.41	43.38	43.50	43.38	43.49
12105	Reflected Pwr	(DBM)	31.59	32.79	32.62	33.07	32.60	32.97	32.88	32.75	32.83
12228	Loop Str. AFC Con Volt (1)	(MHz)	1.11	-0.78	-1.12	-1.05	-1.53	-2.13	-1.52	-2.44	-1.64
12229	Mod Temp VCO	(DgC)	21.70	20.88	21.50	21.78	23.65	18.09	18.64	22.67	19.22
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.68	2.69	2.69	2.65	2.66	2.69	2.69	2.69	2.69
12234	-15 VDC Pwr Sup A	(TMV)	5.90	5.98	5.92	5.81	5.85	5.97	5.81	5.96	5.96
12236	+5 VDC Pwr Sup A	(TMV)	3.97	4.01	4.01	3.97	3.96	4.01	3.97	3.96	3.96
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	5.61	5.50	5.38	5.42
12242	Inv. Temp	(DgC)	23.03	22.96	23.86	23.66	22.73	21.10	22.36	24.33	23.35

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

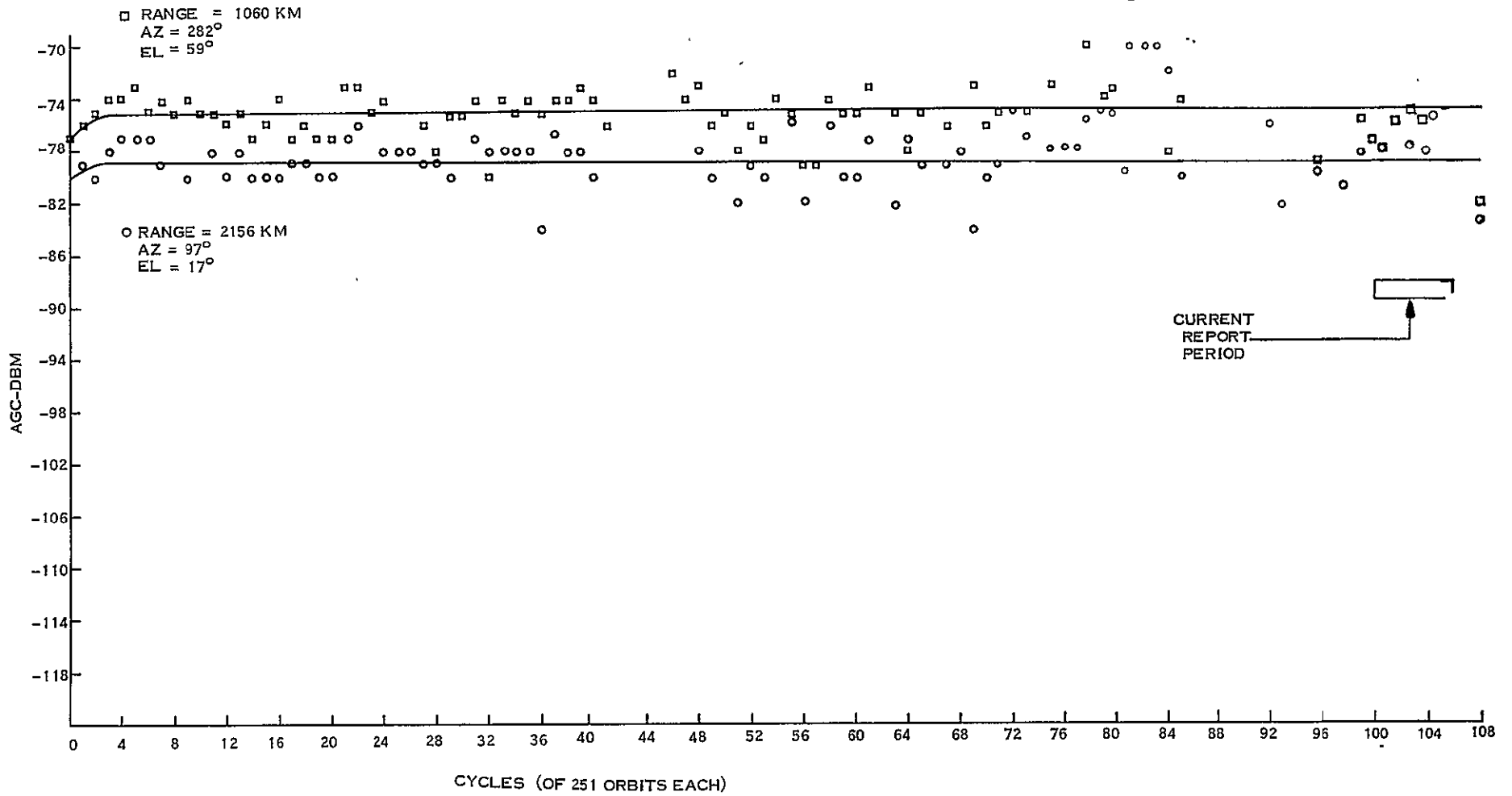


Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna - Landsat-1

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	25523	25886	26332	26753
3004	Case-Temp 1	DGC	18.92	19.42	19.71	18.54	18.23	17.28	17.89	18.81	18.80
3005	Assembly-Temp 2	DGC	19.15	19.76	19.96	18.73	18.51	17.54	18.11	19.12	19.07

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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.

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 (20%) since launch. This is twice the average sensor decline.

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

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



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

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FOLDOUT FRAME

Table 17-1. MSS Telemetry Values

Function No.	Name	Telemetry Values in Orbits									
		Units	20	5060	10587	15233	20358	25452	25898	26330	26734
15044	FOPT 2 T	(DGC)	17.46	19.84	19.75	18.15	18.07	17.50	19.74	20.74	20.77
15046	ELEC CVR T	(DGC)	19.37	21.83	21.96	20.20	20.11	19.46	21.32	22.47	22.19
15048	SCAN MIR REG T	(DGC)	16.35	19.77	20.48	20.94	21.90	21.14	23.65	26.26	25.49
15050	SCAN MIR DR. COIL T	(DGC)	15.94	19.30	19.78	19.21	19.96	19.56	22.43	24.28	24.21
15052	ROT SHUT HSG T	(DGC)	16.91	20.07	20.23	18.74	18.73	18.17	20.27	21.25	21.24
15043	FOPT 1 T	(DGC)	17.67	20.01	19.93	18.35	18.23	17.76	19.92	20.90	20.49
15045	MUX T	(DGC)	21.19	22.03	23.87	26.92	28.63	28.58	33.77	38.04	26.47
15047	PWR SUP T	(DGC)	17.41	20.00	20.21	19.83	20.28	19.14	21.38	23.15	22.95
15049	SCAN MIR DR. ELC T	(DGC)	16.12	19.41	20.23	21.16	22.41	21.22	23.97	27.05	26.45
15051	SCAN MIR HSG T	(DGC)	15.60	19.05	19.49	18.40	19.04	18.92	21.82	23.59	23.52
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	2.28	2.28	2.06	2.07	2.28	2.07
14054	CAL LAMP CUR A	(TMV)	1.12	1.12	1.12	1.12	1.12	1.10	1.10	1.10	1.10
15056	BAND 2 \pm 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10	5.10	5.10
15058	BAND 4 \pm 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5.10	5.10	5.10	5.10
15060	+12 -6 VDC REG	(TMV)	4.82	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	5.08	5.09	5.03	5.03
15064	BAND 1 HV A	(TMV)	5.10	5.16	5.12	5.12	5.12	F	F	F	F
15066	BAND 2 HV A	(TMV)	4.50	4.52	4.52	4.50	4.50	4.50	4.52	4.52	4.52
15068	BAND 3 HV A	(TMV)	4.60	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
15070	SHUT MOT CON OUT	(TMV)	2.43	2.44	2.47	2.51	2.50	2.50	2.49	2.50	2.49
15041	A/D SUPPLY	(TMV)	5.93	5.93	5.87	5.93	5.92	5.93	5.93	5.94	5.93
15053	SCAN MIR REG V	(TMV)	4.42	4.51	4.51	4.61	4.61	4.61	4.61	4.62	4.61
15055	BAND 1 \pm 15V	(TMV)	4.97	4.97	4.92	4.97	4.97	F	F	F	F
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	4.73	4.77	4.77	4.77
15063	-19 VDC REG OUT	(TMV)	3.43	3.39	3.50	3.58	3.57	3.55	3.57	3.57	3.57
15071	SCAN MIR DR. CLK	(TMV)	1.93	1.97	1.98	2.00	1.96	2.00	2.00	1.97	2.00

Table 17-2. MSS Response History Landsat-1

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

Band	1st Year		2nd Year	3rd Year	4th Year	5th Year	This Quarter	% Chg. Since Launch	
	Sensor	Launch	2-4 Quar.	5-8 Quar.	9-12 Quar.	13-16 Quar.			17-20 Quar.
1	1	43	39	39	38	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	34	32		31	
	6	43	39	41	41	40		39	
2	7	47	43	43	42	41	41	-13	
	8	46	41.5	41	41	40	39	-15	
	9	47	44	42.5	42	41	40	-17	
	10	46	42	41.5	41	41	40	-13	
	11	47	42.5	42	42	41	41	-13	
	12	45	42	42.5	42	42	41	-7	
3	13	46	46	49	51	52	53	15	
	14	44	42	42	42	42	43	-5	
	15	45	42.5	42	41	41	41	-9	
	16	40	37.5	37.5	37	37	37	-8	
	17	42	39	40	40	40	41	-2	
	18	44	40	40.5	41	41	41	-2	
4	19	28	28	27	25	23	23	-21	
	20	25	26	25	23	21	20	-20	
	21	26	27	26.5	25	23	22	-15	
	22	23	23	22	21	19	19	-22	
	23	22	22.5	23	21	21	20	-9	
	24	24	23.5	24	23	22	22	-8	
Line Length		3221	3219	3217	3216	3217	3216	3214	-0.2

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

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

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			
15	15	1637	22817-22830			
16	16	1638	22831-22844			
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			

REFERENCE FRAME BEING
SHIFTED THREE DAYS
(NOV 76 = JAN 77)

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LANDSAT-1

FEB, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	REF DAY	CYCLE NO.
1	32	1654	23054-23067	140-153	11	92
2	33	1655	23068-23081	154-167	12	92
3	34	1656	23082-23095	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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LANDSAT-1

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

LANDSAT-1

APR 1977

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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JUN 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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JULY 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	208	1830	25509-25522	85-98	7	102
28	209	1831	25523-25535	99-111	8	102
29	210	1832	25536-25549	112-125	9	102
30	211	1833	25550-25563	126-139	10	102
31	212	1834	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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8CT, 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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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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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	27768-27781	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

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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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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

2078 2079
2080 2081

LANDSAT-1

APR 1978

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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LANDSAT-1

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

01/11/78
01/11/78

LANDSAT-1

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

<u>No.</u>	<u>Document No.</u>	<u>Title and Date</u>
1	PIR-U-1N45-204	Right Solar Array Position Corrections, dated 8-31-77.

LANDSAT-2

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INTRODUCTION

This is the 12th 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
77SDS4244	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 April to 23 July 1977	22 August 1977

This report contains analysis of performance for Orbits 12733 to 14015 for Landsat-2.

SECTION 1
SUMMARY
LANDSAT-2 OPERATIONS

SECTION 1
SUMMARY LANDSAT-2 OPERATIONS

The Landsat-2 spacecraft was launched from the Western Test Range on January 22, 1975, at 022:17:55:51.604. The launch and 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 April 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). 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, 6, 7 and 8 have been turned OFF for restoration cycles and returned to service after a few weeks. Battery 7, turned OFF, in Orbit 13959 on 19 October, 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 14052 (10/26/77) Landsat-2

RBV	Total Scenes Imaged	2509
	Avg. Scenes/Day in Operation	7
	Total Area Imaged (million sq. n. mi.)	21.8
	ON TIME (hr.)	24.9
	ON/OFF Cycles	316
	% Real Time Images	70
	% Recorded Images	30
MSS	Total Scenes Imaged	222,319
	Avg. Scenes/Day	204
	Total Area Imaged (million sq. n. mi.)	1603
	ON TIME (hr.)	2332
	ON/OFF Cycles	14,304
	% Real Time Images	78
	% Recorded Images	22
DCS	Messages at OCC	1,214,383
	Users	47
	ON TIME (hr.)	24,176
WPA-1	% Real Time Mode	69
	% Playback Mode	31
	ON TIME (hr.)	103
	ON/OFF Cycles	674
WPA-2	% Real Time Mode	72
	% P/B Mode	28
	ON TIME (hr.)	2110
	ON/OFF Cycles	11,433
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.)	839
	Cycles Head-Tape Contact	10,827
	ON TIME (hr.)	1062

SECTION 2
ORBITAL PARAMETERS
LANDSAT-2

SECTION 2
ORBITAL PARAMETERS

At the close of this report period, Landsat-2's ground track error was 1.66 n.m. , longitude error at the equator. Control of the ACS Pitch gates through use of the Pitch Position Bias mode circumvented the need for orbit adjustment. (See Section 4 also.) Therefore, no orbit maintenance burn of the OAS was required during the current report period.

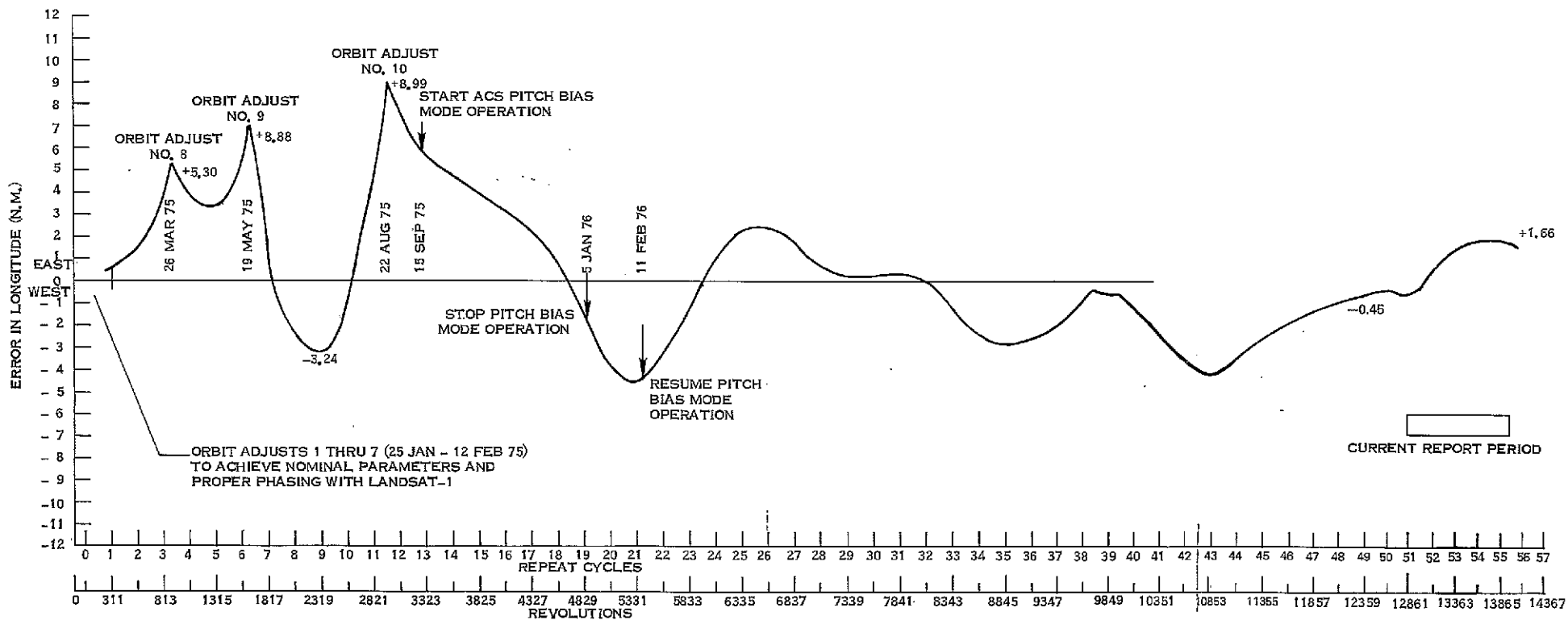
The errors in longitude since launch as a function of time and orbit maintenance burns are shown in Figure 2-1. Figure 2-2 shows the mean local time at the descending equatorial crossings.

As of 23 October 1977, Landsat-2 has descending equatorial crossings at approximately 09:03:35 mean local time as opposed to 08:11:59 AM for Landsat-1. A projection of mean local time at the descending nodes 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 currently with Landsat-2 leading Landsat-1 by 00:17:09, an orbital equivalent of about 60° .

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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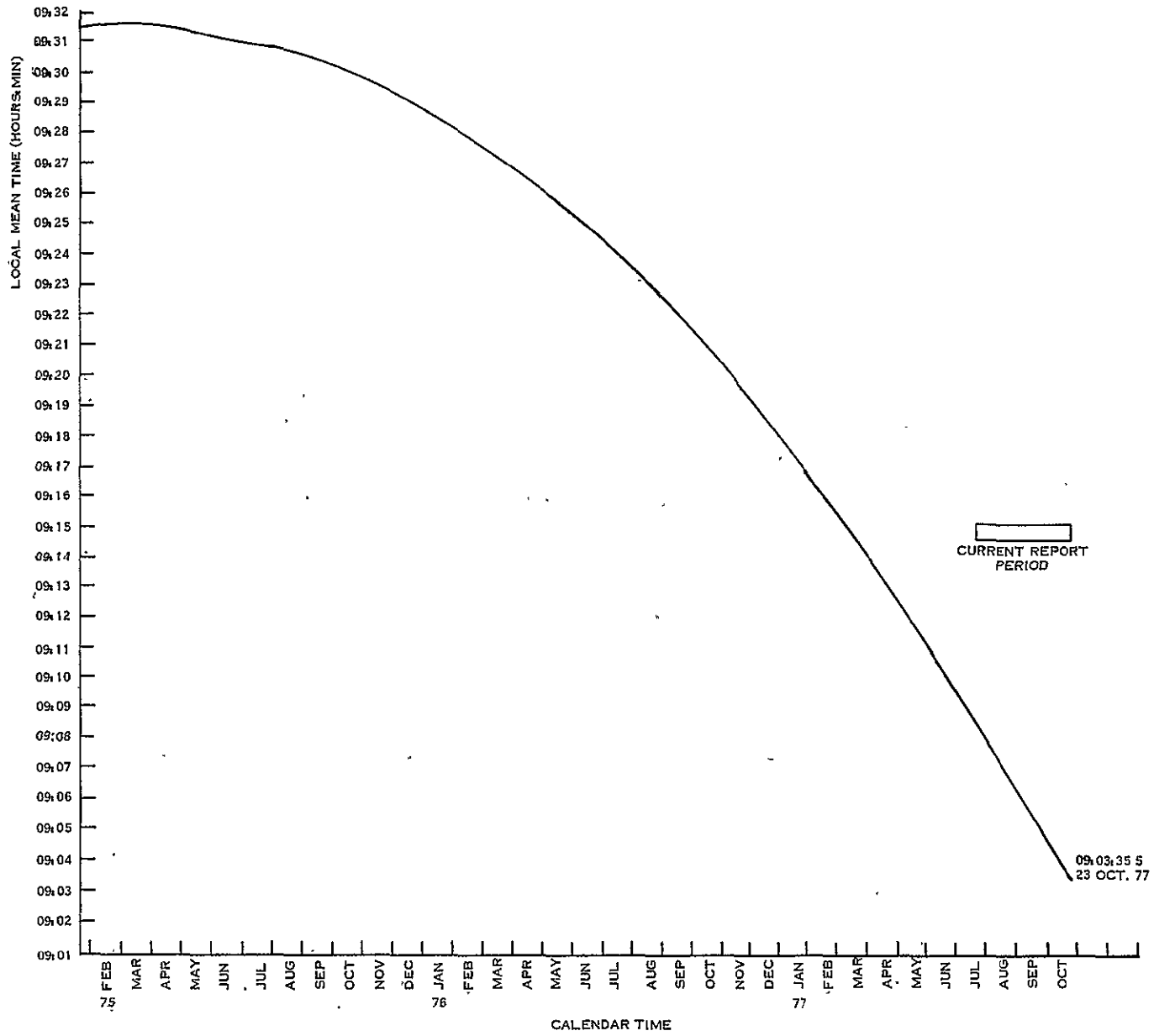


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Figure 2-1. Effect of Orbit Adjusts and Pitch Position Bias Orbit Maintenance on Landsat-2's Ground Track



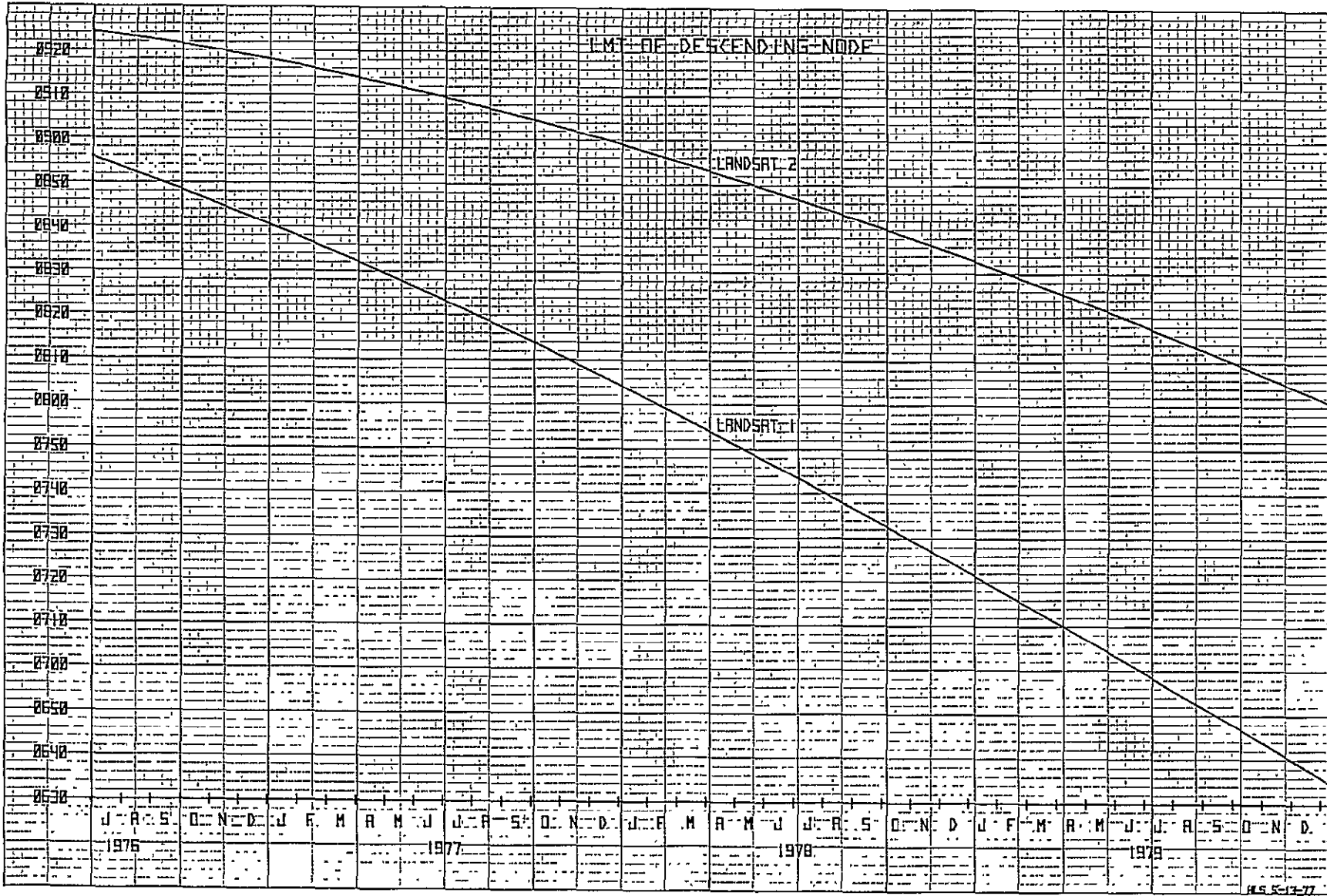


Figure 2-3. Predicted Local Mean Time of Descending Node for LS-1 and LS-2, 1976, 1977, 1978, 1979

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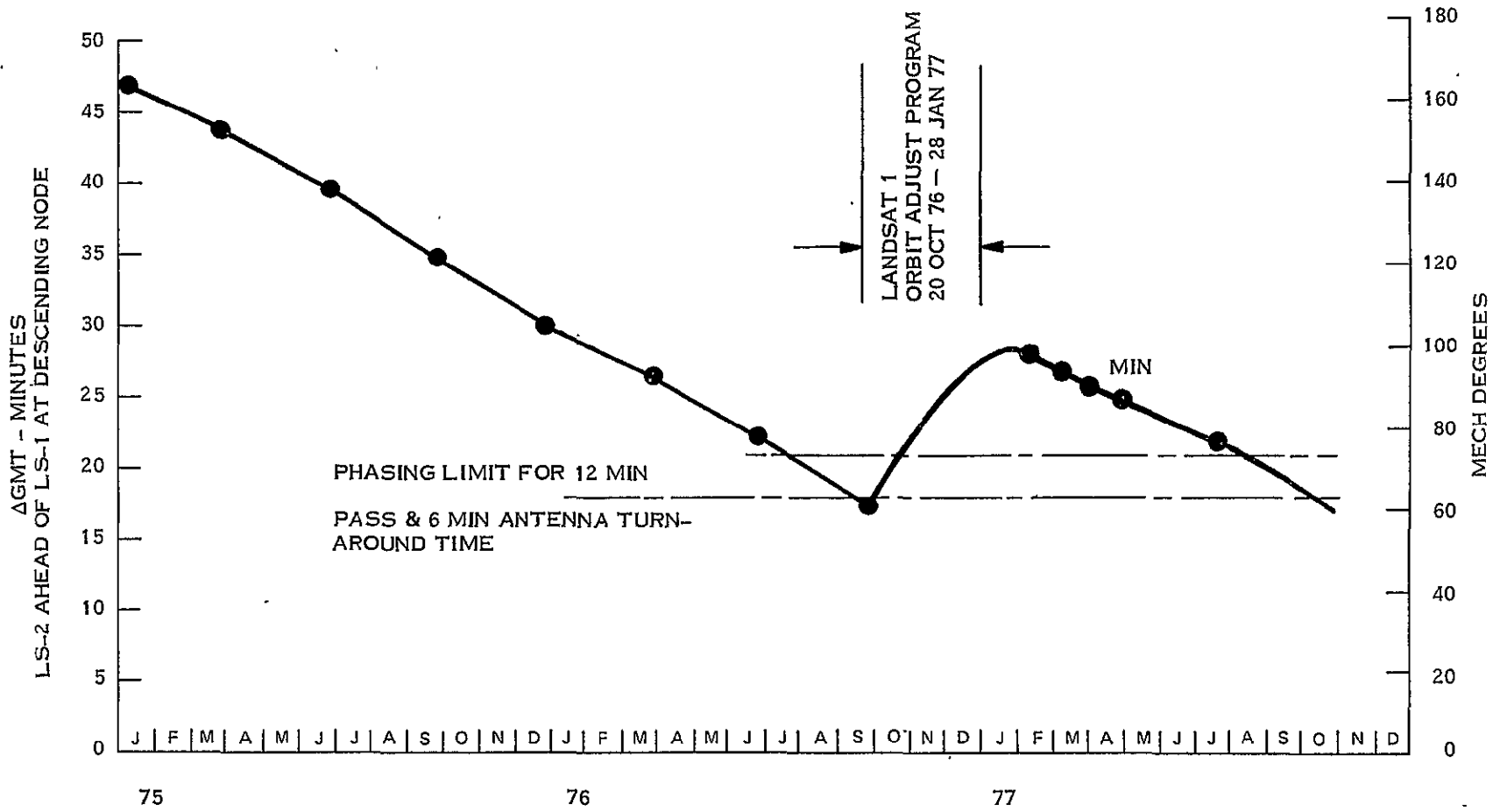


Figure 2-4. Drift in the Angular Phasing Between Landsat-1 and Landsat-2

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	0.00250	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
23 Oct 1977	917.40	897.52	98.955	7285.627	0.001364	103.147	103.263	81.812	347.225	97.914

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 33 months in Orbit was 19.6%, 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 7 was in such a restoration cycle at the end of this report period. All 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 27.2°C during this report period.

The power subsystem electronics have performed well during this report period with all regulated voltage 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.

Landsat-2 passed thru the penumbra of a total eclipse during Orbits 13861 and 13862 on 12 October 1977 without affecting scheduled operations or spacecraft performance.

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.

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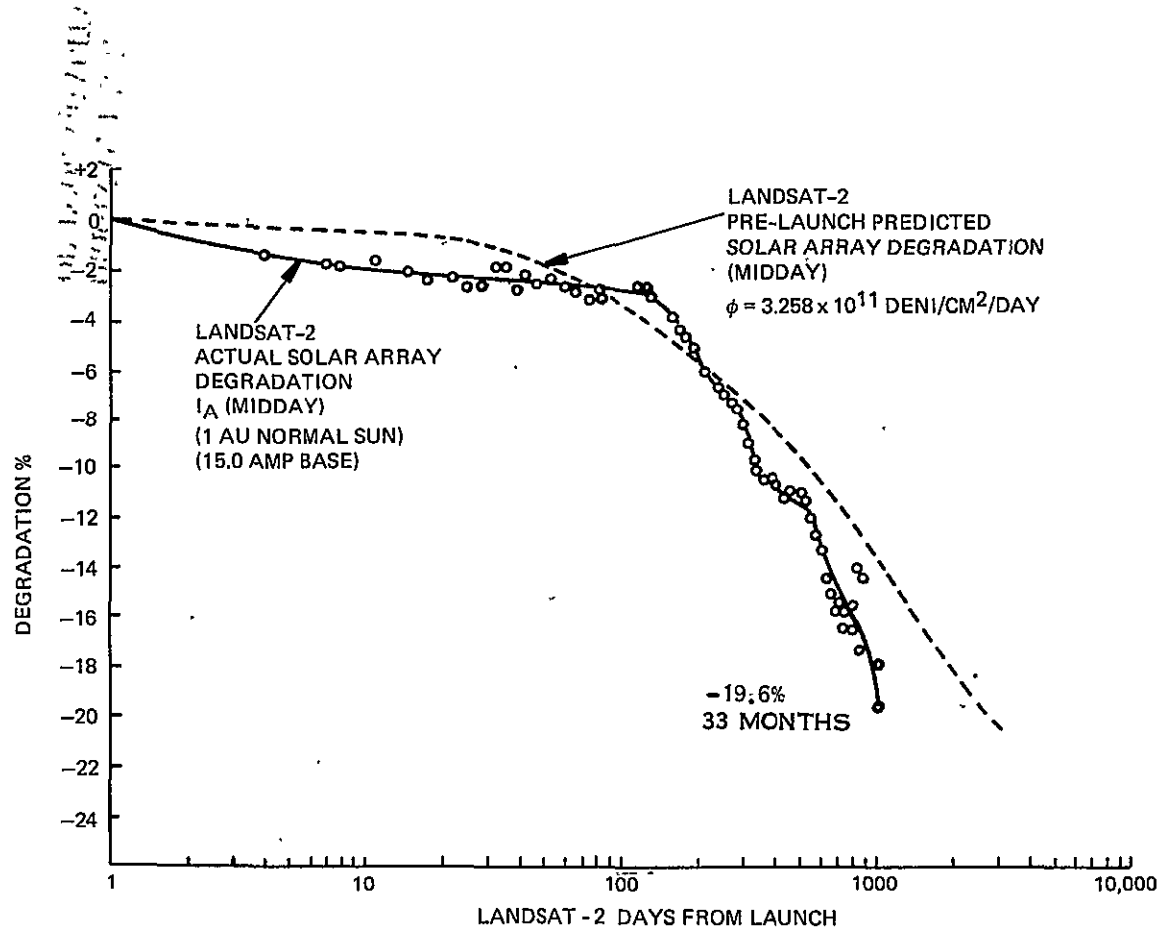


Figure 3-1. Landsat-2 I_A (Midday) Degradation Vs Days

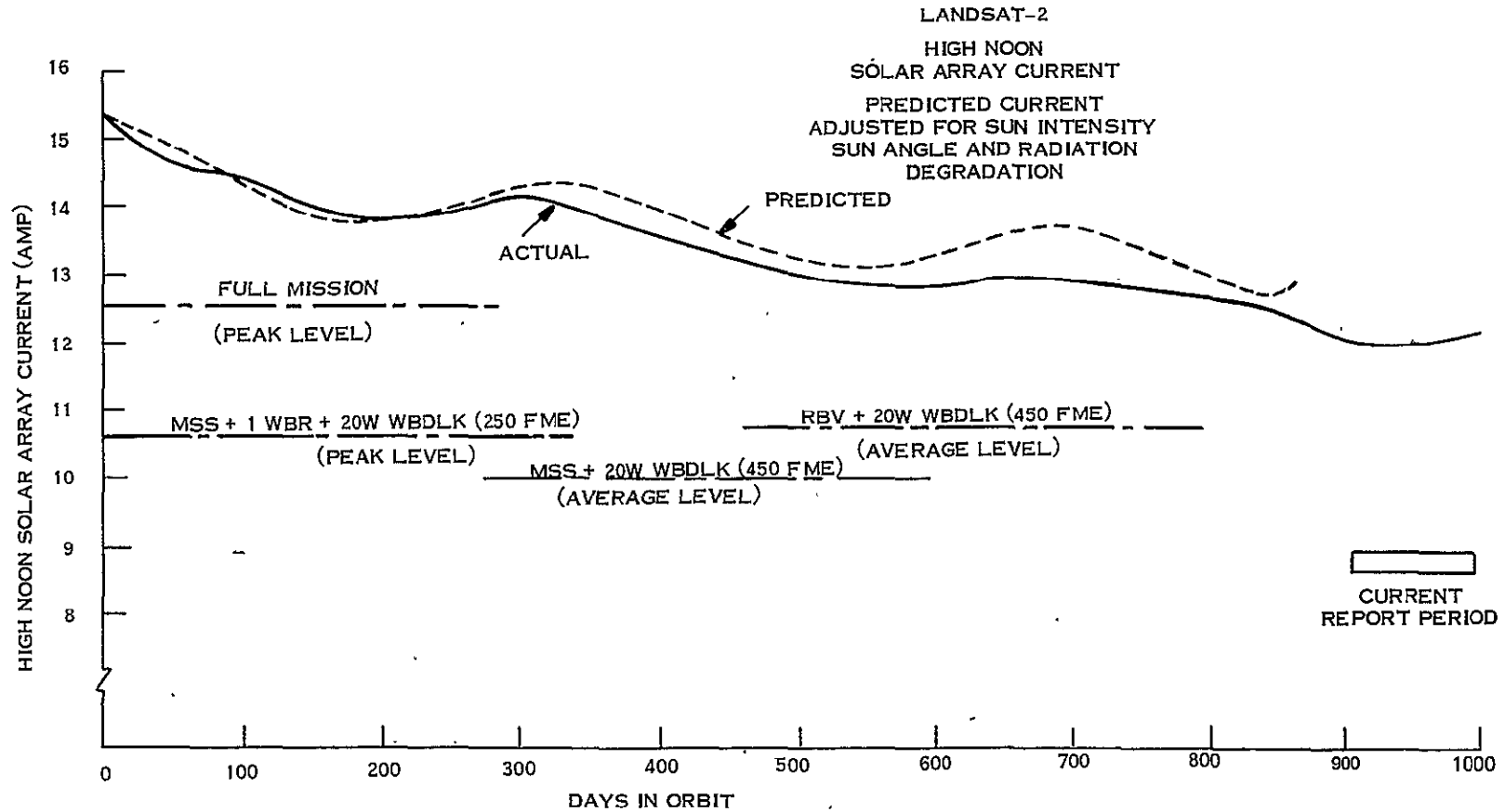


Figure 3-2. Landsat-2 Midday Solar Array Current

Table 3-1. Landsat-2 Battery Restoration Cycles

		ORB DATE	1	2	3	4	5	6	7	8	9
			BATT. 1	OFF	8029 8-20-76	11420 4-20-77	12562 7-11-77	13580 9-22-77			
	ON	8509 9-23-76	11947 5-28-77	12964 8-9-77	13670 9-29-77						
BATT. 2	OFF	12078 6-6-77									
	ON	12272 6-20-77									
BATT. 3	OFF	ORB DATE									
	ON	ORB DATE									
BATT. 4	OFF	ORB DATE									
	ON	ORB DATE									
BATT. 5	OFF	10249 1-26-77									
	ON	10657 2-24-77									
BATT. 6	OFF	7601 7-20-76	8591 10-29-76	9652 12-7-76	10962 3-18-77	11993 5-31-77	12271 6-20-77	12965 8-9-77	13454 9-13-77	13677 9-29-77	
	ON	7992 8-17-76	9164 11-9-76	10028 1-10-77	11311 4-12-77	12077 6-6-77	12532 7-9-77	13159 8-23-77	13486 9-15-77	13836 10-10-77	
BATT. 7	OFF	13489 9-16-77	13959 10-19-77								
	ON	13570 9-21-77									
BATT. 8	OFF	13161 8-23-77									
	ON	13444 9-12-77									

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

Pwr. Mgmt. Orbit No.	50	2540	5100	7640	10192	12722	13150	13600	14016
Batt 1 Max	33.43	33.25	32.66	33.08	32.57	**	32.74	**	32.57
2 Chge	33.40	33.14	32.63	33.05	32.54	-32.89	32.71	32.37	32.63
3 Volts	33.35	33.09	32.57	33.09	32.57	-32.92	32.75	32.41	32.66
4	33.45	33.20	32.68	33.20	32.59	-32.85	32.77	32.43	32.68
5	33.42	33.25	32.65	33.08	32.56	-32.91	32.73	32.48	32.65
6	33.41	33.24	32.64	28.79	32.56	-32.90	**	32.39	32.64
7	33.45	33.28	32.68	33.11	32.59	-32.93	32.85	32.51	**
8	33.45	33.27	32.68	33.10	32.59	-32.93	32.76	32.42	32.68
Average	33.42	33.21	32.65	33.10	32.57	-32.91	32.76	32.44	32.65
Batt 1 End-of-Night	29.32	29.06	29.06	29.06	28.98	**	28.80	**	28.80
2 Volts	29.38	29.12	29.04	29.12	28.95	-28.95	28.78	28.61	28.78
3	29.32	29.07	29.07	29.07	28.89	-28.98	28.81	28.55	28.81
4	29.34	29.09	29.09	29.09	28.91	-28.91	28.83	28.66	28.75
5	29.40	29.06	29.06	29.06	28.97	-28.97	28.80	28.63	28.80
6	29.31	28.96	28.96	28.71	28.88	-28.96	**	28.54	28.71
7	29.34	29.08	29.08	29.00	29.00	-29.00	28.82	28.65	28.65
8	29.34	29.00	29.00	29.00	28.91	-28.91	28.82	28.65	28.82
Average	29.34	29.05	29.04	29.05	28.94	-28.96	28.81	28.64	28.79
Batt 1 Chge	12.76	12.13	12.43	15.51	13.74	**	15.63	**	16.02
2 Share	11.68	12.45	11.42	13.54	11.44	13.66	14.55	15.12	13.97
3 (%)	12.24	13.67	12.48	14.13	12.41	13.84	13.50	14.31	13.27
4	11.99	12.50	11.76	13.97	11.81	13.50	13.13	14.44	13.35
5	12.84	11.52	13.24	14.32	12.95	14.15	13.91	13.58	14.27
6	13.35	13.20	14.32	**	15.14	15.62	**	13.30	14.80
7	12.90	12.81	12.97	14.30	11.74	13.85	13.67	14.03	**
8	12.24	11.72	11.38	13.14	10.77	14.25	14.38	15.20	14.38
Batt 1 Load	12.60	11.35	11.80	12.84	11.16	**	15.88	**	13.71
2 Share	12.70	13.99	13.34	15.60	14.14	15.83	16.30	15.12	15.40
3 (%)	12.67	14.38	13.74	15.41	13.94	15.83	15.95	14.31	14.52
4	12.44	12.99	12.48	14.71	13.00	15.06	15.10	14.44	14.23
5	12.34	11.58	12.36	13.69	9.96	14.05	14.20	13.58	13.36
6	12.70	11.30	11.56	**	15.27	15.46	**	13.30	14.32
7	12.47	12.35	12.70	14.03	11.33	12.63	12.05	14.03	**
8	12.04	12.06	12.02	13.72	11.21	11.15	10.52	15.20	14.38
Batt 1 Temp	21.46	21.34	21.94	21.47	22.71	19.31	22.35	19.42	22.00
2 in	20.25	21.44	19.94	19.90	20.30	19.69	21.38	19.90	20.74
3 (°C)	18.60	19.13	17.86	17.79	17.52	17.01	17.57	16.43	17.41
4	20.83	20.91	20.36	20.37	20.86	19.83	20.05	19.69	20.07
5	24.98	22.31	27.27	22.64	30.49	23.13	25.16	25.51	26.20
6	24.26	23.01	27.28	20.49	27.69	22.99	23.12	25.45	24.90
7	24.71	23.62	26.32	22.90	27.01	24.22	26.37	24.09	24.04
8	23.63	22.71	24.41	22.40	24.55	23.54	25.85	22.34	23.25
Average	22.34	21.81	23.17	21.00	23.83	21.21	22.73	21.60	22.33
S/C Reg Bus Pwr. (W)	*	185.0	149.3	146.12	154.49	134.0	168.8	156.3	153.2
Comp Load Pwr. (W)	*	41.2	24.8	17.64	6.64	6.64	8.1	8.1	8.1
P/L Reg Bus Pwr. (W)	*	9.6	9.8	11.81	9.59	11.9	9.6	9.9	9.8
C/D Ratio	1.15	1.10	1.11	1.15	1.24	1.17	1.25	1.02	1.22
Total Charge (A-M)	271.9	267.55	223.46	239.11	223.51	222.41	232.03	236.61	237.41
Total Discharge (A-M)	237.2	244.33	201.45	207.47	180.84	189.59	185.48	232.46	195.04
Solar Array (A-M)	1106	981	1003	892	939	860.8	868.9	877.4	886.0
S.A. Peak I (Amp)	16.05	14.67	14.43	13.41	13.25	12.55	12.47	12.55	12.86
Midday Array I (Amp)	*	13.88	13.72	12.78	12.86	12.31	11.92	12.00	12.08
Sun Angle (Deg)	*	-1.22	8.35	0.3	10.7	3.0	6.3	7.8	7.6
Max R Pad Temp (°C)	*	59.60	63.20	58.40	58.40	54.18	56.00	56.00	58.40
Min R Pad Temp (°C)	*	-38.00	-35.00	-38.00	-34.40	-30.80	-35.60	-33.80	-33.80
Max L Pad Temp (°C)	*	56.92	62.15	56.92	62.15	56.92	57.69	59.23	60.00
Min L Pad Temp (°C)	*	-45.00	-42.14	-45.71	-39.43	-38.29	-42.14	-39.43	-39.43

* Data not processed and unavailable

** Batt 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	Unit	Orbits								
			50	2532	5102	7641	10192	12722	13150	13592	14016
6001	Batt 1 Disc I	Amp	1.01	0.85	0.74	0.85	0.52	.00	0.94	*	0.69
6002	2		1.01	0.97	0.84	1.02	0.65	.96	0.83	0.68	0.77
6003	3		1.00	0.99	0.87	1.01	0.64	.99	0.90	0.64	0.74
6004	4		1.00	0.93	0.78	0.97	0.60	.94	0.93	0.62	0.72
6005	5		0.99	0.85	0.78	0.91	0.47	.87	0.87	0.59	0.67
6006*	6		1.02	0.86	0.73	*	0.70	.95	*	0.61	0.74
6007	7		1.00	0.91	0.80	0.92	0.52	.77	0.75	0.60	*
6008	8		0.97	0.87	0.75	0.90	0.52	.68	0.66	0.66	0.72
6011	Batt 1 Chg I	Amp	0.47	0.57	0.42	0.52	0.46	.03	0.55	*	0.60
6012	2		0.43	0.57	0.38	0.46	0.37	.43	0.51	0.58	0.52
6013	3		0.45	0.61	0.42	0.48	0.40	.46	0.48	0.53	0.51
6014	4		0.44	0.57	0.39	0.47	0.39	.45	0.46	0.52	0.50
6015	5		0.47	0.54	0.44	0.48	0.45	.47	0.50	0.54	0.54
6016*	6		0.49	0.60	0.47	*	0.49	.52	*	0.63	0.55
6017	7		0.47	0.60	0.43	0.48	0.40	.46	0.49	0.54	*
6018	8		0.45	0.55	0.38	0.44	0.36	.46	0.51	0.54	0.50
6021	Batt 1 Volt	VDC	31.50	30.92	31.11	31.42	30.79	-28.63	-31.00	-28.97	-31.06
6022	2		31.48	30.90	31.09	31.41	30.80	-31.41	-30.97	-30.80	-31.06
6023	3		31.49	30.91	31.10	31.43	30.81	-31.43	-31.00	-30.83	-31.08
6024	4		31.49	30.91	31.10	31.43	30.81	-31.42	-31.00	-30.83	-31.08
6025	5		31.50	30.92	31.11	31.43	30.79	-31.43	-30.99	-30.84	-31.08
6026*	6		31.49	30.90	31.08	28.69	30.80	-31.41	-26.74	-30.81	-31.08
6027	7		31.52	30.94	31.14	31.46	30.83	-31.45	-31.00	-30.87	-28.69
6028	8		31.49	30.92	31.11	31.43	30.81	-31.39	-30.95	-30.83	-31.08
6031	Batt 1 Temp	DGC	21.59	20.93	21.91	21.45	22.67	19.39	22.28	20.12	22.03
6032	2		20.53	20.75	19.90	19.86	20.36	19.54	21.41	20.68	20.65
6033	3		18.80	18.66	17.77	17.43	17.54	16.84	17.58	17.03	17.29
6034	4		20.90	20.88	20.33	20.34	20.43	19.67	20.03	19.76	19.99
6035	5		25.16	22.22	27.18	22.62	30.52	23.13	25.14	25.59	26.19
6036	6		24.37	22.55	27.19	20.42	27.67	23.01	23.09	25.21	24.93
6037	7		24.83	23.26	26.19	22.89	26.95	24.26	26.30	24.49	24.12
6038	8		23.75	22.52	24.36	22.36	24.49	23.56	25.78	22.63	23.26
6040	Rt. Pad Temp	DGC	28.96	26.16	30.90	25.34	26.11	31.84	24.51	26.29	32.81
6041	Rt. Pad VM	VDC	33.72	33.56	32.86	34.00	31.44	33.56	32.66	32.16	32.16
6042	Rt. Pad VN	VDC	33.46	33.18	32.44	33.45	31.27	34.30	32.05	31.73	33.32
6044	Lt. Pad Temp	DGC	25.56	21.16	28.22	22.53	26.41	31.03	24.11	26.53	33.86
6045	Lt. Pad VF	VDC	34.40	33.80	33.82	34.39	33.36	34.38	33.79	33.47	33.64
6046	Lt. Pad VG	VDC	34.48	33.91	33.91	34.48	33.45	34.46	33.85	33.54	33.73
6050	S/C UR Bus V	VDC	31.73	31.14	31.33	31.69	30.93	-31.66	-31.20	-30.99	-31.32
6051	S/C RG Bus V	VDC	24.57	24.57	24.58	24.58	24.57	-24.58	-24.58	-24.57	-24.58
6052	Aux Reg AV	VDC	23.36	23.40	23.44	23.43	23.44	-23.44	-23.44	-23.43	-23.44
6053	Aux Reg BV	VDC	23.37	23.39	23.44	23.44	23.43	-23.44	-23.44	-23.43	23.44
6054	Solar I	Amp	14.81	13.76	13.40	12.37	12.25	11.93	11.67	11.70	11.94
6056	S/C RG Bus J	Amp	7.23	7.17	6.28	5.98	6.41	5.47	*	6.38	5.96
6058	PC Mod T1	DGC	21.67	21.98	20.77	20.49	20.08	18.97	20.44	20.04	20.00
6059	PC Mod T2	DGC	20.44	20.53	19.56	19.39	19.16	18.41	19.19	18.81	18.96
6070	P/L RG Bus V	VDC	24.61	24.60	24.60	24.62	24.59	-24.62	-24.60	-24.60	-24.60
6071	P/L UR Bus V	VDC	31.85	31.21	31.40	31.79	30.97	-31.75	-31.24	-31.05	-31.39
6073	P Aux AV	VDC	23.47	23.51	23.51	23.50	23.50	-23.51	-23.50	-23.50	-23.50
6074	P Aux BV	VDC	23.46	23.51	23.51	23.50	23.50	-23.51	-23.50	-23.50	-23.50
6075	PR Mod T1	DGC	20.84	21.39	20.32	20.21	20.82	19.83	21.22	20.71	20.77
6076	PR Mod T2	DGC	22.13	22.38	21.79	21.72	22.14	21.32	22.38	22.02	22.05
6079	Fuse Blow V	VDC	24.48	24.48	24.49	24.51	24.48	-24.47	-24.48	-24.47	-24.47
6080	Shunt 1 I	Amp	0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6081	2		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6082	3		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6083	4		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6084	5		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6085	6		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6086	7		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6087	8		0.0	0.0	0.00	0.0	0.00	.00	0.00	0.00	0.00
6100	P/L RG Bus I	Amp	0.38	0.80	0.54	0.43	0.40	.49	0.39	0.40	0.40
Total No.	Major Frames	Frm.	396	387	785	384	697	747	751	785	351

*Battery 6 was turned off for a restoration cycle.

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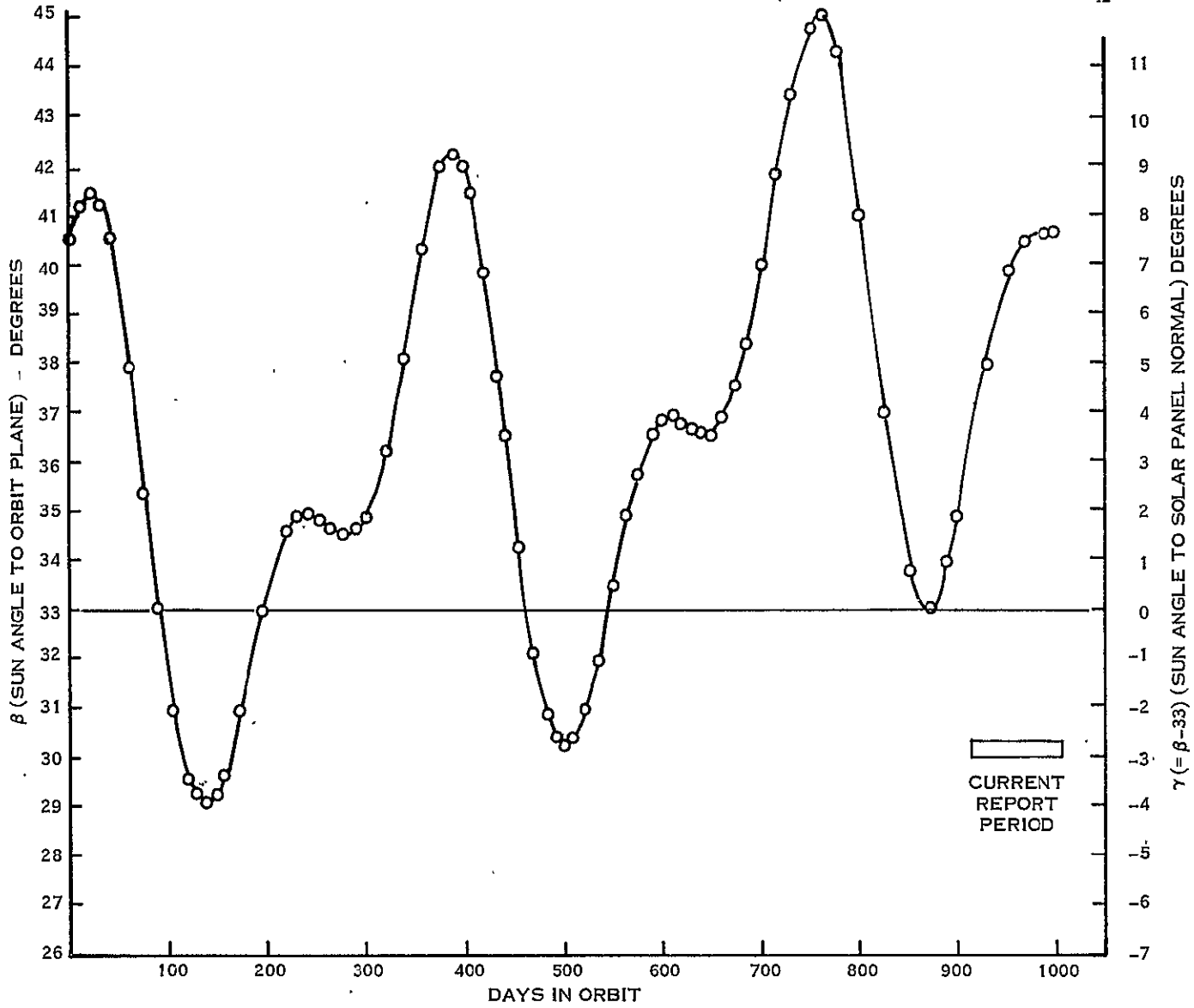


Figure 3-3. Landsat 2 Actual β and α (Paddle) Sun Angles

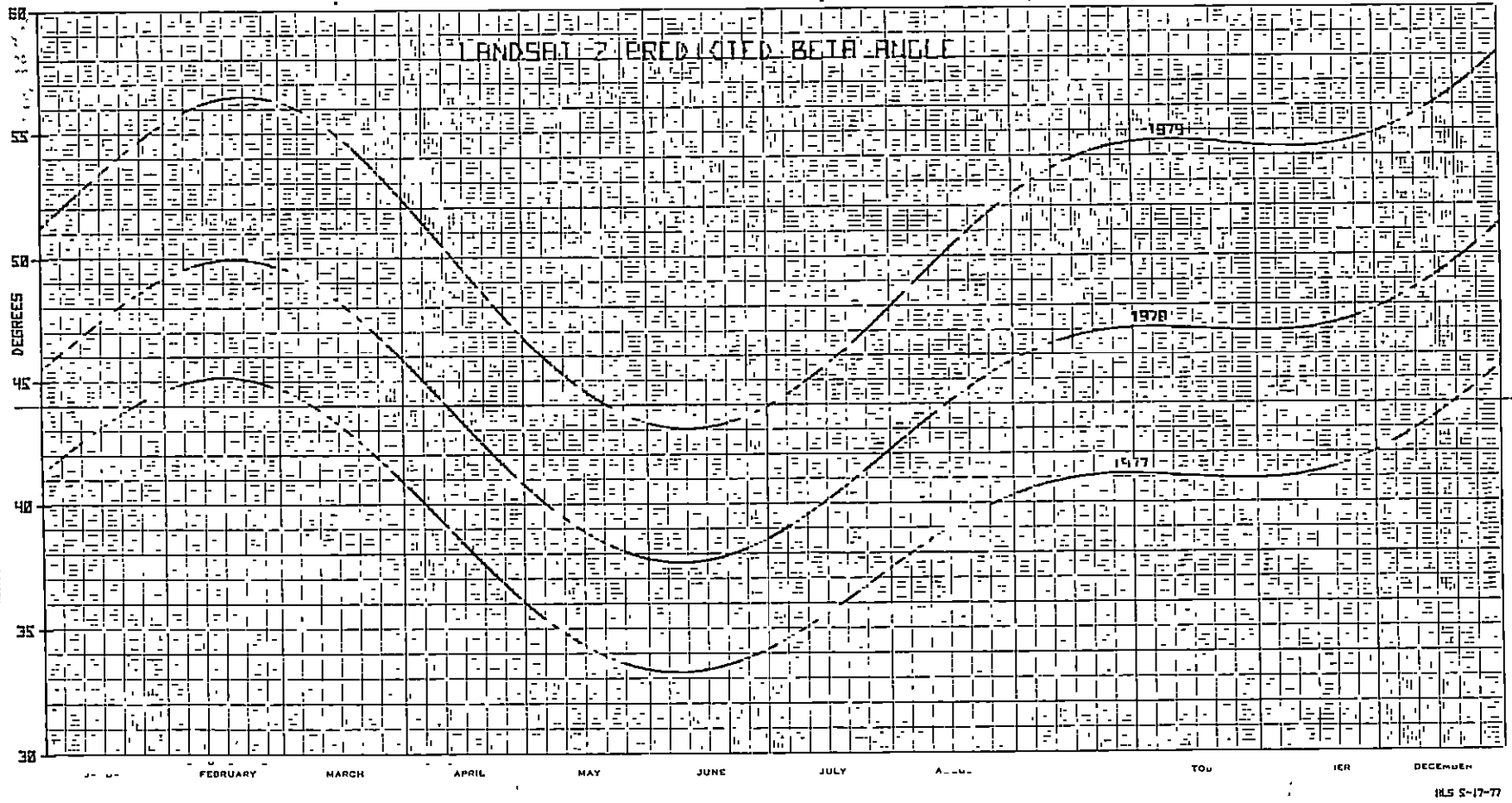


Figure 3-4. Predicted Beta Angle for LS-2 - 1977, 1978, 1979

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			Duration Centered About Satellite Midnight (minutes)	Resulting Average Number of Pitch Gates per Day
From Orbit	To Orbit	Orbit Number				
		N ₀	N ₀ +1	N ₀ +2		
12283 21 June 77	12966 8 Aug 77	+2.0	+2.0	+2.0	50	1 to 2 (+ P)
12967 8 Aug 77	13091 18 Aug 77	+2.0	+2.9	+2.0	50	0
13092 18 Aug 77	13148 22 Aug 77	+2.9	+2.9	+2.9	46	0
13149 22 Aug 77	13444 12 Sept 77	+2.9	+2.9	+2.9	50	3 to 4 (- P)
13445 13 Sept 77	13552 20 Sept 77	+2.9	+2.9	+2.9	48	2 to 3 (- P)
13553 20 Sept 77	13579 22 Sept 77	+2.9	+2.9	+2.9	46	3 to 4 (- P)
13580 22 Sept 77	13651 27 Sept 77	+2.0	+2.0	+2.0	45	1 to 2 (+ P)
13652 27 Sept 77	14018 23 Oct 77	+2.0	+2.9	+2.0	50	2 to 3 (- P)

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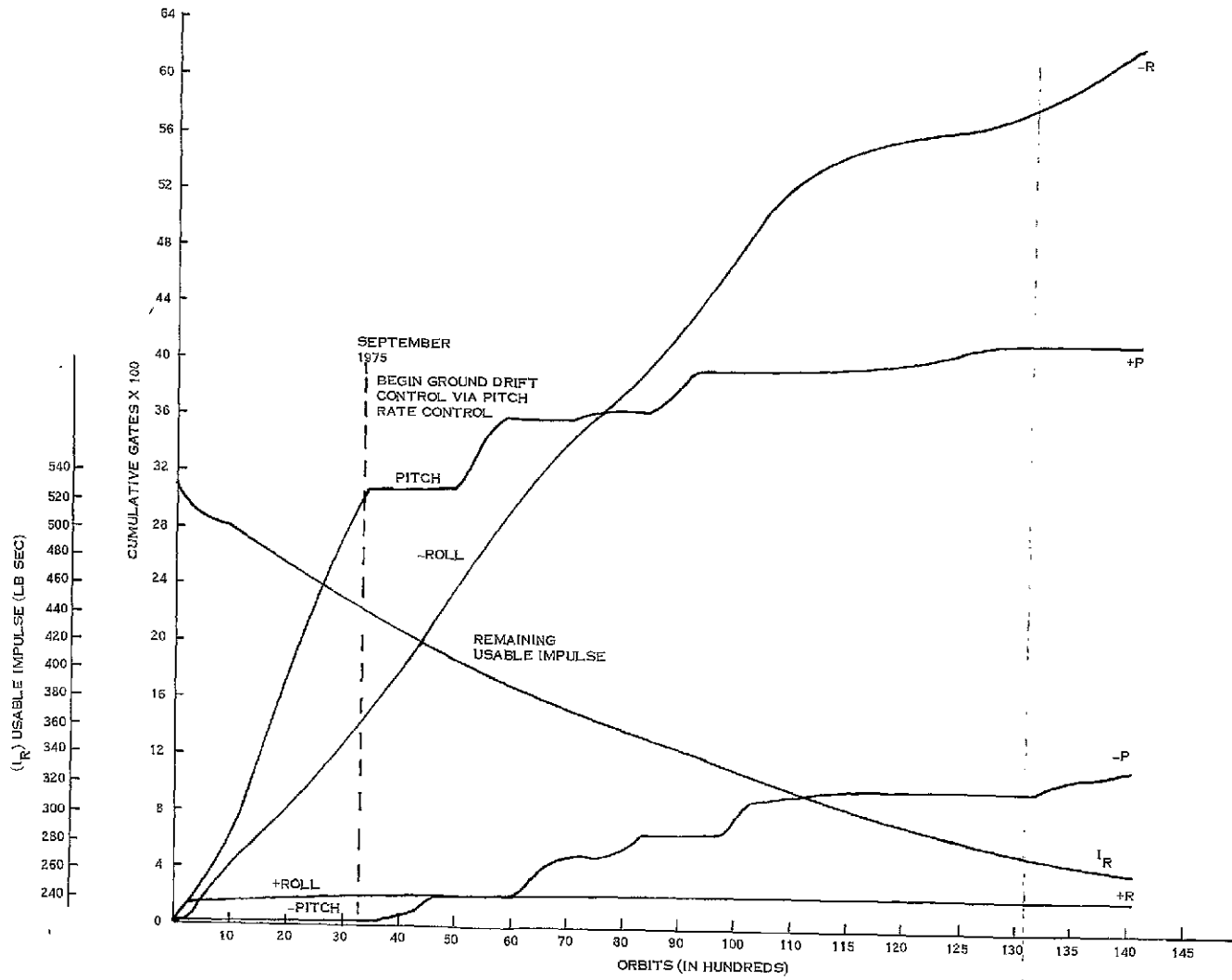
As a result of the ground track drift maintenance program, Freon Usable Impulse declined at a lower rate as shown in Figures 4-1 and 4-2.

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

LS-2

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FOURTH FRAME

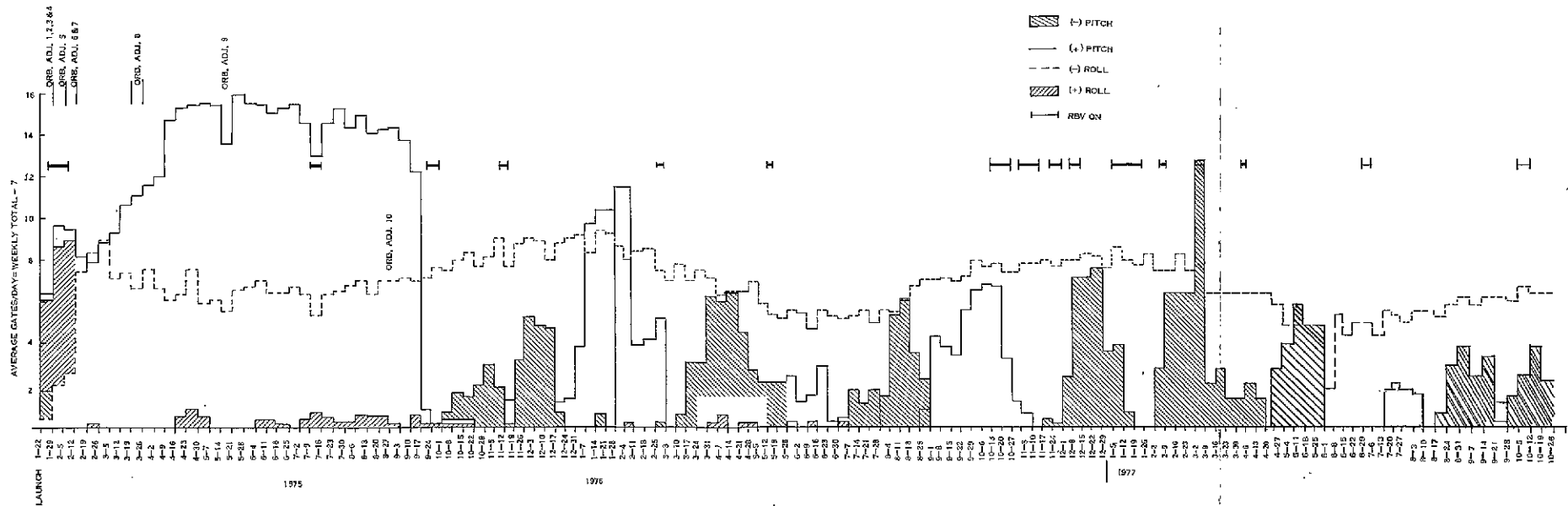


Figure 4-2. Landsat-3 Gating Frequency vs. Time.

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

Function	Units	Orbits								
		29	2532	5102	7641	10191	12720	13150	13590	14016
1084 RMP 1 Gyro Temperature	DGC	19.33 ⁽¹⁾	21.02	22.69	22.45	22.70	22.54	22.04	22.33	23.24
1094 RMP 2 Gyro Temperature	DGC	74.00	74.00	74.26	74.45	74.50	74.67	74.71	74.77	74.93
1222 SAD RT MTR HSNG Temp.	DGC	19.50	22.23	22.98	23.62	22.73	23.43	22.75	22.76	23.83
1242 SAD LT MTR HSNG Temp.	DGC	26.87	27.54	29.79	28.94	30.26	29.30	29.32	29.67	30.59
1223 SAD RT MTR WNDNG Temp.	DGC	21.76	24.23	24.36	25.23	23.72	24.84	24.02	23.90	24.85
1243 SAD LT MTR WNDNG Temp.	DGC	30.23	30.32	32.83	31.68	33.15	31.92	31.93	32.37	33.34
1228 SAD RT HSG Pressure	PSI	7.26	7.25	7.18	7.13	7.00	6.94	6.94	6.94	6.94
1248 SAD LT HSG Pressure	PSI	7.28	7.27	7.21	7.02	6.91	6.73	6.68	6.66	6.66
1007 FWD Scanner MTR Temp.	DGC	22.07	22.25	23.80	23.39	23.97	23.31	23.20	23.35	24.51
1016 Rear Scanner MTR Temp.	DGC	24.19	23.62	25.04	24.59	24.83	24.59	24.46	24.64	25.39
1003 FWD Scanner Pressure	PSI	9.59 ⁽²⁾	D	D	D	D	0.27	0.28	0.27	0.27
1012 Rear Scanner Pressure	PSI	6.21	6.00	5.62	5.35	5.11	4.82	4.82	4.82	4.81
1212 Gas Tank Pressure	PSI	1948.0	1672.12	1517.04	1381.12	1256.98	1134.50	1120.04	1097.50	1085.19
1210 Gas Tank Temperature	DGC	20.66	22.33	24.25	23.75	24.43	24.00	23.77	24.00	25.04
1213 Manifold Pressure	PSI	53.98	54.83	54.56	54.78	55.26	56.00	55.55	55.53	55.54
1211 Manifold Temperature	DGC	19.18	20.50	22.59	21.91	22.78	22.07	21.92	22.26	23.31
1059 CLG Power Supply Card Temp	DGC	39.00	39.52	41.47	40.71	41.81	41.05	40.95	41.29	42.12
1260 TH01 EBP	DGC	24.29	25.01	27.21	26.43	27.58	26.75	26.75	27.05	28.07
1261 TH02 EBP	DGC	20.29	21.36	23.25	22.79	23.48	22.98	22.85	23.12	24.15
1262 TH03 EBP	DGC	18.29	20.05	21.46	21.34	21.29	21.33	21.01	21.11	22.09
1263 TH01 STS	DGC	6.54	-6.22	0.52	-2.62	-1.66	-2.48	-3.01	-1.68	0.27
1264 TH02 STS	DGC	D	D	D	D	D	D	D	D	D
1265 TH03 STS	DGC	8.46	-4.48	8.67	5.75	11.66	7.09	7.57	9.95	13.00
1266 TH04 STS	DGC	-2.78	-9.65	-3.26	-3.63	-0.08	-2.87	-2.85	-1.60	1.41
1267 TH05 STS	DGC	9.62	-2.64	5.57	2.20	4.24	1.98	1.18	3.31	5.76
1224 SAD R FSST	DGC	35.00	36.57	35.81	40.86	34.24	3.71	39.23	39.01	41.77
1244 SAD L FSST	DGC	50.00	46.29	49.13	51.71	55.24	53.20	53.45	54.40	56.49

(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	12720	13150	13590	14016
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	OFF	OFF	0.00	OFF	OFF	OFF
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	OFF	OFF	0.00	OFF	OFF	OFF
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	OFF	OFF	-17.55	OFF	OFF	OFF
1091 RMP 2 MTR Volts	VDC	29.99	29.94	29.92	29.87	29.87	29.91	29.87	29.87	29.87
1092 RMP 2 MTR Current	Amps	0.10	0.10	0.10	0.11	0.10	0.10	0.11	0.11	0.11
1090 RMP 2 Supply Volts	VDC	-23.63	-23.61	-23.59	-23.59	-23.58	-23.59	-23.58	-23.58	-23.58
1220 SAD RT MTR WNDNG Volts	VDC	- 5.47	- 4.51	- 4.47	- 4.22	- 4.09	- 4.20	- 4.19	- 4.14	- 4.19
1240 SAD LT MTR WNDNG Volts	VDC	- 5.08	- 4.70	- 4.72	- 4.54	- 4.57	- 4.65	- 4.60	- 4.62	- 4.54
1227 SAD RT -15 VDC Conv	VDC	15.14	15.15	15.16	15.13	15.15	15.13	15.14	15.13	15.12
1247 SAD LT -15 VDC Conv	VDC	15.23	15.22	15.21	15.20	15.22	15.22	15.22	15.21	15.21
1056 CLB ± 6 VDC	TMV	2.35	2.35	2.38	2.38	2.40	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	2.94
1057 CLB Power Supply Volts	TMV	2.97	2.94	2.96	2.96	2.97	2.96	2.97	2.97	2.97

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

Function	Units	Orbit								
		26	2532	5102	7641	10191	12720	13150	13590	14016
1041 Pitch Fine Error	DEG	- 0.15	- 0.14	- 0.13	- 1.48*	- 0.82	- 1.37	- 1.14*	- 1.14*	- 1.57*
1043 Pitch Flywheel Speed	RPM	-156.12	-198.41	-162.97	214.14	3.39	-157.35	165.61	48.44	107.58
1038 Pitch Mtr Drvr CCW	PCT	6.64	7.35	6.05	4.24	4.33	7.77	4.49	3.49	2.14
1039 Pitch Mtr Drvr CW	PCT	2.03	2.60	1.80	8.51	3.87	0.04	8.31	5.57	5.24
1030 Roll Fine Error	DEG	- 0.13	- 0.09	- 0.14	- 0.14	- 0.21	- 0.18	- 0.20	- 0.17	- 0.16
1027 Roll Rear Flywheel SPD	RPM	729.30	739.75	748.56	742.88	792.27	785.40	772.79	743.54	737.58
1026 Roll Fwd Flywheel SPD	RPM	703.02	725.23	735.81	721.03	737.44	756.66	749.20	725.13	713.07
1022 Roll Rear Mtr Drvr CCW	PCT	0.67	0.39	0.63	0.41	0.87	0.66	0.66	0.91	0.06
1025 Roll Rear Mtr Drvr CW	PCT	7.54	5.47	6.34	6.80	6.09	7.57	7.90	6.65	5.40
1023 Roll Fwd Mtr Drvr CCW	PCT	0.70	0.37	0.87	0.68	0.72	0.70	0.98	0.94	0.37
1024 Roll Fwd Mtr Drvr CW	PCT	5.46	4.74	4.01	3.82	4.34	3.71	3.93	3.95	3.06
1035 Yaw Tach	RPM	- 95.73	- 41.57	-38.16	- 11.03	-163.04	-108.28	- 40.25	- 79.84	- 77.31
1033 Yaw Mtr Drvr CW	PCT	1.98	1.77	2.01	1.76	1.91	2.10	2.27	2.01	1.13
1034 Yaw Mtr Drvr CCW	PCT	2.10	1.72	1.90	1.64	2.49	2.13	2.15	2.10	1.27
1221 SAD Right Tach	D/M	3.38	3.38	3.38	3.38	3.37	3.36	3.35	3.37	3.41
1241 SAD Left Tach	D/M	3.68	3.63	3.56	3.55	3.48	3.56	3.55	3.52	3.48

*Pitch Pos. Bias Implemented During This Orbit

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, 14,197 seconds faster in 33 months; and Figure 5-3 gives drift rate of S/C clock, an average of 1,013 msec fast per orbit. In this period, the drift rate is increasing and is at the average rate of 1,282 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.

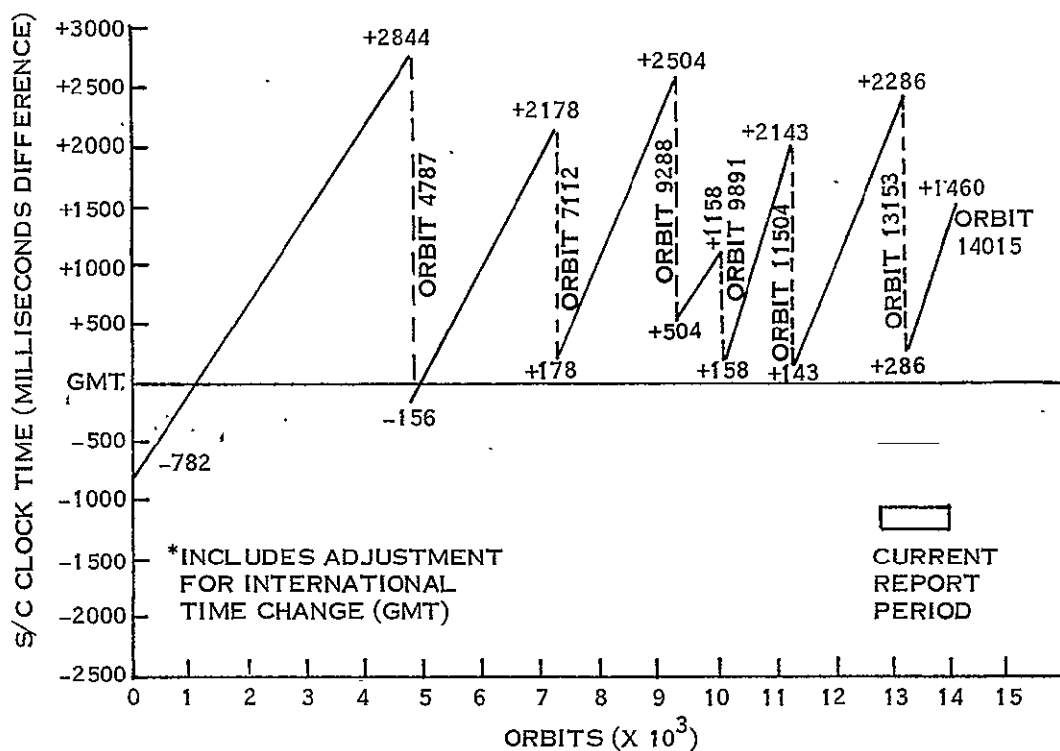


Figure 5-1. Landsat-2 Drift History

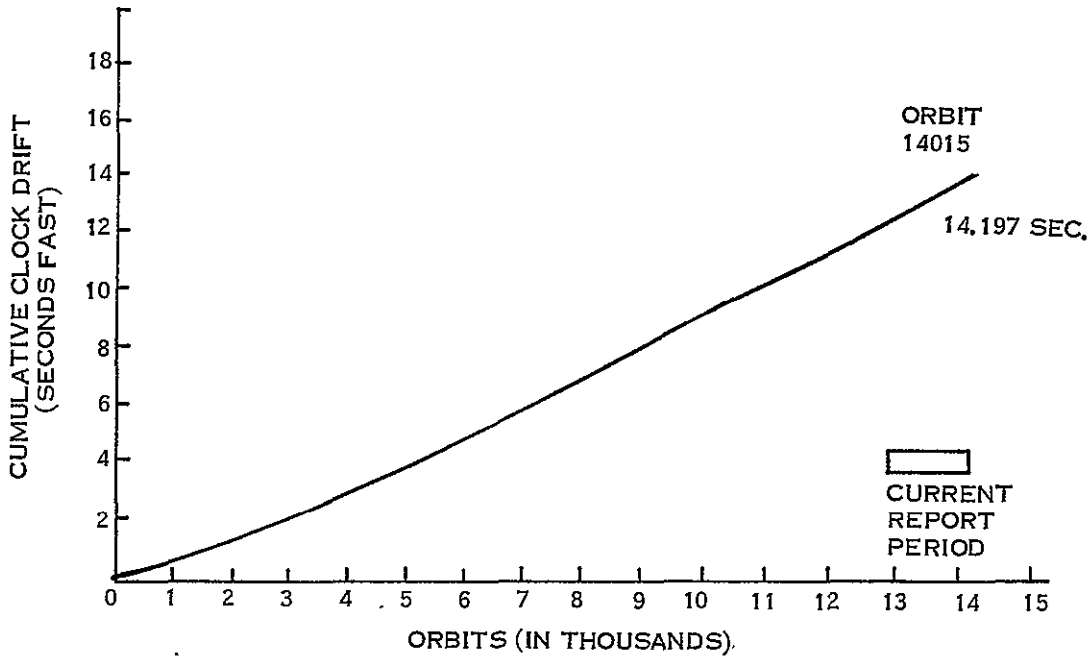


Figure 5-2. Cumulative Clock Drift

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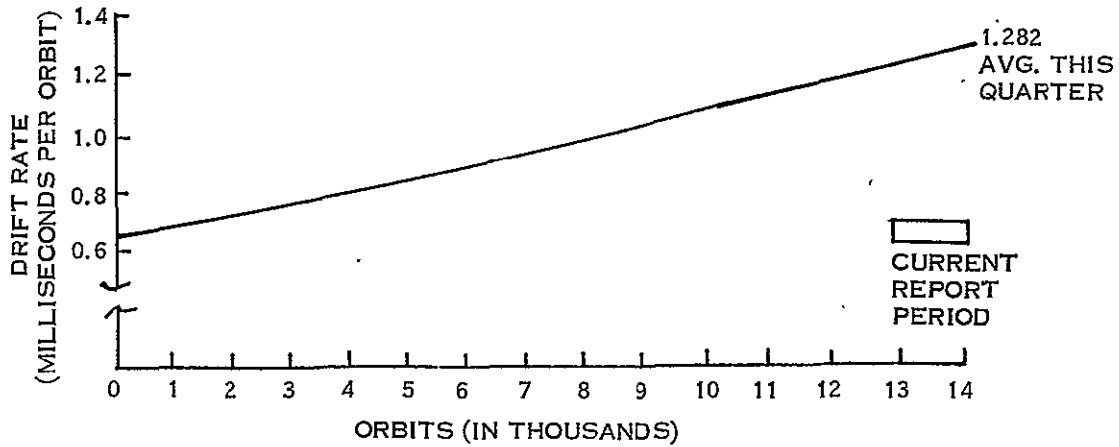


Figure 5-3. Drift Rate of S/C Clock

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

Function No.	Name	Mode	Orbit									
			Units	35	2462	5091	7640	10,192	12720	13150	13590	14015
8005	Pri. Power Supply Temp	-	DGC	38.82	40.43	39.43	39.94	39.08	39.15	38.95	38.42	39.08
8006	Ped. Power Supply Temp	-	DGC	36.93	38.70	38.00	38.52	37.85	38.03	37.79	37.33	37.89
8007	Pri. Osc. Temp	-	DGC	28.70	29.35	28.70	28.69	28.56	27.92	27.99	27.33	28.11
8008	Red Osc. Temp	-	DGC	27.82	28.68	27.26	27.60	26.97	26.95	26.95	26.51	26.96
8009	Pri. Osc. Output	-	TMV	1.06	1.06	1.05	1.05	1.05	1.05	1.06	1.05	1.05
8010	Red. Osc. Output	-	TMV	1.17	1.20	1.18	1.19	1.18	1.18	1.18	1.18	1.18
8011	100 KHz	Pri. - Red	TMV	3.17	3.16	3.15	3.15	3.15	3.15	3.16	3.15	3.15
8012	10 KHz	Pri. - Red	TMV	3.08	3.05	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	2.95	2.95	2.95
8014	400 Hz	Pri. - Red	TMV	4.17	4.45	4.45	4.45	4.45	4.45	4.45	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	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	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	2.30
8018	Red. +6V Power Supply	Red Clk ON	VDC	NA	2.31	2.30	2.30	2.30	2.30	2.31	2.30	2.30
8019	Pri. -6V Power Supply	Pri. Clk ON	VDC	NA	5.23	5.23	5.22	5.23	5.23	5.23	5.23	5.23
8020	Red. -6V Power Supply	Red. Clk ON	VDC	NA	5.23	5.23	5.23	5.23	5.23	5.23	5.23	5.23
8021	Pri. -23V Power Supply	Pri. Clk ON	VDC	NA	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
8022	Red -23V Power Supply	Red Clk ON	VDC	NA	5.65	5.65	5.65	5.65	5.65	5.66	5.65	5.65
8023	Pri. -29V Power Supply	Pri. Clk ON	VDC	NA	5.30	5.29	5.29	5.29	5.30	5.30	5.30	5.30
8024	Red -29V Power Supply	Red Clk ON	VDC	NA	5.29	5.29	5.29	5.28	5.29	5.29	5.29	5.29
8101	CIU A - 12V	CIU A ON	VDC	3.79	3.97	3.97	3.96	3.96	3.96	3.96	3.97	3.97
8102	CIU B - 12V	CIU B ON	VDC	3.78	3.95	3.95	3.95	3.95	3.95	3.95	3.95	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	4.14
8104	CIU B - 5V	CIU B ON	VDC	3.90	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
8105	CIU A Temp	CIU A ON	DGC	26.01	22.50	21.67	21.62	21.67	21.06	21.17	20.91	21.34
8106	CIU B Temp	CIU B ON	DGC	23.35	20.38	19.70	19.65	19.71	19.20	19.28	19.04	19.43
8201	Receiver RF-A Temp	-	DGC	NA	30.02	29.14	29.22	28.83	28.50	28.61	28.16	28.65
8202	Receiver RF-B Temp	-	DGC	29.09	*	*	24.04	22.66	22.36	22.44	21.87	22.49
8203	D MOD A Output	-	DGC	28.95	39.20	38.56	39.08	38.25	37.98	38.09	37.78	38.17
8204	D MOD B Output	-	DGC	37.73	27.56	26.72	28.11	26.31	25.96	26.08	25.54	26.16
8205	Receiver A AGC	Receiver A ON	DGC	*	-92.18	-91.43	-89.93	-90.78	-93.39	-91.97	-89.10	-91.82
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	2.35	2.58	2.59	2.46
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	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	1.13	1.13
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	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	5.40
8218	Regulator B - 10V	Receiver B ON	TMV	5.32	*	*	5.31	*	*	*	*	*
8311	ECAM Mem. Temp	ECAM ON	DGC	NA	18.03	18.41	18.10	18.44	18.04	18.43	17.60	18.38
8312	ECAM Pwr Sply Temp	ECAM ON	DGC	NA	23.13	23.13	22.45	23.00	22.35	23.03	21.86	22.91

NA - Not available due to processing problem - MIT 710

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SECTION 6
TELEMETRY SUBSYSTEM (TLM)
LANDSAT-2

SECTION 6

TELEMETRY SUBSYSTEM (TLM)

The TLM has operated nominally in this report period.

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

The memory section of the telemetry matrix remains in the 0.0 mode.

Table 6-1. Landsat-2 TMP Telemetry Values

Func. No.	Function Name	Unit	Orbit							
			35	2467	5091	7641	10,192	13,150	13,561	14,015
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	21.34	21.13	19.04	21.10
9004	Formatter A Converter	VDC	4.52	4.51	4.52	4.50	4.52	4.52	4.50	4.52
9005	Formater B Converter	VDC	**	**	**	**	**	**	**	**
9006	Dig. Mux A Converter	VDC	4.22	4.22	4.22	4.21	4.22	4.22	4.21	4.22
9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**	**
9008	Formatter/Dig Mux Temp	°C	25.00	23.98	27.80	22.51	29.75	26.15	24.32	27.17
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	4.04	4.03	4.04
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	26.99	24.69	27.15
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	25.47	22.77	22.11	22.52
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	17.17	16.43	17.13
9019	Memory B Converter	VDC	**	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.50	17.28	17.41	17.45	17.50	17.49	16.21	17.17
9100	Reflected Power (Xmtr A)	dBm	18.29	13.68	14.18	13.88	14.53	14.07	14.02	14.17
9101	Xmtr A-20 VDC	VDC	3.80	3.98	3.97	3.97	3.98	3.97	3.97	3.97
9102	Xmtr B-20 VDC	VDC	**	**	**	**	**	**	**	**
9103	Xmtr A Temp	°C	27.73	20.97	26.40	21.06	30.37	24.00	21.69	25.69
9104	Xmtr B Temp	°C	*	22.07	27.74	22.13	31.74	25.21	22.75	27.06
9105	Xmtr A Power Output	dBm	27.73	26.19	26.29	26.19	26.41	26.32	26.23	26.36
9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**	**

*Not available due to software

**Not turned on since Prelaunch

SECTION 7
ORBIT ADJUST SUBSYSTEM (OAS)
LANDSAT-2

SECTION 7
ORBIT ADJUST SUBSYSTEM (OAS)

The Orbit Adjust Subsystem on Landsat-2 has been fired ten times since launch, 6 times using the -X thruster and 4 times using the +X thruster. One firing of the -X and +X thruster each was for alignment test. Three +X firings and two -X firings were made to phase the satellite with Landsat-1 to obtain a combined nine day ground track repeat pattern. Three -X firings were for orbit maintenance.

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

The Subsystem activity since launch is summarized in Table 7-1. A total of 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)	+Δa (Meters)	Engine Performance Efficiency %	Fuel ¹ Used (Lbs)	Tank Pressure (PSIA)	Tank Temperature (°F)	Thruster Axis
32	1	25 Jan 75 00 34 00.8	4.8	39	104.3	0.02	539.96	72.0	-X
71	2	27 Jan 75 19 57 00.8	4.8	- 36	90.1	0.02	547.46	73.5	+X
79	3	28 Jan 75 09 49 00.8	420.0	3455	107.0	1.62	547.46	73.5	-X
86	4	28 Jan 75 21 13 00.8	420.0	3233	107.0	1.51	502.46	73.5	-X
163	5	3 Feb 75 10 36 00.8	420.0	-2974	97.0	1.42	468.75	75.0	+X
191	6	5 Feb 75 10 15 00.8	360.0	-2421	97.5	1.15	438.71	75.0	+X
212	7	6 Feb 75 22 31 00.8	308.8	-2009	98.6	0.95	416.21	75.0	+X
880	8	26 Mar 75 21 44 00.8	12.8	82	107.6	0.04	397.47	70.5	-X
1632	9	19 May 75 18 54 00.8	24.0	+ 154	107.6	0.07	401.21	73.5	-X
2958	10	22 Aug 75	22.0	146	110.3	0.07	404.96	73.5	-X

¹Initial Fuel Capacity - 67 lbs.

Table 7-2. Landsat-2 OAS Telemetry Values

Function No.	Name	Units	Orbit							
			50	2532	5102	7641	10191	13150	13590	14016
2001	Prop. Tank Temp.	°C	23.03	23.05	23.89	22.22	23.05	21.80	21.80	22.22
2003	Thrust Chamber No. 1 (-X) Temp.*	°C	24.84	30.14	25.12	28.57	21.75	24.54	23.87	24.16
2004	Thrust Chamber No. 2 (+X) Temp.*	°C	37.34	38.41	38.55	39.29	37.60	36.83	36.22	38.78
2005	Thrust Chamber No. 3 (-Y) Temp.*	°C	47.22	34.20	46.35	34.82	49.78	41.40	43.50	44.55
2006	Line Pressure	psia	545.60	404.97	413.25	415.39	419.94	421.73	422.14	425.01

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

SECTION 8
MAGNETIC MOMENT COMPENSATING ASSEMBLY (MMCA)
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	12721	13150	13590	14016
4001	A1 Board Temp	°C	20.56	19.82	19.47	19.20	19.12	18.79	18.87	18.43	18.91
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	3.40
4004	Yaw Flux Density	TMV	3.05	3.07	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	2.90
4006	Roll Flux Density	TMV	2.99	2.98	2.97	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.

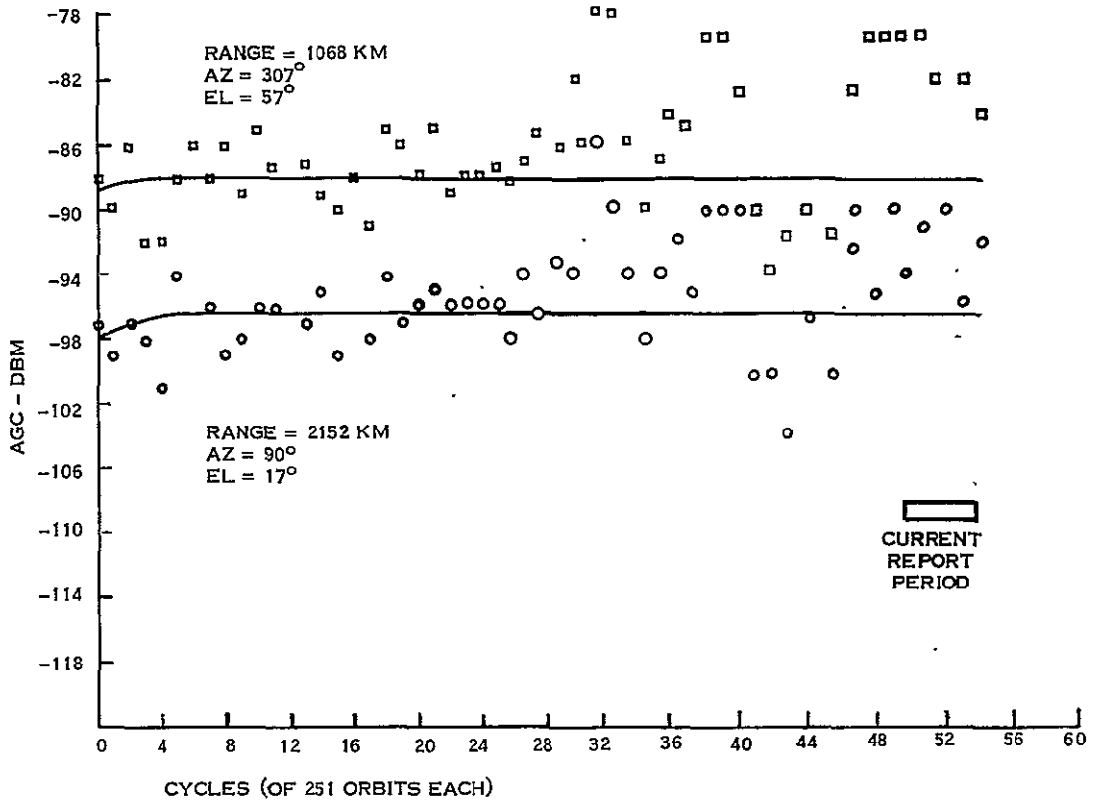


Figure 9-1. USB (Link 4) AGC Readings at Goldstone with 30' Antenna - Landsat-2

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

No.	Function Name	Units	T/V (20°C)	Orbits								
				15	2462	5091	7641	10641	12720	13150	13590	14014
11001	USB Rcvr AGC	DBM	NA	-112.72	-128.8	-124.29	-122.37	-124.85	-131.50	-126.45	-125.31	-125.53
11002	USB Xmtr Pwr	WTS	1.40	1.36	1.43	1.38	1.37	1.39	1.37	1.38	1.36	1.38
11003	USB Rcvr Error	KHz	- 2.15	- 2.15	- 4.64	- 2.97	- 4.30	- 3.43	- 4.09	- 4.58	- 6.34	- 5.29
11004	USB Xpond Temp	DGC	22.93	25.88	24.37	27.49	24.12	29.06	24.63	26.87	27.15	27.48
11005	USB Xpond Press	PSI	16.99	17.08	16.74	16.49	15.94	15.96	15.62	15.71	15.69	15.70
11007	USB Xmtr A -15V	VDC	2.35	2.36	F	F	F	F	F	F	F	F
11008	USB Xmtr B -15V	VDC	2.39	F	2.40	2.42	2.39	2.39	2.41	2.39	2.39	2.39
11009	USB Range -15V	VDC	2.07	2.07	2.07	2.06	2.05	2.06	2.05	2.06	2.05	2.06
11101	PMP Pwr A Volt	VDC	-15.22	- 15.10	F	F	F	F	F	F	F	F
11102	PMP Pwr B Volt	VDC	-15.07	F	- 15.02	- 14.99	- 14.99	- 14.99	- 15.01	- 14.92	- 14.96	- 14.98
11103	PMP Temp A	DGC	N/A	37.30	29.12	34.67	28.38	37.49	29.59	32.37	33.45	34.05
11104	PMP Temp B	DGC	N/A	28.34	30.57	36.08	29.62	38.64	30.90	34.34	35.09	35.62

F = Unit OFF

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, and is nominal.

Table 10-1. Landsat-2 APU Telemetry Functions

Function	Description	Unit	Orbit								
			21	2532	5102	7641	10192	12720	13150	13590	14014
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	2.45
13202	APU Temp	DGC	27.44	26.60	27.70	26.21	28.78	26.20	26.94	27.21	27.62

*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 33 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 0.969 to 1.010 times the mean value and the average spacecraft temperatures increased.

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

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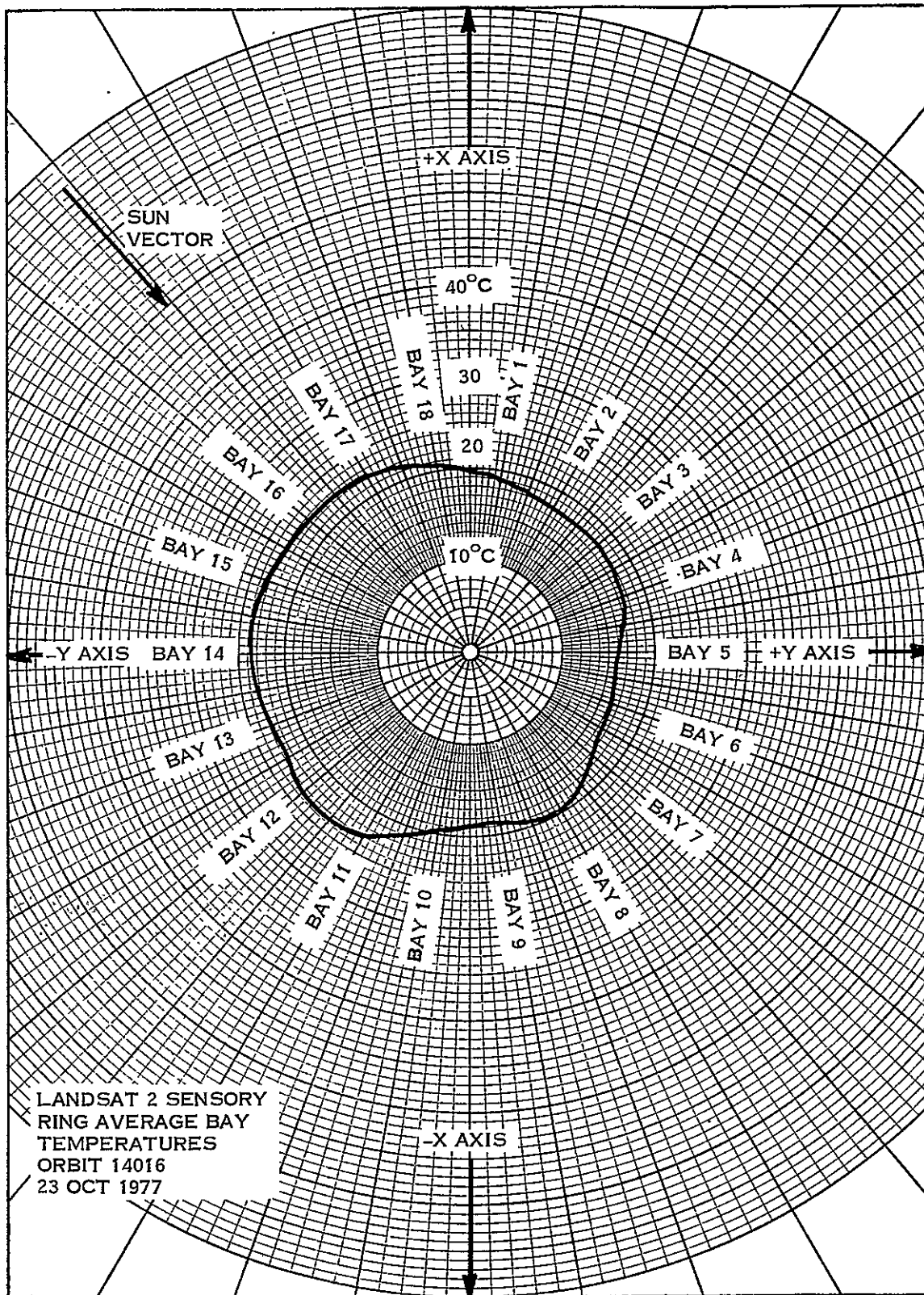


Figure 11-1. Landsat-2 Sensory Ring Thermal Profile

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	2532	5102	7641	10192	12720	13150	13590	14016
7001	THM TH01 STI	DGC	19.40	19.59	19.97	18.63	19.59	18.17	19.53	18.44	19.18
7002	THM TH02 SBO	DGC	17.18	18.05	17.47	17.21	17.65	17.28	18.10	17.37	17.65
7003	THM TH03 STI	DGC	18.73	19.49	18.50	17.73	18.65	17.95	19.01	18.02	18.33
7004	THM TH10 TCB	DGC	19.38	19.01	19.34	18.64	19.94	18.22	18.63	18.70	18.97
7005	THM TH04 STI	DGC	17.19	17.92	16.76	16.30	17.37	16.83	17.74	16.82	17.10
7006	THM TH05 SBO	DGC	17.42	17.46	16.68	16.52	16.65	16.41	16.78	16.23	16.49
7007	OA-X Thruster	DGC	19.66	20.56	19.65	20.02	19.44	19.30	19.15	18.84	19.30
7008	THM TH06-STO	DGC	14.78	14.77	13.94	13.78	13.57	13.39	13.52	12.97	13.45
7009	THM TH06 SBI	DGC	19.18	19.18	18.41	18.06	18.10	17.64	17.89	17.18	17.77
7010	THM TH07 STI	DGC	18.08	18.26	17.44	17.56	17.11	16.62	16.84	16.25	16.72
7011	THM TH08 STO	DGC	19.34	20.22	19.23	19.74	19.00	18.98	18.84	18.42	18.92
7012	THM TH09 SBI	DGC	21.44	21.80	20.93	20.68	20.94	20.12	20.28	19.99	20.43
7013	THM TH10 SBO	DGC	18.58	18.56	18.39	18.05	18.59	17.72	17.83	17.73	18.13
7014	THM TH11 STI	DGC	21.65	21.13	21.93	20.61	22.75	20.26	20.97	21.06	21.37
7015	THM TH12 SBO	DGC	23.93	22.13	24.68	21.83	26.86	22.23	23.42	24.02	24.46
7016	THM TH13 STI	DGC	22.21	20.51	23.62	20.24	25.73	20.41	22.05	22.63	22.84
7017	RBV Beam Ctr Ln	DGC	20.38	20.33	19.92	19.09	20.16	18.58	18.97	18.83	19.22
7018	THM TH14 STO	DGC	24.12	21.29	26.43	21.40	29.64	22.11	24.13	25.07	25.66
7019	NBR Rad Outfd B4	DGC	2.72	3.26	2.93	2.31	2.44	1.89	2.01	1.72	2.14
7020	THM TH15 SBI	DGC	23.07	21.13	25.56	20.11	27.07	21.20	22.74	23.53	24.09
7021	THM TH16 STI	DGC	23.26	22.29	25.46	21.07	25.87	21.71	23.20	23.10	23.53
7022	THM TH17 SBI	DGC	21.77	21.22	23.74	20.21	23.75	21.00	22.67	21.48	22.09
7023	THM TH18 SBO	DGC	21.67	21.45	23.36	21.30	23.69	21.57	23.49	21.67	22.77
7030	THM TH03 Bur	DGC	15.50	16.28	15.14	15.21	15.59	15.48	16.16	15.50	15.60
7033	THM TH12 Bur	DGC	23.05	21.70	24.59	21.44	27.14	21.99	23.55	24.19	24.47
7035	THM TH18 Bur	DGC	19.53	19.32	20.39	19.05	20.20	18.51	19.82	18.99	19.66
7040	THM TH01 TCB	DGC	19.42	19.78	19.72	18.82	19.96	18.82	19.99	18.99	19.70
7041	THM TH02 TCB	DGC	17.55	18.02	17.39	17.06	17.42	17.06	17.89	17.17	17.40
7042	THM TH03 TCB	DGC	16.85	18.23	16.32	16.37	18.04	17.78	19.11	17.94	17.95
7043	THM TH04 TCB	DGC	19.90	20.05	19.33	19.21	19.65	19.34	19.85	19.30	19.48
7044	THM TH05 TCB	DGC	16.42	16.21	15.75	15.47	15.44	15.20	15.44	14.93	15.29
7045	THM TH07 TCB	DGC	17.76	18.12	17.33	17.64	17.01	16.78	16.88	16.33	16.82
7046	THM TH09 TCB	DGC	19.30	19.31	18.81	18.83	18.82	18.32	18.41	18.17	18.48
7048	THM TH11 TCB	DGC	23.27	22.45	23.74	22.07	24.99	22.08	22.87	23.10	23.41
7049	THM TH12 TCB	DGC	23.04	20.62	23.94	20.34	26.83	20.88	22.76	23.50	23.65
7050	THM TH13 TCB	DGC	22.89	20.34	24.67	20.46	27.61	20.77	22.82	23.66	24.03
7051	THM TH14 TCB	DGC	25.07	22.11	27.69	22.22	31.17	22.99	25.00	25.88	26.65
7052	THM TH16 TCB	DGC	22.22	21.59	24.29	20.64	25.62	21.97	23.83	22.80	23.39
7053	THM TH17 TCB	DGC	23.52	22.79	24.86	22.53	25.00	23.64	25.66	22.96	23.78
7054	THM TH18 TCB	DGC	20.01	20.05	20.99	20.27	21.41	18.93	21.10	19.29	20.98
7060	THM Shutter By 1	DEG	22.54	24.43	26.65	15.42	27.36	14.94	26.74	16.33	24.30
7061	THM Shutter By 2	DEG	19.34	24.75	21.13	17.50	17.89	17.34	21.00	12.96	19.15
7062	THM Shutter By 3	DEG	22.75	31.67	11.99	12.70	28.91	26.94	35.41	26.96	28.38
7063	THM Shutter By 4	DEG	33.89	36.32	33.00	33.02	32.90	33.22	33.96	29.33	33.57
7064	THM Shutter By 5	DEG	7.50	8.67	2.90	2.88	2.42	1.87	1.98	1.81	1.81
7065	THM Shutter By 7	DEG	17.06	22.52	14.11	18.98	8.88	8.18	6.95	4.23	6.89
7067	THM Shutter By 9	DEG	33.75	38.22	34.12	33.75	33.70	31.46	31.40	31.43	31.50
7068	THM Shutter By 10	DEG	37.46	34.96	37.09	33.32	40.64	30.67	33.90	33.79	35.14
7069	THM Shutter By 11	DEG	52.25	10.16	17.39	3.29	22.81	0.04	4.08	17.03	13.26
7070	THM Shutter By 12	DEG	61.38	46.20	67.46	45.57	80.70	48.06	61.05	66.42	66.78
7071	THM Shutter By 13	DEG	63.60	45.76	74.14	47.85	81.89	49.06	64.01	68.54	70.66
7072	THM Shutter By 14	DEG	59.44	40.40	72.14	40.22	72.91	44.59	55.81	61.45	66.23
7073	THM Shutter By 15	DEG	67.79	53.78	82.12	48.88	83.87	59.18	67.77	75.80	78.65
7074	THM Shutter By 16	DEG	45.20	43.68	61.13	36.55	68.30	46.48	57.44	48.94	55.84
7075	THM Shutter By 17	DEG	57.88	52.10	67.62	50.12	68.67	58.64	73.57	53.32	59.19
7076	THM Shutter By 18	DEG	40.49	39.32	45.84	40.47	47.49	32.22	45.77	35.04	45.04
7080	THM Q1 T Zener V	VDC	4.85	4.85	4.85	4.85	4.85	4.85	4.86	4.85	4.85
7081	THM Q2 T Zener V	VDC	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
7082	THM Q3 T Zener V	VDC	5.05	5.04	5.05	5.04	5.04	5.03	5.04	5.03	5.03
7083	THM Q1 S Zener V	VDC	4.97	4.96	4.96	4.95	4.96	4.95	4.96	4.95	4.95
7084	THM Q2 S Zener V	VDC	4.98	4.98	4.99	4.98	4.98	4.98	4.98	4.98	4.98
7085	THM Q3 S Zener V	VDC	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15
7090	THM PSM Mount	DGC	21.02	21.05	21.71	19.63	21.28	19.10	19.61	19.61	20.18
7091	THM Ind Attitude	DGC	17.79	17.86	17.24	16.55	16.95	16.20	16.44	15.96	16.41
7092	THM RBV Radiator	DGC	18.01	18.06	16.24	14.46	16.71	14.53	14.96	15.05	15.70
7093	THM RBVC Ctr Bm	DGC	20.74	20.82	19.31	17.95	19.44	17.58	18.09	17.93	18.43
7094	THM WBVTR Root	DGC	13.77	14.71	15.72	11.86	13.90	12.06	12.95	12.35	13.04
7095	THM WBVTR Rad Ctr	DGC	3.64	4.99	5.55	3.24	4.45	3.43	3.97	3.56	4.17
7096	THM WBVTR Strap	DGC	15.90	16.95	17.63	13.48	15.29	13.59	14.62	13.86	14.51
7097	THM WB Mat Bay 1	DGC	22.91	22.60	22.49	21.29	16.47	15.29	16.60	15.91	15.97
7098	THM WB Mat Bay 2	DGC	22.07	19.25	20.14	18.71	16.20	14.79	16.27	15.93	15.67
7099	THM WBVTR Sep 3	DGC	18.03	18.76	18.12	16.69	17.79	16.93	18.00	17.05	17.46
7100	THM WBVTR Sep 17	DGC	21.83	21.55	23.51	19.96	22.98	20.39	21.97	20.82	21.42
7101	THM WBVTR 1 Cent	DGC	22.45	23.13	23.78	18.59	20.33	18.56	19.90	18.86	19.49
7102	THM WBVTR 2 Bay	DGC	17.34	17.69	17.29	16.15	17.04	16.12	16.85	16.12	16.52
7103	THM WBVTR 2 Bay 15	DGC	21.77	20.99	23.87	19.11	23.50	19.50	20.85	20.93	21.30
7104	THM WBVTR 2 Ctr	DGC	20.74	21.08	22.34	17.73	19.94	17.56	18.58	18.26	18.59
7105	THM NBTR B Sep 6	DGC	17.82	17.95	17.86	16.61	17.29	16.14	16.61	16.03	16.63
7106	THM NBTR B Sep 1	DGC	22.11	20.70	23.85	19.82	24.92	19.97	21.47	21.87	22.26
7107	THM NBTR Bm Ctr	DGC	20.32	20.44	21.21	18.38	20.59	18.30	18.95	18.69	19.29
7108	THM MSS Mount 14	DGC	20.59	19.40	22.86	18.20	23.83	18.86	20.41	20.60	21.19
7109	THM OA - Y Thruster	DGC	25.64	21.99	27.51	21.88	29.91	22.63	24.68	25.54	26.16
7110	THM MSS WBVTR Bm	DGC	16.75	17.54	18.21	14.97	16.84	15.07	15.90	15.22	15.98
7111	THM OA +X Thruster	DGC	20.33	19.72	20.43	19.28	17.54	16.41	17.67	17.01	17.31
7130	THM Aux P1 T	DGC	34.18	6.21	29.67	8.42	12.01	9.38	2.88	8.24	11.01
7131	THM Aux P2 T	DGC	2.90	2.22	6.97	22.95	26.16	6.23	3.41	21.83	27.34

Table 11-2. Landsat-2 Compensation Load History

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

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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	12664	11532	493	12171
B	12664	11532	493	12171

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	266.12	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	21.87	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

SECTION 13
WIDEBAND TELEMETRY SUBSYSTEM (WBTS)
LANDSAT-2

SECTION 13
 WIDEBAND TELEMETRY SUBSYSTEM (WBTS)
 LANDSAT-2

The WBTS has operated nominally in this report period.

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

Figure 13-1 is the AGC history recorded at Goldstone with the spacecraft successively at the same 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	12340	13150	13590	13951
12001	Temp TWT Coll. (DGC)	33.6	34.38	35.00	F	35.63	20.00	19.46	19.35	18.86	18.75
12101		31.2	30.00	37.14	32.16	26.69	18.40	21.40	21.16	19.08	18.03
12002	Cur. Helix (MA)	3.85	4.29	4.51	F	4.06	F	3.49	F	F	F
12102		4.58	4.41	4.48	4.59	4.63	4.61	4.71	4.68	4.57	4.73
12003	Cur. Cath (MA)	46.10	46.04	45.12	F	45.05	F	40.44	F	F	F
12103		46.78	46.42	45.24	46.00	44.66	44.07	44.91	44.78	44.48	44.45
12004	Fwd. Pwr. (DBM)	42.68	42.83	42.77	F	42.78	F	42.48	F	F	F
12104		43.71	43.81	43.69	43.61	43.56	43.51	43.64	43.61	43.52	43.60
12005	Refl. Pwr (DBM)	27.0	26.50	26.10	F	25.85	F	25.32	F	F	F
12105		36.45	37.50	37.14	37.08	36.50	36.90	37.23	37.11	36.70	36.45
12227	Mod A Volt Loop Stress (MHz)	1.54	2.14	1.12	F	1.60	1.60	1.39	1.22	1.01	1.28
12228	Mod B Loop Stress (MHz)	2.53	1.51	-0.01	-0.22	0.41	0.28	-0.10	-0.27	-0.52	-0.27
12229	Temp. Mod (DGC)	19.5	18.51	20.88	17.97	17.71	17.41	19.33	20.00	18.19	17.40
12232	+15 VDC Pwr Sply (TMV)	2.65	2.65	2.65	2.65	2.60	2.65	2.63	2.65	2.65	2.65
12234	-15 VDC Pwr Sply (TMV)	4.07	4.27	3.94	4.04	4.04	3.99	4.04	4.06	4.10	4.11
12236	+5 VDC Pwr Sply (TMV)	3.55	3.57	3.54	3.51	3.50	3.50	3.51	3.52	3.50	3.52
12238	-5 VDC Pwr Sply (TMV)	4.08	4.20	4.01	4.07	4.02	4.02	4.04	4.08	4.07	4.07
12240	-24 VDC Unreg Pwr (TMV)	5.86	6.20	5.66	5.90	5.91	5.92	5.86	5.84	5.92	5.92
12242	Temp. Inv. (DGC)	23.7	24.12	23.79	22.53	20.90	22.18	22.47	23.00	21.95	21.73

F = Unit Off

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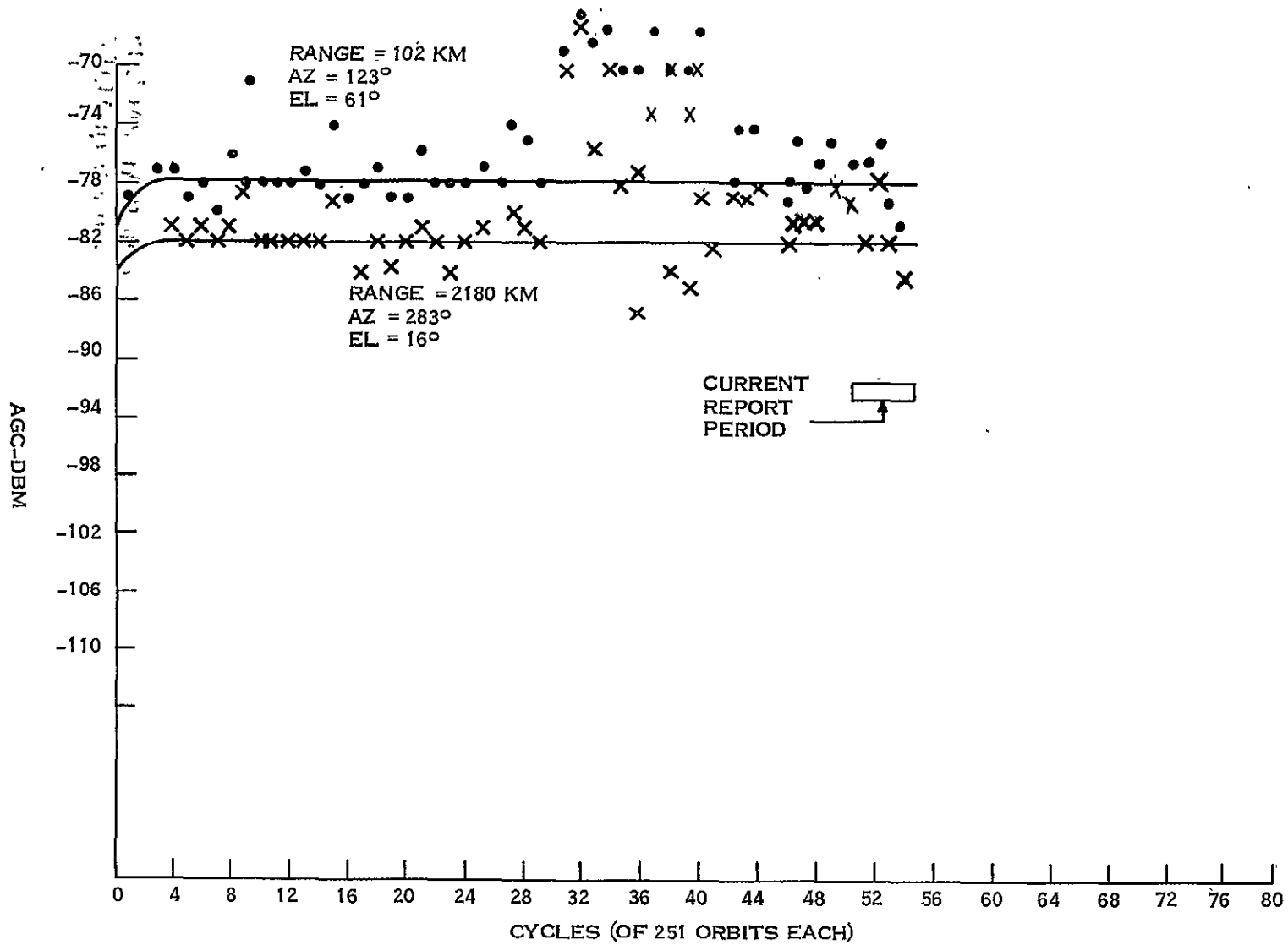


Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna, Landsat-2

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	12720	13150	13590	14016
3004	Case Temp 1	DGC	19.00	19.02	18.68	17.87	18.36	17.48	17.70	17.15	17.91
3005	Assembly-Temp-2	DGC	18.70	18.71	18.30	17.45	17.97	17.09	17.23	16.80	17.51

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.

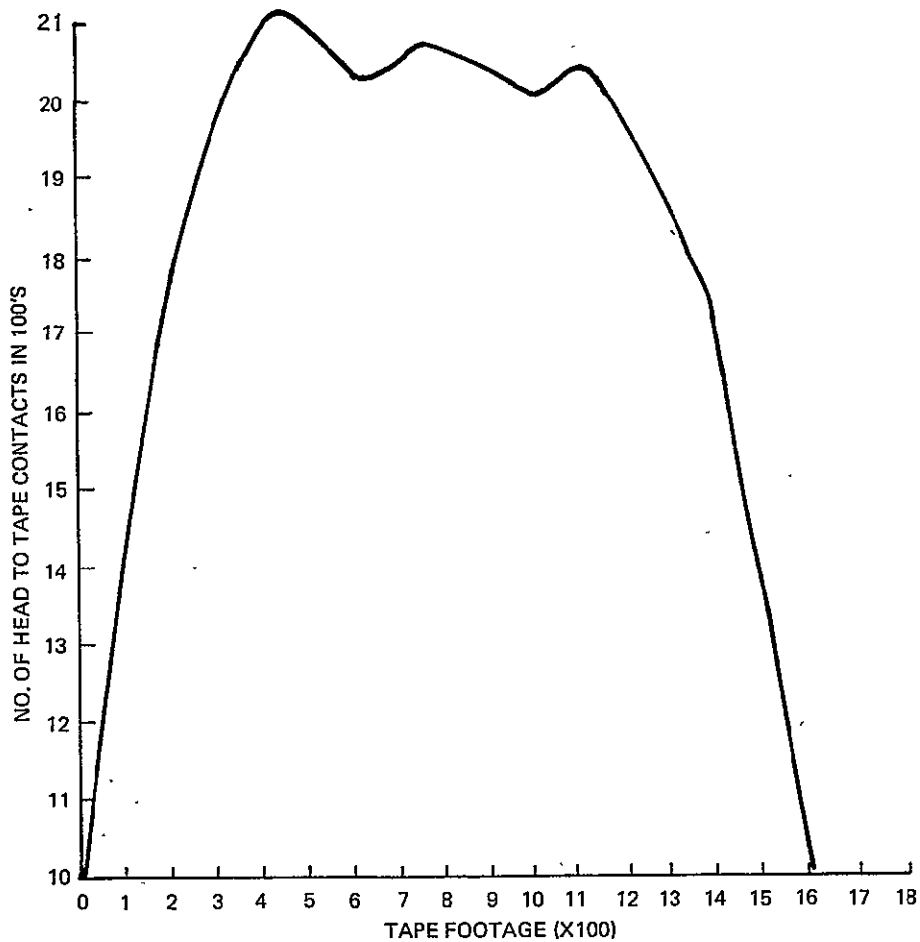


Figure 15-1. Landsat-2 WBR-2 Tape Usage thru Orbit 12722

Table 15-1. WBVTR Telemetry Values

WBVTR-1 Functions*		Telemetry Values In Orbits						
Number	Name	45/46	2642	4879 (ET)	7628	11871	12320	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	Limitter 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	12722	13171	13590	13951
13122	Pressure Trans	16.12	15.81	15.33	14.67	14.54	13.98	13.97	13.96	13.95
13123	Temp Trans	21.50	20.00	23.08	19.41	19.92	17.07	19.60	18.23	19.04
13124	Temp Elec	23.50	18.31	22.72	22.07	16.63	15.07	19.39	17.93	18.22
13132	Limitter Volt	1.30	1.32	1.28	1.35	1.34	1.33	1.33	1.33	1.31
13134	+5.6 VDC Conv	5.71	5.69	5.85	5.87	5.66	5.81	5.74	5.66	5.66
13201	-12 VDC APU	2.44	2.45	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	26.19	26.80	27.21	27.36

(ET) - Engineering Test of WBVTR-1

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	0.53	0.53	0.44	0.45	
Rewind	0.44	0.44	0.47	0.47	0.45	0.44	
Standby	0.45	0.45	0.46	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	50.37	50.04	49.61	50.08	
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 1	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

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. There were only three RBV operations during this report period. Telemetry data was normal. Because the operations occurred on successive days, and telemetry values were nearly identical, only one orbit is shown.

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	13790
14001	CCC Board Temp. (DgC)	19.65	20.27	20.41	19.17	20.15	18.85	18.98	19.29
14002	CCC Pwr. Sup. Temp (DgC)	20.52	21.46	20.80	19.84	20.17	19.83	19.59	20.16
14003	15 VDC Sup. (TMV)	3.92	3.92	4.00	3.44	3.84	3.68	3.62	3.83
14004	+6V, -5.25 VDC Sup. (TMV)	2.92	3.07	3.13	2.69	3.03	2.87	2.83	2.98
14100	* VID Output V (TMV)	NA	0.70	0.70	1.20	1.95	1.02	1.05	2.98
14200		1.05	1.23	1.26	1.15	0.88	.95	.98	1.06
14300		1.03	1.27	1.31	1.05	1.10	.97	.98	1.07
14102	* Comb. Align Cur. (TMV)	3.85	3.81	3.82	3.82	3.70	3.83	3.83	3.74
14202		3.91	3.92	3.88	3.92	3.92	3.90	3.91	3.91
14302		3.90	3.80	3.83	3.40	3.75	3.65	3.59	3.78
14103	* Elec Temp. (DgC)	24.24	24.49	26.51	22.41	23.00	22.13	22.28	24.27
14203		19.84	22.40	22.05	20.01	20.18	19.18	19.53	19.26
14303		25.05	24.15	23.42	22.46	23.42	21.72	21.80	25.82
14104	* LV Pwr Sup T. (DgC)	23.44	24.13	26.28	21.83	23.15	21.46	21.59	25.82
14204		18.14	20.87	20.61	18.32	18.90	17.56	17.76	17.83
14304		25.36	24.12	29.47	22.22	24.00	21.79	21.94	26.13
14105	* Defl. Pwr. Sup. +10 VDC (TMV)	4.00	3.94	3.96	3.50	3.84	3.99	3.68	3.88
14205		3.97	3.92	3.94	3.98	3.82	3.97	3.97	3.86
14305		4.00	3.95	3.96	4.00	3.96	4.00	4.00	3.89
14106	* L. V. P. S. +6V, -6.3 VDC (TMV)	3.67	3.59	3.63	3.23	3.26	3.67	3.39	3.58
14206		3.65	3.61	3.62	3.19	3.34	3.65	3.37	3.55
14306		3.70	3.66	3.68	3.71	3.42	3.70	3.70	3.60
14107	* Ther. Elec. Cur. (TMV)	2.61	2.54	2.61	2.53	2.60	2.60	2.60	2.68
14207		2.49	2.44	2.51	2.31	2.44	2.59	2.40	2.53
14307		2.57	2.52	2.57	2.85	2.71	2.73	3.95	2.57
14108	* Vid. Fil. Cur. (TMV)	2.43	2.48	2.50	2.23	2.46	2.39	2.36	2.48
14208		2.40	2.34	2.36	2.12	2.39	2.40	2.45	2.34
14308		2.58	2.54	2.54	2.27	2.59	2.58	2.39	2.50
14110	* Vid. Tgt. Volt (TMV)	2.98	2.95	2.96	2.98	2.98	2.98	2.98	2.90
14210		2.86	2.93	2.96	2.64	2.60	2.82	3.10	2.92
14310		2.63	2.56	2.58	2.31	2.37	2.46	2.43	2.56
14113	* Vert Def V (TMV)	2.92	2.79	2.81	3.22	2.98	3.08	2.42	2.86
14213		3.15	2.99	3.05	3.79	3.16	3.21	2.95	3.06
14313		3.59	3.48	3.44	3.09	3.04	3.71	3.46	3.52
14114	* Vid FPT (DgC)	19.87	20.67	19.21	16.32	19.85	16.32	16.52	17.01
14214		20.55	21.14	19.80	17.77	20.46	17.61	17.89	18.04
14314		20.65	21.12	20.56	18.05	20.38	18.05	18.24	18.81
14115	* Foc Coil T (DgC)	21.04	22.41	21.31	17.79	21.02	18.18	18.08	18.50
14215		20.67	22.22	21.26	18.16	19.17	17.96	18.21	18.56
14315		22.25	23.08	22.89	19.17	20.61	19.04	19.27	20.26

* 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		Mode	Orbit							
No.	Name		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	Hold	0.23	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		Mode	Orbit							
No.	Name		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	4.27	4.27	4.27	4.27	4.27	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
14301	Focus I	Hold	0.65	0.70	0.72	0.65	0.69	0.65	0.65	0.65
		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
14309	Grid V	Prep	0.75	0.80	0.75	0.77	0.77	0.77	0.77	0.77
		Read	2.65	2.70	2.66	2.71	2.66	2.70	2.72	2.72
		Hold	4.08	4.18	4.13	4.09	4.12	4.10	4.10	4.10
14311	Cath I	Hold	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.40
		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
14312	Hor Def	Hold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		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".

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; it dropped slightly in this quarter, but is still satisfactory.

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

Table 17-1. MSS Telemetry - Landsat-2

Function	Name	*T. V. Norm	Orbit								
			27	2500	5091	7641	10192	12720	13150	13590	14015
15040	MUX -6 VDC (TMV)	3.92	4.05	4.04	4.04	4.07	4.05	4.06	4.05	4.05	4.05
15041	A/D SUPPLY (TMV)	5.74	5.96	5.95	5.95	5.93	5.95	5.95	5.95	5.94	5.94
15042	AVERAGE DENSITY (TMV)	1.72	1.71	2.39	1.95	2.16	2.62	2.29	2.11	2.12	2.11
15043	FIBER OPTICS PLATE 1 TEMP (DGC)	22.30	18.13	20.41	21.75	17.21	20.15	18.05	18.94	18.04	19.27
15044	FIBER OPTICS PLATE 2 TEMP (DGC)	22.30	17.87	18.86	20.28	15.29	18.54	16.26	17.14	16.15	17.65
15045	MUX TEMP (DGC)	25.59	23.38	20.57	23.63	19.57	24.68	21.31	23.71	21.71	22.81
15046	ELEC COVER TEMP (DGC)	23.09	20.25	21.40	22.96	16.63	20.01	17.81	18.94	17.76	19.24
15047	PWR. SUP. TEMP (DGC)	23.85	19.45	19.83	21.62	16.51	20.66	18.14	19.55	17.96	19.75
15048	SCAN MIR REG. TEMP (DGC)	23.44	18.30	18.29	21.13	15.93	20.94	17.52	19.31	17.68	19.52
15049	SCAN MIR DRIVE ELEC. TEMP (DGC)	24.34	18.96	18.49	21.42	16.01	21.25	17.80	19.76	17.88	19.89
15050	SCAN MIR DRIVE COVER TEMP (DGC)	22.50	17.26	18.28	21.21	16.02	20.85	17.48	19.12	17.66	19.49
15051	SCAN MIR TEMP (DGC)	21.87	17.26	18.09	20.89	15.87	20.46	17.17	18.62	17.54	19.20
15052	ROT. SHUT HOUSING TEMP (DGC)	22.58	23.26	18.91	20.28	15.29	18.58	16.31	17.22	16.22	17.72
15053	SCAN MIR REG VOLT (TMV)	4.56	4.7	4.57	4.57	4.39	4.63	4.64	4.63	4.63	4.63
15054	CAL LAMP CURRENT (TMV)	1.18	1.17	1.20	1.17	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	4.97
15056	BAND 2 15 VDC (TMV)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.99
15057	BAND 3 15 VDC (TMV)	4.88	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.94
15058	BAND 4 15 VDC (TMV)	4.83	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.99	4.99
15059	TLM 15 VDC (TMV)	5.04	5.06	5.07	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	5.01	5.02	5.01	5.01	5.01
15061	LOGIC +5 VDC (TMV)	4.86	4.81	4.80	4.83	4.83	4.85	4.84	4.84	4.87	4.84
15062	RECT. +19 VDC (TMV)	4.97	5.03	5.05	5.05	5.05	5.05	5.06	5.05	5.05	5.05
15063	RECT. -19 VDC (TMV)	3.54	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.59	3.60
15064	BAND 1 HVA (TMV)	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95
15065	BAND 1 HVB (TMV)	5.03	F	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	4.72	4.72	4.72	4.72
15067	BAND 2 HVB (TMV)	4.70	F	F	F	F	F	F	F	F	F
15068	BAND 3 HVA (TMV)	4.75	4.72	4.76	4.73	4.75	4.75	4.75	4.75	4.75	4.75
15069	BAND 3 HVB (TMV)	4.65	F	F	F	F	F	F	F	F	F
15070	SHUT MOT. CONTR. INTEG (TMV)	2.49	2.60	2.60	2.60	2.60	2.60	2.61	2.60	2.59	2.59
15071	SCAN MIRROR DRIVE CLOCK (TMV)	1.93	2.0	2.00	2.00	1.99	2.01	2.01	2.00	2.00	2.00

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

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

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

Band	Sensor	Launch	Average Value				% Change Since Launch
			1st Year	2nd Year	9th & 10th Quar	This Quar	
1	1	43	40	39	38	38	-12
	2	41	40	39	37	38	-8
	3	46	43	42	41	42	-9
	4	46	45	45	44	44	-4
	5	44	40	39	38	38	-14
	6	46	43	43	42	42	-9
2	7	47	45	45	45	45	-4
	8	44	40	41	40	41	-7
	9	48	46	46	46	45	-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	46	-2
	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	3243	-0.1

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SECTION 18
DATA COLLECTION SYSTEM (DCS)
LANDSAT-2

C-3

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 average about 83. The percentage of good messages are about 96%.

There are 47 users in the data base. 281 DCP's are in the data base.

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

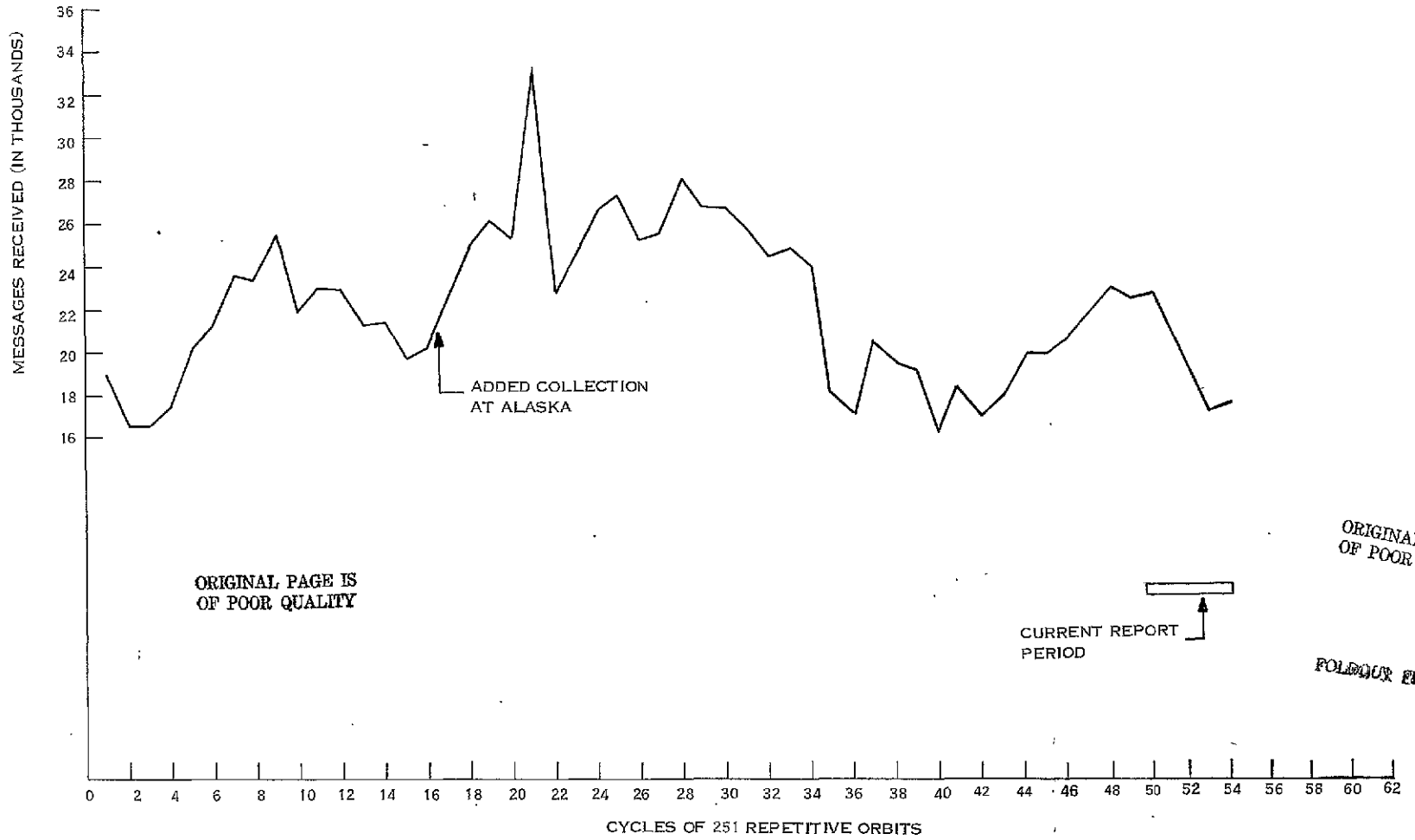
Table 18-1. DCS Telemetry Values

Func No.	Name	Orbits								
		5	2452	5091	7641	10192	12721	13150	13590	13950
16001	Receiver 1 Sig Strength (DBM)*	-123.34	-124.81	-122.02	-123.16	-123.06	-124.99	-121.86	-121.88	-123.57
16002	Receiver 1 Temp (DGC)	22.54	24.20	24.37	25.12	24.82	23.12	23.55	23.55	23.63
16003	Rec-1 Pwr Input Volt (VDC)	2.35	2.36	2.36	2.37	2.37	2.35	2.35	2.35	2.35
16004	Receiver 2 Sig Strength (DBM)	F	F	F	F	F	F	F	F	F
16005	Receiver 2 Temp (DGC)	F	F	F	F	F	F	F	F	F
16006	Receiver 2 Input Volt (VDC)	F	F	F	F	F	F	F	F	F

*This value is for a CW carrier only; it is not valid during DCS message reception

F = Receiver 2 was OFF

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FOLOOY FRAM 1

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FOLOOY FRAM 2

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 1284, 4002, 13200	Spacecraft Integration	Functions measure non-critical temperatures. Sensors failed prior to launch. Mission unaffected.
3/8/78	Unencoded command 751, CHU Channel B OH, received by spacecraft from RF Interference. Commands 782 or 788, switch condens; and commands 780 or 784, switch PWM regulator, received at other times.	On-Line	Non-Landsat OGC Authorized Unencoded commands received in Orbit 619, 640, 743, 1675, 1700, 2065, 3164, 4709, 6025, 7825, 8721, 8804, 9283, 9523, 10285, 10683
5/17/76	MEMCA 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.
4/6/76	WBVTR-1 Rewind Failure (MDR D01253)	On-Line	WBVTR-1 failed to execute Rewind command or prematurely terminated rewinds due to false BOT signal. Subsequent commands or Foot-Logic techniques allowed return to operation. Investigation Committee report issued. Problems occurred Orbit 1221, 1583, 1653, 2238. Operation restricted to 300 thru 1500 feet.
9/9/76	WBVTR-2 had Short Rewind (MDR E01255)	On-Line	WBVTR-2 started rewinding but stopped prematurely in Orbit 1510 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.
8/8/76	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.
11/14/76	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.
1/23/76	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.
7/20/78	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 7501. (Returned to service in Orbit 7902.)
7/28/76	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.
3/20/76	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 8023. Returned to service in Orbit 8500.
9/23/76	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 8361. Returned to service in Orbit 9161.
12/7/76	Battery 6 Turned Off	On-Line/Off-Line	Battery 6 turned off for restoration cycle in Orbit 9552. See 7/26/76 and 8/20/76 above. Returned to service in Orbit 10928, 10 Jan 77
12/21/76	WBVTR-2 had 30% high P/B speed (MDR D04936)	On-Line	Ground equipment would not sync on WBVTR-2 P/B data during Orbit 9738 P/B. Analysis showed P/B speed was 30% high. Toggling, correct to P/B, restored normal operation. Recurred and cured by toggling in Orbits 9830 and 10109.
1/18/77	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.
1/20/77	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
3/19/77	Battery 6 turned OFF in Orbit 10562	On-Line/Off-Line	C/D and temperature abnormally high. Turned OFF for restore cycle until Orbit 11311 on 12 April 1977.
4/20/77	Battery 1 turned OFF in Orbit 11429	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.
5/21/77	Battery 6 turned OFF in Orbit 11998.	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 12978 on 29 June 1977.
6/24/77	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 12302	R/T & Off-Line	High C/D ratio and temperature. Turned ON during Orbit 12864 on 5 August 1977.
8/9/77	Battery 6 turned OFF in Orbit 12355	R/T & Off-Line	High temperature and C/D. Turned ON during Orbit 13159 on 28 August 1977.
8/23/77	Battery 5 turned OFF in Orbit 13161	R/T & Off-Line	High temperature and C/D. Turned ON during Orbit 13444 on 12 September 1977.
9/13/77	Battery 6 turned OFF in Orbit 12955	R/T & Off-Line	High temperature and C/D. Turned ON during Orbit 13486 on 15 September 1977.
9/19/77	Battery 7 turned OFF in Orbit 13483	R/T & Off-Line	High temperature and C/D. Turned ON during Orbit 13570 on 21 September 1977.
9/22/77	Battery 1 turned OFF in Orbit 13530	R/T & Off-Line	High temperature and C/D. Turned ON during Orbit 13670 on 20 September 1977.
9/29/77	Battery 6 turned OFF in Orbit 13077	R/T & Off-Line	High temperature and C/D. Turned ON during Orbit 13886 on 10 October 1977.
10/17/77	WBVTR-2 P/B had high MFSE counts in Orbit 13021	R/T	Repeat of anomalies of 10/21/76, 2/10/77 and 5/9/77. Operational procedure corrects.
10/18/77	Battery 7 turned OFF in Orbit 13959	R/T & Off-Line	Remained OFF at end of this report period.

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A-1/2

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

LANDSAT-2
JAN, 1977

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DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS										REF DAY	CYCLE NO.
					1	2	3	4	5	6	7	8	9	10		
1	1	710	9090-9904	42-56	109,127,145,163,181,199,217,235	2	20	38	56	74	92	110	4	39		
2	2	711	9904-9918	56-70	110,128,146,164,182,200,218,236	3	21	39	57	75	93	111	5	39		
3	3	712	9910-9932	70-84	111,129,147,165,183,201,219,237	4	22	40	58	76	94	112	6	39		
4	4	713	9932-9946	84-98	112,130,148,166,184,202,220,238	5	23	41	59	77	95	113	7	39		
5	5	714	9946-9960	98-112	113,131,149,167,185,203,221,239	6	24	42	60	78	96	114	8	39		
6	6	715	9960-9974	112-126	114,132,150,168,186,204,222,240	7	25	43	61	79	97	115	9	39		
7	7	716	9974-9987	126-139	115,133,151,169,187,205,223,241	8	26	44	62	80	98		10	39		
8	8	717	9987-10001	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	99,117,135,153,171,189,207,225,243	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	10225-10238	126-139	115,133,151,169,187,205,223,241	8	26	44	62	80	98		10	40		
26	26	735	10238-10252	139-153	94,116,134,152,170,188,206,224,242	9	27	45	63	81	99		11	40		
27	27	736	10252-10266	153-167	99,117,135,153,171,189,207,225,243	10	28	46	64	82	100		12	40		
28	28	737	10266-10280	167-181	100,118,136,154,172,190,208,226,244	11	29	47	65	83	101		13	40		
29	29	738	10280-10294	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	10322-10336	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	40
2	33	742	10336-10350	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	40
3	34	743	10350-10364	251-14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	41
4	35	744	10364-10378	14-28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	41
5	36	745	10378-10392	28-42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	41
6	37	746	10392-10406	42-56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	41
7	38	747	10406-10420	56-70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	41
8	39	748	10420-10434	70-84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	41
9	40	749	10434-10448	84-98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	41
10	41	750	10448-10462	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	41
11	42	751	10462-10476	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	41
12	43	752	10476-10489	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	41
13	44	753	10489-10503	139-153	116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	41
14	45	754	10503-10517	153-167	117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	41
15	46	755	10517-10531	167-181	118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	41
16	47	756	10531-10545	181-195	119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	41
17	48	757	10545-10559	195-209	120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	41
18	49	758	10559-10573	209-223	121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	41
19	50	759	10573-10587	223-237	122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	41
20	51	760	10587-10601	237-251	123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	41
21	52	761	10601-10615	251-14	124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	42
22	53	762	10615-10629	14-28	125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	42
23	54	763	10629-10643	28-42	126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	42
24	55	764	10643-10657	42-56	127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	42
25	56	765	10657-10671	56-70	128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	42
26	57	766	10671-10685	70-84	129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	42
27	58	767	10685-10699	84-98	130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	42
28	59	768	10699-10713	98-112	131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	42

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MAR, 1977

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DATE	GMI DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	60	769	10713-10727	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	42
2	61	770	10727-10740	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	42
3	62	771	10740-10754	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	42
4	63	772	10754-10768	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	42
5	64	773	10768-10782	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	42
6	65	774	10782-10796	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	42
7	66	775	10796-10810	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	42
8	67	776	10810-10824	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	42
9	68	777	10824-10838	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	42
10	69	778	10838-10852	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	42
11	70	779	10852-10866	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	43
12	71	780	10866-10880	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	43
13	72	781	10880-10894	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	43
14	73	782	10894-10908	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	43
15	74	783	10908-10922	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	43
16	75	784	10922-10936	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	43
17	76	785	10936-10950	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	43
18	77	786	10950-10964	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	43
19	78	787	10964-10978	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	43
20	79	788	10978-10991	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	43
21	80	789	10991-11005	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	43
22	81	790	11005-11019	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	43
23	82	791	11019-11033	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	43
24	83	792	11033-11047	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	43
25	84	793	11047-11061	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	43
26	85	794	11061-11075	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	43
27	86	795	11075-11089	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	43
28	87	796	11089-11103	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	43
29	88	797	11103-11117	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	44
30	89	798	11117-11131	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	44
31	90	799	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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ARR, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	91	800	11145-11159	42-56	107,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	44
2	92	801	11159-11173	56-70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	44
3	93	802	11173-11187	70-84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	44
4	94	803	11187-11201	84-98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	44
5	95	804	11201-11215	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	44
6	96	805	11215-11229	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	44
7	97	806	11229-11242	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	44
8	98	807	11242-11256	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	44
9	99	808	11256-11270	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	44
10	100	809	11270-11284	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	44
11	101	810	11284-11298	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	44
12	102	811	11298-11312	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	44
13	103	812	11312-11326	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	44
14	104	813	11326-11340	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	44
15	105	814	11340-11354	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	44
16	106	815	11354-11368	251-14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	45
17	107	816	11368-11382	14-28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	45
18	108	817	11382-11396	28-42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	45
19	109	818	11396-11410	42-56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	45
20	110	819	11410-11424	56-70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	45
21	111	820	11424-11438	70-84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	45
22	112	821	11438-11452	84-98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	45
23	113	822	11452-11466	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	45
24	114	823	11466-11480	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	45
25	115	824	11480-11493	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	45
26	116	825	11493-11507	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	45
27	117	826	11507-11521	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	45
28	118	827	11521-11535	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	45
29	119	828	11535-11549	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	45
30	120	829	11549-11563	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	45

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MAY, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF	CYCLE
						DAY	NO.
1	121	850	11063-11577	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	45
2	122	851	11077-11591	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	45
3	123	852	11091-11605	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	45
4	124	853	11099-11619	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	46
5	125	854	11099-11633	14- 26	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	46
6	126	855	11099-11647	23- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	46
7	127	856	11047-11661	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	46
8	128	857	11051-11675	56- 70	110,129,147,165,183,201,219,237, 3, 21, 39, 57, 75, 93,111	5	46
9	129	858	11059-11689	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	46
10	130	859	11069-11703	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	46
11	131	860	11073-11717	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	46
12	132	861	11077-11731	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	46
13	133	862	11081-11744	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	46
14	134	863	11084-11758	139-153	98,114,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	46
15	135	864	11088-11772	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	46
16	136	865	11092-11786	167-181	100,119,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	46
17	137	866	11096-11800	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	46
18	138	867	11099-11814	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	46
19	139	868	11099-11828	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	46
20	140	869	11099-11842	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	46
21	141	870	11042-11856	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	46
22	142	871	11050-11870	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	47
23	143	872	11070-11884	14- 26	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	47
24	144	873	11074-11893	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	47
25	145	874	11078-11912	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	47
26	146	875	11092-11926	56- 70	110,129,147,165,183,201,219,237, 3, 21, 39, 57, 75, 93,111	5	47
27	147	876	11096-11940	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	47
28	148	877	11040-11954	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	47
29	149	878	11074-11968	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	47
30	150	879	11064-11982	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	47
31	151	880	11064-11996	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	47

LANDSAT-2

JUN 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS										REF DAY	CYCLE NS.
					98	99	100	101	102	103	104	105	106	107		
1	152	861	12000-12000	139-153	98, 115, 134, 152, 170, 188, 206, 224, 242	9	27	45	63	81	99	11	47			
2	153	862	12000-12023	153-167	99, 117, 135, 153, 171, 189, 207, 225, 243	10	28	46	64	82	100	12	47			
3	154	863	12023-12037	167-181	100, 119, 136, 154, 172, 190, 208, 226, 244	11	29	47	65	83	101	13	47			
4	155	864	12037-12051	181-195	101, 119, 137, 155, 173, 191, 209, 227, 245	12	30	48	66	84	102	14	47			
5	156	865	12051-12065	195-209	102, 120, 138, 156, 174, 192, 210, 228, 246	13	31	49	67	85	103	15	47			
6	157	866	12065-12079	209-223	103, 121, 139, 157, 175, 193, 211, 229, 247	14	32	50	68	86	104	16	47			
7	158	867	12079-12093	223-237	104, 122, 140, 158, 176, 194, 212, 230, 248	15	33	51	69	87	105	17	47			
8	159	868	12093-12107	237-251	105, 123, 141, 159, 177, 195, 213, 231, 249	16	34	52	70	88	106	18	47			
9	160	869	12107-12121	251-14	106, 124, 142, 160, 178, 196, 214, 232, 250	17	35	53	71	89	107	1	48			
10	161	870	12121-12135	14-28	107, 125, 143, 161, 179, 197, 215, 233, 251	18	36	54	72	90	108	2	48			
11	162	871	12135-12149	28-42	108, 125, 144, 162, 180, 198, 216, 234	1	19	37	55	73	91	3	48			
12	163	872	12149-12163	42-56	109, 127, 145, 163, 181, 199, 217, 235	2	20	38	56	74	92	4	48			
13	164	873	12163-12177	56-70	110, 128, 146, 164, 182, 200, 218, 236	3	21	39	57	75	93	5	48			
14	165	874	12177-12191	70-84	111, 129, 147, 165, 183, 201, 219, 237	4	22	40	58	76	94	6	48			
15	166	875	12191-12205	84-98	112, 130, 148, 166, 184, 202, 220, 238	5	23	41	59	77	95	7	48			
16	167	876	12205-12219	98-112	113, 131, 149, 167, 185, 203, 221, 239	6	24	42	60	78	96	8	48			
17	168	877	12219-12233	112-126	114, 132, 150, 168, 186, 204, 222, 240	7	25	43	61	79	97	9	48			
18	169	878	12233-12246	126-139	115, 133, 151, 169, 187, 205, 223, 241	8	26	44	62	80	98	10	48			
19	170	879	12246-12260	139-153	98, 116, 134, 152, 170, 188, 206, 224, 242	9	27	45	63	81	99	11	48			
20	171	880	12260-12274	153-167	99, 117, 135, 153, 171, 189, 207, 225, 243	10	28	46	64	82	100	12	48			
21	172	881	12274-12288	167-181	100, 119, 136, 154, 172, 190, 208, 226, 244	11	29	47	65	83	101	13	48			
22	173	882	12288-12302	181-195	101, 119, 137, 155, 173, 191, 209, 227, 245	12	30	48	66	84	102	14	48			
23	174	883	12302-12316	195-209	102, 120, 138, 156, 174, 192, 210, 228, 246	13	31	49	67	85	103	15	48			
24	175	884	12316-12330	209-223	103, 121, 139, 157, 175, 193, 211, 229, 247	14	32	50	68	86	104	16	48			
25	176	885	12330-12344	223-237	104, 122, 140, 158, 176, 194, 212, 230, 248	15	33	51	69	87	105	17	48			
26	177	886	12344-12358	237-251	105, 123, 141, 159, 177, 195, 213, 231, 249	16	34	52	70	88	106	18	48			
27	178	887	12358-12372	251-14	106, 124, 142, 160, 178, 196, 214, 232, 250	17	35	53	71	89	107	1	49			
28	179	888	12372-12386	14-28	107, 125, 143, 161, 179, 197, 215, 233, 251	18	36	54	72	90	108	2	49			
29	180	889	12386-12400	28-42	108, 125, 144, 162, 180, 198, 216, 234	1	19	37	55	73	91	3	49			
30	181	890	12400-12414	42-56	109, 127, 145, 163, 181, 199, 217, 235	2	20	38	56	74	92	4	49			

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LANDSAT-2

AUG, 1977.

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	213	922	12040-12090	237-251	105,123,141,157,177,195,213,231,249,16,34,52,70,88,106	18	50
2	214	923	12050-12104	251-14	106,124,142,160,178,196,214,232,250,17,35,53,71,89,107	1	51
3	215	924	12074-12128	14-28	107,125,143,161,179,197,215,233,251,18,36,54,72,90,108	2	51
4	216	925	12088-12142	28-42	108,126,144,162,180,198,216,234,1,19,37,55,73,91,109	3	51
5	217	926	12102-12156	42-56	109,127,145,163,181,199,217,235,2,20,38,56,74,92,110	4	51
6	218	927	12116-12170	56-70	110,128,146,164,182,200,218,236,3,21,39,57,75,93,111	5	51
7	219	928	12130-12184	70-84	111,129,147,165,183,201,219,237,4,22,40,58,76,94,112	6	51
8	220	929	12144-12198	84-98	112,130,148,166,184,202,220,238,5,23,41,59,77,95,113	7	51
9	221	930	12158-12212	98-112	113,131,149,167,185,203,221,239,6,24,42,60,78,96,114	8	51
10	222	931	12172-12226	112-126	114,132,150,168,186,204,222,240,7,25,43,61,79,97,115	9	51
11	223	932	12186-12240	126-139	115,133,151,169,187,205,223,241,8,26,44,62,80,98	10	51
12	224	933	12199-13013	139-153	98,116,134,152,170,188,206,224,242,9,27,45,63,81,99	11	51
13	225	934	13013-13027	153-167	99,117,135,153,171,189,207,225,243,10,28,46,64,82,100	12	51
14	225	935	13027-13041	167-181	100,117,136,154,172,190,208,226,244,11,29,47,65,83,101	13	51
15	227	936	13041-13055	181-195	101,117,137,155,173,191,209,227,245,12,30,48,66,84,102	14	51
16	228	937	13055-13069	195-209	102,118,138,156,174,192,210,228,246,13,31,49,67,85,103	15	51
17	229	938	13069-13083	209-223	103,121,139,157,175,193,211,229,247,14,32,50,68,86,104	16	51
18	230	939	13083-13097	223-237	104,122,140,158,176,194,212,230,248,15,33,51,69,87,105	17	51
19	231	940	13097-13111	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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LAIUSAT-2

SEP, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF	CYCLE
						DAY	NO.
1	244	953	13270-13292	167-181	100,110,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	52
2	245	954	13290-13308	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	52
3	246	955	13306-13320	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	52
4	247	956	13320-13334	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	52
5	248	957	13334-13348	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	52
6	249	958	13348-13362	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	52
7	250	959	13362-13376	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	53
8	251	960	13376-13390	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	53
9	252	961	13390-13404	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	53
10	253	962	13404-13418	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	53
11	254	963	13418-13432	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	53
12	255	964	13432-13446	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94,112	6	53
13	256	965	13446-13460	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	53
14	257	966	13460-13474	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	53
15	258	967	13474-13488	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	53
16	259	968	13488-13501	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	53
17	260	969	13501-13515	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	53
18	261	970	13515-13529	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	53
19	262	971	13529-13543	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	53
20	263	972	13543-13557	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	53
21	264	973	13557-13571	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	53
22	265	974	13571-13585	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	53
23	266	975	13585-13599	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	53
24	267	976	13599-13613	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	53
25	268	977	13613-13627	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	54
26	269	978	13627-13641	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	54
27	270	979	13641-13655	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	54
28	271	980	13655-13669	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	54
29	272	981	13669-13683	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93,111	5	54
30	273	982	13683-13697	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	2	3	4	5	6	7	8	9	10	11	12	13	14	15			16	17	18	19	20	21	22	23	24
1	274	903	13097-13711	84- 98	112,130,148,165,184,202,220,238, 5, 23, 41, 59, 77, 95,113	7	54																							
2	275	904	13111-13725	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96,114	8	54																							
3	276	905	13725-13739	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97,115	9	54																							
4	277	906	13739-13752	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	54																							
5	278	907	13752-13760	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	54																							
6	279	908	13760-13760	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82,100	12	54																							
7	280	909	13760-13774	167-181	100,118,136,154,172,190,208,226,244, 11, 29, 47, 65, 83,101	13	54																							
8	281	910	13774-13808	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84,102	14	54																							
9	282	911	13808-13822	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85,103	15	54																							
10	283	912	13822-13836	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86,104	16	54																							
11	284	913	13836-13850	223-237	104,123,140,158,176,194,212,230,248, 15, 33, 51, 69, 87,105	17	54																							
12	285	914	13850-13864	237-251	105,124,141,159,177,195,213,231,249, 16, 34, 52, 70, 88,106	18	54																							
13	286	915	13864-13878	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89,107	1	55																							
14	287	916	13878-13892	14- 28	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90,108	2	55																							
15	288	917	13892-13906	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91,109	3	55																							
16	289	918	13906-13920	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92,110	4	55																							
17	290	919	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	13990-14004	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	55																							
23	296	1005	14004-14017	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	104,123,140,158,176,194,212,230,248, 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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OF POOR QUALITY

LAPD 5A1-2

NOV, 1977

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS													REF DAY	CYCLE NO.										
					107,127,143,161,179,197,215,233,251,18,36,54,72,90,108	108,128,144,162,180,198,216,234,1,19,37,55,73,91,109	109,127,145,163,181,199,217,235,2,20,38,56,74,92,110	110,128,146,164,182,200,218,236,3,21,39,57,75,93,111	111,129,147,165,183,201,219,237,4,22,40,58,76,94,112	112,130,148,166,184,202,220,238,5,23,41,59,77,95,113	113,131,149,167,185,203,221,239,6,24,42,60,78,96,114	114,132,150,168,186,204,222,240,7,25,43,61,79,97,115	115,133,151,169,187,205,223,241,8,26,44,62,80,98	98,110,134,152,170,188,206,224,242,9,27,45,63,81,99	99,117,135,153,171,189,207,225,243,10,28,46,64,82,100	100,118,136,154,172,190,208,226,244,11,29,47,65,83,101	101,119,137,155,173,191,209,227,245,12,30,48,66,84,102			102,120,138,156,174,192,210,228,246,13,31,49,67,85,103	103,121,139,157,175,193,211,229,247,14,32,50,68,86,104	104,122,140,158,176,194,212,230,248,15,33,51,69,87,105	105,123,141,159,177,195,213,231,249,16,34,52,70,88,106	106,124,142,160,178,196,214,232,250,17,35,53,71,89,107	107,125,143,161,179,197,215,233,251,18,36,54,72,90,108	108,126,144,162,180,198,216,234,1,19,37,55,73,91,109	109,127,145,163,181,199,217,235,2,20,38,56,74,92,110	110,128,146,164,182,200,218,236,3,21,39,57,75,93,111	111,129,147,165,183,201,219,237,4,22,40,58,76,94,112
1	305	1014	14129-14143	14-28	107,127,143,161,179,197,215,233,251,18,36,54,72,90,108	2	56																						
2	306	1015	14143-14157	28-42	108,128,144,162,180,198,216,234,1,19,37,55,73,91,109	3	56																						
3	307	1016	14157-14171	42-56	109,127,145,163,181,199,217,235,2,20,38,56,74,92,110	4	56																						
4	308	1017	14171-14185	56-70	110,128,146,164,182,200,218,236,3,21,39,57,75,93,111	5	56																						
5	309	1018	14185-14199	70-84	111,129,147,165,183,201,219,237,4,22,40,58,76,94,112	6	56																						
6	310	1019	14199-14213	84-98	112,130,148,166,184,202,220,238,5,23,41,59,77,95,113	7	56																						
7	311	1020	14213-14227	98-112	113,131,149,167,185,203,221,239,6,24,42,60,78,96,114	8	56																						
8	312	1021	14227-14241	112-126	114,132,150,168,186,204,222,240,7,25,43,61,79,97,115	9	56																						
9	313	1022	14241-14255	126-139	115,133,151,169,187,205,223,241,8,26,44,62,80,98	10	56																						
10	314	1023	14255-14269	139-153	98,110,134,152,170,188,206,224,242,9,27,45,63,81,99	11	56																						
11	315	1024	14269-14283	153-167	99,117,135,153,171,189,207,225,243,10,28,46,64,82,100	12	56																						
12	316	1025	14283-14297	167-181	100,118,136,154,172,190,208,226,244,11,29,47,65,83,101	13	56																						
13	317	1026	14297-14311	181-195	101,119,137,155,173,191,209,227,245,12,30,48,66,84,102	14	56																						
14	318	1027	14311-14325	195-209	102,120,138,156,174,192,210,228,246,13,31,49,67,85,103	15	56																						
15	319	1028	14325-14339	209-223	103,121,139,157,175,193,211,229,247,14,32,50,68,86,104	16	56																						
16	320	1029	14339-14353	223-237	104,122,140,158,176,194,212,230,248,15,33,51,69,87,105	17	56																						
17	321	1030	14353-14367	237-251	105,123,141,159,177,195,213,231,249,16,34,52,70,88,106	18	56																						
18	322	1031	14367-14381	251-14	106,124,142,160,178,196,214,232,250,17,35,53,71,89,107	1	57																						
19	323	1032	14381-14395	14-28	107,125,143,161,179,197,215,233,251,18,36,54,72,90,108	2	57																						
20	324	1033	14395-14409	28-42	108,126,144,162,180,198,216,234,1,19,37,55,73,91,109	3	57																						
21	325	1034	14409-14423	42-56	109,127,145,163,181,199,217,235,2,20,38,56,74,92,110	4	57																						
22	326	1035	14423-14437	56-70	110,128,146,164,182,200,218,236,3,21,39,57,75,93,111	5	57																						
23	327	1036	14437-14451	70-84	111,129,147,165,183,201,219,237,4,22,40,58,76,94,112	6	57																						
24	328	1037	14451-14465	84-98	112,130,148,166,184,202,220,238,5,23,41,59,77,95,113	7	57																						
25	329	1038	14465-14479	98-112	113,131,149,167,185,203,221,239,6,24,42,60,78,96,114	8	57																						
26	330	1039	14479-14493	112-126	114,132,150,168,186,204,222,240,7,25,43,61,79,97,115	9	57																						
27	331	1040	14493-14507	126-139	115,133,151,169,187,205,223,241,8,26,44,62,80,98	10	57																						
28	332	1041	14507-14521	139-153	98,110,134,152,170,188,206,224,242,9,27,45,63,81,99	11	57																						
29	333	1042	14521-14535	153-167	99,117,135,153,171,189,207,225,243,10,28,46,64,82,100	12	57																						
30	334	1043	14535-14549	167-181	100,118,136,154,172,190,208,226,244,11,29,47,65,83,101	13	57																						

LANDSAT-2
DEC, 1977

DATE	GMT DAY	FLIGHT DAY	SPACELCRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS										REF DAY	CYCLE NO.
					1	2	3	4	5	6	7	8	9	10		
1	335	1074	1454/-14561	141-195	101,119,137,155,173,191,209,227,245	12	30	48	66	84	102	14	57			
2	336	1075	14561-14575	195-209	102,120,138,156,174,192,210,228,246	13	31	49	67	85	103	15	57			
3	337	1076	14575-14589	209-223	103,121,139,157,175,193,211,229,247	14	32	50	68	86	104	16	57			
4	338	1077	14589-14603	223-237	104,122,140,158,176,194,212,230,248	15	33	51	69	87	105	17	57			
5	339	1078	14603-14617	237-251	105,123,141,159,177,195,213,231,249	16	34	52	70	88	106	18	57			
6	340	1079	14617-14631	251-14	106,124,142,160,178,196,214,232,250	17	35	53	71	89	107	1	58			
7	341	1080	14631-14645	14-28	107,125,143,161,179,197,215,233,251	18	36	54	72	90	108	2	58			
8	342	1081	14645-14659	28-42	108,126,144,162,180,198,216,234	1	19	37	55	73	91	109	3	58		
9	343	1082	14659-14673	42-56	109,127,145,163,181,199,217,235	2	20	38	56	74	92	110	4	58		
10	344	1083	14673-14687	56-70	110,128,146,164,182,200,218,236	3	21	39	57	75	93	111	5	58		
11	345	1084	14687-14701	70-84	111,129,147,165,183,201,219,237	4	22	40	58	76	94	112	6	58		
12	346	1085	14701-14715	84-98	112,130,148,166,184,202,220,238	5	23	41	59	77	95	113	7	58		
13	347	1086	14715-14729	98-112	113,131,149,167,185,203,221,239	6	24	42	60	78	96	114	8	58		
14	348	1087	14729-14743	112-126	114,132,150,168,186,204,222,240	7	25	43	61	79	97	115	9	58		
15	349	1088	14743-14757	126-140	115,133,151,169,187,205,223,241	8	26	44	62	80	98	10	58			
16	350	1089	14757-14771	140-154	94,116,134,152,170,188,206,224,242	9	27	45	63	81	99	11	58			
17	351	1090	14771-14785	154-168	99,117,135,153,171,189,207,225,243	10	28	46	64	82	100	12	58			
18	352	1091	14785-14799	168-182	100,118,136,154,172,190,208,226,244	11	29	47	65	83	101	13	58			
19	353	1092	14799-14813	182-196	101,119,137,155,173,191,209,227,245	12	30	48	66	84	102	14	58			
20	354	1093	14813-14827	196-210	102,120,138,156,174,192,210,228,246	13	31	49	67	85	103	15	58			
21	355	1094	14827-14841	210-224	103,121,139,157,175,193,211,229,247	14	32	50	68	86	104	16	58			
22	356	1095	14841-14855	224-238	104,122,140,158,176,194,212,230,248	15	33	51	69	87	105	17	58			
23	357	1096	14855-14869	238-252	105,123,141,159,177,195,213,231,249	16	34	52	70	88	106	18	58			
24	358	1097	14869-14883	252-14	106,124,142,160,178,196,214,232,250	17	35	53	71	89	107	1	59			
25	359	1098	14883-14897	14-28	107,125,143,161,179,197,215,233,251	18	36	54	72	90	108	2	59			
26	360	1099	14897-14911	28-42	108,126,144,162,180,198,216,234	1	19	37	55	73	91	109	3	59		
27	361	1070	14911-14925	42-56	109,127,145,163,181,199,217,235	2	20	38	56	74	92	110	4	59		
28	362	1071	14925-14939	56-70	110,128,146,164,182,200,218,236	3	21	39	57	75	93	111	5	59		
29	363	1072	14939-14953	70-84	111,129,147,165,183,201,219,237	4	22	40	58	76	94	112	6	59		
30	364	1073	14953-14967	84-98	112,130,148,166,184,202,220,238	5	23	41	59	77	95	113	7	59		
31	365	1074	14967-14981	98-112	113,131,149,167,185,203,221,239	6	24	42	60	78	96	114	8	59		

ORIGINAL PAGE IS
OF POOR QUALITY

LANDSAT-2

JAN, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF	CYCLE		
						DAY	NO.		
1	1	10/5	15050-15004	112-126	110,130,150,160,170,180,200,220,240	7	25, 43, 61, 79, 97, 115	9	59
2	2	10/6	15007-15007	126-139	110,130,151,160,170,187,205,223,241	8	26, 44, 62, 80, 98	10	59
3	3	10/7	15007-15021	139-153	99,110,134,150,170,188,206,224,242	9	27, 45, 63, 81, 99	11	59
4	4	10/8	15021-15035	153-167	99,117,135,151,171,189,207,225,243	10	28, 46, 64, 82, 100	12	59
5	5	10/9	15035-15049	167-181	100,110,136,150,172,190,208,226,244	11	29, 47, 65, 83, 101	13	59
6	6	10/10	15049-15063	181-195	101,117,137,155,173,191,209,227,245	12	30, 48, 66, 84, 102	14	59
7	7	10/11	15063-15077	195-209	102,120,138,155,174,192,210,228,246	13	31, 49, 67, 85, 103	15	59
8	8	10/12	15077-15091	209-223	103,121,139,157,175,193,211,229,247	14	32, 50, 68, 86, 104	16	59
9	9	10/13	15091-15105	223-237	104,122,140,158,176,194,212,230,248	15	33, 51, 69, 87, 105	17	59
10	10	10/14	15105-15119	237-251	105,123,141,159,177,195,213,231,249	16	34, 52, 70, 88, 106	18	59
11	11	10/15	15119-15133	251- 14	106,124,142,160,178,196,214,232,250	17	35, 53, 71, 89, 107	1	60
12	12	10/16	15133-15147	14- 28	107,125,143,161,179,197,215,233,251	18	36, 54, 72, 90, 108	2	60
13	13	10/17	15147-15161	28- 42	108,126,144,162,180,198,216,234	1	19, 37, 55, 73, 91, 109	3	60
14	14	10/18	15161-15175	42- 56	109,127,145,163,181,199,217,235	2	20, 38, 56, 74, 92, 110	4	60
15	15	10/19	15175-15189	56- 70	110,128,146,164,182,200,218,236	3	21, 39, 57, 75, 93, 111	5	60
16	16	10/20	15189-15203	70- 84	111,129,147,165,183,201,219,237	4	22, 40, 58, 76, 94, 112	6	60
17	17	10/21	15203-15217	84- 98	112,130,148,166,184,202,220,238	5	23, 41, 59, 77, 95, 113	7	60
18	18	10/22	15217-15231	98-112	113,131,149,167,185,203,221,239	6	24, 42, 60, 78, 96, 114	8	60
19	19	10/23	15231-15245	112-126	114,132,150,168,186,204,222,240	7	25, 43, 61, 79, 97, 115	9	60
20	20	10/24	15245-15259	126-139	110,133,151,169,187,205,223,241	8	26, 44, 62, 80, 98	10	60
21	21	10/25	15259-15272	139-153	99,110,134,152,170,188,206,224,242	9	27, 45, 63, 81, 99	11	60
22	22	10/26	15272-15286	153-167	99,117,135,153,171,189,207,225,243	10	28, 46, 64, 82, 100	12	60
23	23	10/27	15286-15300	167-181	100,118,136,154,172,190,208,226,244	11	29, 47, 65, 83, 101	13	60
24	24	10/28	15300-15314	181-195	101,119,137,155,173,191,209,227,245	12	30, 48, 66, 84, 102	14	60
25	25	10/29	15314-15328	195-209	102,120,138,156,174,192,210,228,246	13	31, 49, 67, 85, 103	15	60
26	26	11/00	15328-15342	209-223	103,121,139,157,175,193,211,229,247	14	32, 50, 68, 86, 104	16	60
27	27	11/01	15342-15356	223-237	104,122,140,158,176,194,212,230,248	15	33, 51, 69, 87, 105	17	60
28	28	11/02	15356-15370	237-251	105,123,141,159,177,195,213,231,249	16	34, 52, 70, 88, 106	18	60
29	29	11/03	15370-15384	251- 14	106,124,142,160,178,196,214,232,250	17	35, 53, 71, 89, 107	1	61
30	30	11/04	15384-15398	14- 28	107,125,143,161,179,197,215,233,251	18	36, 54, 72, 90, 108	2	61
31	31	11/05	15398-15412	28- 42	108,126,144,162,180,198,216,234	1	19, 37, 55, 73, 91, 109	3	61

LANDSAT-2

FEB, 1976

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS											REF DAY	CYCLE NO.
					1	2	3	4	5	6	7	8	9	10	11		
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	15426-15440	56-70	110,128,146,164,182,200,218,236	3	21	39	57	75	93	111	5	61			
3	34	1108	15440-15454	70-84	111,129,147,165,183,201,219,237	4	22	40	58	76	94	112	6	61			
4	35	1109	15454-15468	84-98	112,130,148,166,184,202,220,238	5	23	41	59	77	95	113	7	61			
5	36	1110	15468-15482	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	15496-15510	126-139	115,133,151,169,187,205,223,241	8	26	44	62	80	98		10	61			
8	39	1113	15510-15524	139-153	99,116,134,152,170,188,206,224,242	9	27	45	63	81	99		11	61			
9	40	1114	15524-15537	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	99,116,134,152,170,188,206,224,242	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			

ORIGINAL PAGE IS
OF POOR QUALITY

LANDSAT-2

MAR, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS										REF DAY	CYCLE NO.
					1	2	3	4	5	6	7	8	9	10		
1	60	1134	15000-15010	181-195	101,117,137,155,173,191,209,227,245	12	30	48	66	84	102	14	62			
2	61	1135	15010-15020	195-209	102,120,138,156,174,192,210,228,246	13	31	49	67	85	103	15	62			
3	62	1136	15020-15034	209-223	103,121,139,157,175,193,211,229,247	14	32	50	68	86	104	16	62			
4	63	1137	15034-15048	223-237	104,122,140,158,176,194,212,230,248	15	33	51	69	87	105	17	62			
5	64	1138	15048-15062	237-251	105,123,141,159,177,195,213,231,249	16	34	52	70	88	106	18	62			
6	65	1139	15062-15076	251-14	106,124,142,160,178,196,214,232,250	17	35	53	71	89	107	1	63			
7	66	1140	15076-15090	14-28	107,125,143,161,179,197,215,233,251	18	36	54	72	90	108	2	63			
8	67	1141	15090-15104	28-42	108,126,144,162,180,198,216,234	1	19	37	55	73	91	3	63			
9	68	1142	15104-15118	42-56	109,127,145,163,181,199,217,235	2	20	38	56	74	92	4	63			
10	69	1143	15118-15132	56-70	110,128,146,164,182,200,218,236	3	21	39	57	75	93	5	63			
11	70	1144	15132-15146	70-84	111,129,147,165,183,201,219,237	4	22	40	58	76	94	6	63			
12	71	1145	15146-15160	84-98	112,130,148,166,184,202,220,238	5	23	41	59	77	95	7	63			
13	72	1146	15160-15174	98-112	113,131,149,167,185,203,221,239	6	24	42	60	78	96	8	63			
14	73	1147	15174-15188	112-126	114,132,150,168,186,204,222,240	7	25	43	61	79	97	9	63			
15	74	1148	15188-16011	126-139	115,133,151,169,187,205,223,241	8	26	44	62	80	98	10	63			
16	75	1149	16011-16025	139-153	98,117,134,152,170,188,206,224,242	9	27	45	63	81	99	11	63			
17	76	1150	16025-16039	153-167	99,117,135,153,171,189,207,225,243	10	28	46	64	82	100	12	63			
18	77	1151	16039-16053	167-181	100,117,136,154,172,190,208,226,244	11	29	47	65	83	101	13	63			
19	78	1152	16053-16067	181-195	101,118,137,155,173,191,209,227,245	12	30	48	66	84	102	14	63			
20	79	1153	16067-16081	195-209	102,120,138,156,174,192,210,228,246	13	31	49	67	85	103	15	63			
21	80	1154	16081-16095	209-223	103,121,139,157,175,193,211,229,247	14	32	50	68	86	104	16	63			
22	81	1155	16095-16109	223-237	104,122,140,158,176,194,212,230,248	15	33	51	69	87	105	17	63			
23	82	1156	16109-16123	237-251	105,123,141,159,177,195,213,231,249	16	34	52	70	88	106	18	63			
24	83	1157	16123-16137	251-14	106,124,142,160,178,196,214,232,250	17	35	53	71	89	107	1	64			
25	84	1158	16137-16151	14-28	107,125,143,161,179,197,215,233,251	18	36	54	72	90	108	2	64			
26	85	1159	16151-16165	28-42	108,126,144,162,180,198,216,234	1	19	37	55	73	91	3	64			
27	86	1160	16165-16179	42-56	109,127,145,163,181,199,217,235	2	20	38	56	74	92	4	64			
28	87	1161	16179-16193	56-70	110,128,146,164,182,200,218,236	3	21	39	57	75	93	5	64			
29	88	1162	16193-16207	70-84	111,129,147,165,183,201,219,237	4	22	40	58	76	94	6	64			
30	89	1163	16207-16221	84-98	112,130,148,166,184,202,220,238	5	23	41	59	77	95	7	64			
31	90	1164	16221-16235	98-112	113,131,149,167,185,203,221,239	6	24	42	60	78	96	8	64			

LANDSAT-2

APR 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF	CYCLE
						DAY	NO.
1	91	1105	16249-16249	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97, 115	9	64
2	92	1106	16249-16249	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	64
3	93	1107	16249-16276	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	64
4	94	1108	16276-16290	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82, 100	12	64
5	95	1109	16290-16304	167-181	100,117,136,154,172,190,208,226,244, 11, 29, 47, 65, 83, 101	13	64
6	96	1110	16304-16318	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84, 102	14	64
7	97	1111	16318-16332	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85, 103	15	64
8	98	1112	16332-16346	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86, 104	16	64
9	99	1113	16346-16360	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87, 105	17	64
10	100	1114	16360-16374	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88, 106	18	64
11	101	1115	16374-16388	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89, 107	1	65
12	102	1116	16388-16402	14- 26	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90, 108	2	65
13	103	1117	16402-16416	28- 42	108,126,144,162,180,198,216,234, 1, 19, 37, 55, 73, 91, 109	3	65
14	104	1118	16416-16430	42- 56	109,127,145,163,181,199,217,235, 2, 20, 38, 56, 74, 92, 110	4	65
15	105	1119	16430-16444	56- 70	110,128,146,164,182,200,218,236, 3, 21, 39, 57, 75, 93, 111	5	65
16	106	1100	16444-16458	70- 84	111,129,147,165,183,201,219,237, 4, 22, 40, 58, 76, 94, 112	6	65
17	107	1101	16458-16472	84- 98	112,130,148,166,184,202,220,238, 5, 23, 41, 59, 77, 95, 113	7	65
18	108	1102	16472-16486	98-112	113,131,149,167,185,203,221,239, 6, 24, 42, 60, 78, 96, 114	8	65
19	109	1103	16486-16500	112-126	114,132,150,168,186,204,222,240, 7, 25, 43, 61, 79, 97, 115	9	65
20	110	1104	16500-16513	126-139	115,133,151,169,187,205,223,241, 8, 26, 44, 62, 80, 98	10	65
21	111	1105	16513-16527	139-153	98,116,134,152,170,188,206,224,242, 9, 27, 45, 63, 81, 99	11	65
22	112	1106	16527-16541	153-167	99,117,135,153,171,189,207,225,243, 10, 28, 46, 64, 82, 100	12	65
23	113	1107	16541-16555	167-181	100,117,136,154,172,190,208,226,244, 11, 29, 47, 65, 83, 101	13	65
24	114	1108	16555-16569	181-195	101,119,137,155,173,191,209,227,245, 12, 30, 48, 66, 84, 102	14	65
25	115	1109	16569-16583	195-209	102,120,138,156,174,192,210,228,246, 13, 31, 49, 67, 85, 103	15	65
26	116	1110	16583-16597	209-223	103,121,139,157,175,193,211,229,247, 14, 32, 50, 68, 86, 104	16	65
27	117	1111	16597-16611	223-237	104,122,140,158,176,194,212,230,248, 15, 33, 51, 69, 87, 105	17	65
28	118	1112	16611-16625	237-251	105,123,141,159,177,195,213,231,249, 16, 34, 52, 70, 88, 106	18	65
29	119	1113	16625-16639	251- 14	106,124,142,160,178,196,214,232,250, 17, 35, 53, 71, 89, 107	1	66
30	120	1114	16639-16653	14- 26	107,125,143,161,179,197,215,233,251, 18, 36, 54, 72, 90, 108	2	66

ORIGINAL PAGE IS
OF POOR QUALITY

LANDSAT-2

MAY, 1978

DATE	GMT DAY	FLIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS	REF DAY	CYCLE NO.
1	121	1125	16053-16067	23-42	103,126,144,162,180,198,216,234	1	66
2	122	1126	16057-16081	42-50	107,127,145,163,181,199,217,235	2	66
3	123	1127	16061-16095	56-70	110,129,146,164,182,200,218,236	3	66
4	124	1128	16035-16709	70-84	111,129,147,165,183,201,219,237	4	66
5	125	1129	16709-16723	84-98	112,130,148,166,184,202,220,238	5	66
6	126	1200	16723-16737	98-112	113,131,149,167,185,203,221,239	6	66
7	127	1201	16747-16751	112-120	114,132,150,168,186,204,222,240	7	66
8	128	1202	16731-16764	120-132	115,133,151,169,187,205,223,241	8	66
9	129	1203	16747-16776	132-153	95,110,134,152,170,188,206,224,242	9	66
10	130	1204	16776-16792	153-167	99,117,135,153,171,189,207,225,243	10	66
11	131	1205	16792-16800	167-181	100,118,136,154,172,190,208,226,244	11	66
12	132	1206	16806-16820	181-195	101,119,137,155,173,191,209,227,245	12	66
13	133	1207	16820-16834	195-209	102,120,138,156,174,192,210,228,246	13	66
14	134	1208	16834-16848	209-223	103,121,139,157,175,193,211,229,247	14	66
15	135	1209	16848-16862	223-237	104,122,140,158,176,194,212,230,248	15	66
16	136	1210	16862-16876	237-251	105,123,141,159,177,195,213,231,249	16	66
17	137	1211	16876-16890	251-14	106,124,142,160,178,196,214,232,250	17	67
18	138	1212	16890-16904	14-28	107,125,143,161,179,197,215,233,251	18	67
19	139	1213	16904-16918	28-42	108,126,144,162,180,198,216,234	19	67
20	140	1214	16918-16932	42-56	109,127,145,163,181,199,217,235	20	67
21	141	1215	16932-16946	56-70	110,128,146,164,182,200,218,236	21	67
22	142	1216	16946-16960	70-84	111,129,147,165,183,201,219,237	22	67
23	143	1217	16960-16974	84-98	112,130,148,166,184,202,220,238	23	67
24	144	1218	16974-16988	98-112	113,131,149,167,185,203,221,239	24	67
25	145	1219	16988-17002	112-120	114,132,150,168,186,204,222,240	25	67
26	146	1220	17002-17016	120-132	115,133,151,169,187,205,223,241	26	67
27	147	1221	17016-17029	132-153	95,110,134,152,170,188,206,224,242	27	67
28	148	1222	17029-17043	153-167	99,117,135,153,171,189,207,225,243	28	67
29	149	1223	17043-17057	167-181	100,118,136,154,172,190,208,226,244	29	67
30	150	1224	17057-17071	181-195	101,119,137,155,173,191,209,227,245	30	67
31	151	1225	17071-17085	195-209	102,120,138,156,174,192,210,228,246	31	67

LANDSAT-2

JUL, 1978

DATE	GMT DAY	EIGHT DAY	SPACECRAFT ORBITS	REFERENCE ORBITS	PATH NUMBERS										REF DAY	CYCLE NO.
					1	2	3	4	5	6	7	8	9	10		
1	152	1266	17065-17099	209-223	103, 121, 139, 157, 175, 193, 211, 229, 247,	14,	32,	50,	68,	86,	104,	16	67			
2	153	1267	17099-17113	223-237	104, 122, 140, 158, 176, 194, 212, 230, 248,	15,	33,	51,	69,	87,	105,	17	67			
3	154	1268	17113-17127	237-251	105, 123, 141, 159, 177, 195, 213, 231, 249,	16,	34,	52,	70,	88,	106,	18	67			
4	155	1269	17127-17141	251- 14	106, 124, 142, 160, 178, 196, 214, 232, 250,	17,	35,	53,	71,	89,	107,	1	68			
5	156	1230	17141-17155	14- 28	107, 125, 143, 161, 179, 197, 215, 233, 251,	18,	36,	54,	72,	90,	108,	2	68			
6	157	1231	17155-17169	28- 42	108, 126, 144, 162, 180, 198, 216, 234,	1	19,	37,	55,	73,	91,	3	68			
7	158	1232	17169-17183	42- 56	109, 127, 145, 163, 181, 199, 217, 235,	2,	20,	38,	56,	74,	92,	4	68			
8	159	1233	17183-17197	56- 70	110, 128, 146, 164, 182, 200, 218, 236,	3,	21,	39,	57,	75,	93,	5	68			
9	160	1234	17197-17211	70- 84	111, 129, 147, 165, 183, 201, 219, 237,	4,	22,	40,	58,	76,	94,	6	68			
10	161	1235	17211-17225	84- 98	112, 130, 148, 166, 184, 202, 220, 238,	5,	23,	41,	59,	77,	95,	7	68			
11	162	1236	17225-17239	98-112	113, 131, 149, 167, 185, 203, 221, 239,	6,	24,	42,	60,	78,	96,	8	68			
12	163	1237	17239-17253	112-126	114, 132, 150, 168, 186, 204, 222, 240,	7,	25,	43,	61,	79,	97,	9	68			
13	164	1238	17253-17267	126-139	115, 133, 151, 169, 187, 205, 223, 241,	8,	26,	44,	62,	80,	98,	10	68			
14	165	1239	17267-17280	139-153	94, 110, 134, 152, 170, 190, 206, 224, 242,	9,	27,	45,	63,	81,	99,	11	68			
15	166	1240	17280-17294	153-167	99, 117, 135, 153, 171, 191, 207, 225, 243,	10,	28,	46,	64,	82,	100,	12	68			
16	167	1241	17294-17308	167-181	100, 118, 136, 154, 172, 192, 208, 226, 244,	11,	29,	47,	65,	83,	101,	13	68			
17	168	1242	17308-17322	181-195	101, 119, 137, 155, 173, 193, 209, 227, 245,	12,	30,	48,	66,	84,	102,	14	68			
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20	171	1245	17350-17364	223-237	104, 122, 140, 158, 176, 196, 212, 230, 248,	15,	33,	51,	69,	87,	105,	17	68			
21	172	1246	17364-17378	237-251	105, 123, 141, 159, 177, 197, 213, 231, 249,	16,	34,	52,	70,	88,	106,	18	68			
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APPENDIX C

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