

#201

EMP-6
EXPLORER 41

LOW ENERGY TELESCOPE

69-053A-01A

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

IMP-G

DATA SET -01A IN IBM 7094 FORMAT

69-053A-01C

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY TWENTY-THREE 7-TRACK, 800 BPI TAPES WRITTEN IN BINARY. THERE ARE THREE RESTORED TAPES. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE YEARS FOR THE TIME SPANS COULD NOT BE VERIFIED. THE ORIGINAL TAPES WERE CREATED ON AN IBM 7094 COMPUTER AND WERE RESTORED ON AN IBM 9021 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR005056	DS005056	D010873	1	06/21/69 - 07/08/69 (a)
		D010874	2	07/08/69 - 07/25/69 (b)
		D010875	3	07/25/69 - 08/10/69 (c)
		D010876	4	08/10/69 - 08/27/69
		D010877	5	08/27/69 - 09/13/69
		D010878	6	09/13/69 - 09/30/69 (d)
		D010879	7	09/30/69 - 10/17/69 (e)
		D010880	8	10/17/69 - 11/02/69
		D010881	9	11/02/69 - 11/19/69
DR005057	DS005057	D010882	1	11/19/69 - 12/06/69
		D010883	2	12/06/69 - 12/20/69 (f)
		D010884	3	12/20/69 - 01/02/70
		D010885	4	01/02/70 - 01/15/70 (g)
		D010886	5	01/17/70 - 02/01/70
		D010887	6	02/01/70 - 02/21/70 (h)
		D010889	7	02/28/70 - 03/17/70 (i)
		D010890	8	03/17/70 - 04/06/70
		D010891	9	04/06/70 - 04/26/70
DR005058	DS005058	D010892	1	04/26/70 - 05/17/70 (j)
		D010893	2	05/17/70 - 06/06/70 (k)
		D010894	3	06/06/70 - 06/29/70 (l)
		D010895	4	06/29/70 - 07/23/70 (m)
		D010896	5	07/23/70 - 08/15/70 (n)

- (a) D010873 - 2 ERRORS, REC. 3333, 3376, FILE 1
 (b) D010874 - 1 ERROR, REC. 405, FILE 1
 (c) D010875 - 4 ERRORS, REC. 13, 17, 23, 1106, FILE 1
 (d) D010878 - 1 ERROR, REC. 2112, FILE 1

- (e) D010879 - 2 ERRORS, REC. 18, 3908, FILE 1
- (f) D010883 - 2 ERRORS, REC. 2859, 3310, FILE 1
- (g) D010885 - 1 ERROR, REC. 495, FILE 1
- (h) D010887 - 8 ERRORS, REC. 1541 - 47, 1556, FILE 1
- (i) D010889 - 1 ERROR, REC. 191, FILE 1
- (j) D010892 - 1 ERROR, REC. 134, FILE 1
- (h) D010893 - 14 ERRORS, REC. 21, 23, 72, 412, 413, 437-439, 441, 442, 444, 445, 2056, 2408, FILE 1
- (i) D010894 - 14 ERRORS, REC. 11-13, 15, 82, 94, 121, 154, 160, 163, 169, 184, 190, 4135, FILE 1
- (j) D010895 - 3 ERRORS, REC. 1114, 2279, 3386, FILE 1
- (k) D010896 - 3 ERRORS, REC. 370, 2131, 6482, FILE 1

IMP-G

LOW ENERGY TELESCOPE

69-053A-01A

THIS DATA SET HAS BEEN RESTORED. ORIGINALLY IT CONTAINED FORTY-THREE 7-TRACK, 800 BPI TAPES. THE FIRST 23 TAPES CONTAINED ONE FILE OF DATA. THE NEXT 20 TAPES WERE STANDARD LABELLED WITH THREE FILES EACH. THESE LABELS WERE STRIPPED AND JUST THE DATA FILE WAS LEFT. THERE ARE SEVEN RESTORED TAPES. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON A GE635 COMPUTER AND THEY WERE RESTORED ON THE MRS SYSTEM. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND THE TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR004416	DS004416	D009835	1	06/21/69 - 07/08/69 (a)
		D009836	2	07/08/69 - 07/25/69 (b)
		D009837	3	07/25/69 - 08/10/69 (c)
		D009838	4	08/10/69 - 08/27/69 (d)
		D009839	5	08/27/69 - 09/13/69
		D009840	6	09/13/69 - 09/30/69 (e)
		D009841	7	09/30/69 - 10/17/69 (f)
		D009842	8	10/17/69 - 11/02/69
		D009843	9	11/02/69 - 11/19/69 (g)
DR004417	DS004417	D009844	1	11/19/69 - 12/06/69
		D009845	2	12/06/69 - 12/20/69 (h)
		D009846	3	12/20/69 - 01/02/70
		D009847	4	01/02/70 - 01/15/70
		D009848	5	01/15/70 - 01/26/70
		D009849	6	01/26/70 - 02/11/70 (i)
		D009851	7	02/28/70 - 03/17/70
		D009852	8	03/17/70 - 04/06/70 (j)
		D009853	9	04/06/70 - 04/26/70 (k)
		D009854	10	04/26/70 - 05/17/70
DR004418	DS004418	D009855	1	05/17/70 - 06/06/70
		D009856	2	06/06/70 - 06/29/70 (l)
		D009857	3	06/29/70 - 07/23/70
		D009858	4	07/23/70 - 08/15/70
DR004419	DS004419	D017890	1	08/15/70 - 09/09/70
		D017891	2	09/08/70 - 10/01/70
		D017892	3	10/01/70 - 10/25/70
		D017893	4	10/25/70 - 11/18/70
		D017894	5	11/18/70 - 12/11/70 (m)
		D017895	6	12/11/70 - 01/04/71 (o)
DR004420	DS004420	D017896	1	01/04/71 - 01/27/71
		D017897	2	01/27/71 - 02/20/71
		D017898	3	02/20/71 - 03/15/71
		D017899	4	03/15/71 - 04/08/71 (p)

DR004421	DS004421	D023795	1	04/08/71 - 05/01/71	
		D023796	2	05/01/71 - 05/25/71	
		D023797	3	05/25/71 - 06/21/71	(q)
		D023798	4	06/21/71 - 07/18/71	
		D023799	5	07/18/71 - 08/14/71	
DR004422	DS004422	D023800	1	08/14/71 - 09/06/71	(r)
		D023801	2	09/06/71 - 09/30/71	
		D023802	3	09/30/71 - 10/23/71	(s)
		D023803	4	10/23/71 - 11/15/71	
		D023804	5	02/28/72 - 03/23/72	

- (a) READ ERROR OCCURRED ON RECORD 99 OF FILE 1
- (b) READ ERROR OCCURRED ON RECORD 705 OF FILE 1
- (c) READ ERRORS OCCURRED ON RECORDS 1741 - 1745 OF FILE 1
- (d) READ ERRORS OCCURRED ON RECORDS 1256, 1274, 1283, 1292, 1301, 1310, 1319, 1328, 1337, 1346, 1355, 1373, 1382, OF FILE 1
- (e) READ ERROR OCCURRED ON RECORD 310 OF FILE 1
- (f) READ ERROR OCCURRED ON RECORD 8 OF FILE 1
- (g) READ ERROR OCCURRED ON RECORD 480 OF FILE 1
- (h) READ ERRORS OCCURRED ON RECORDS 6, 546 - 548, 564, 1426 OF FILE 1
- (i) READ ERROR OCCURRED ON RECORD 275 OF FILE 1
- (j) READ ERRORS OCCURRED ON RECORDS 1916, 1921 OF FILE 1
- (k) READ ERROR OCCURRED ON RECORD 305 OF FILE 1
- (l) READ ERRORS OCCURRED ON RECORDS 62, 63, 66, 383 OF FILE 1
- (m) READ ERROR OCCURRED ON RECORD 80 OF FILE 1
- (n) READ ERROR OCCURRED ON RECORD 4, FILE 1
- (o) READ ERROR OCCURRED ON RECORD 290, FILE 1
- (p) READ ERRORS OCCURRED ON RECORDS 293, 441, 450 OF FILE 1
- (q) READ ERROR OCCURRED ON RECORD 2546 OF FILE 1
- (r) READ ERROR OCCURRED ON RECORD 6160 OF FILE 1
- (s) READ ERROR OCCURRED ON RECORD 209, OF FILE 1

REQ. AGENT
PAR
CMT
WTJ

RAN# NO.
RB2368
RC3475
RC6124

ACQ. AGENT
JHK

EXPLORER 41

LOW ENERGY TELESCOPE

69-053A-01A

This data set consists of 43 Explorer 41 Low Energy Telescope tapes. These tapes are 800 BPI, Binary, 7-track, each containing one file of Low Energy Telescope Telemetry and Orbital data. They were originally created on a GE635 computer.

The physical records are variable length. The telemetry logical records are 10 words long and the orbital records are 20 words long.

The time spans for the tapes are:

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-09835	C-07930	6/21/69 - 7/08/69
D-09836	C-07931	7/08/69 - 7/25/69
D-09837	C-07932	7/25/69 - 8/10/69
D-09838	C-07933	8/10/69 - 8/27/69
D-09839	C-07934	8/27/69 - 9/13/69
D-09840	C-07935	9/13/69 - 9/30/69
D-09841	C-07936	9/30/69 - 10/17/69
D-09842	C-07937	10/17/69 - 11/02/69
D-09843	C-07938	11/02/69 - 11/19/69
D-09844	C-07939	11/19/69 - 12/06/69
D-09845	C-07940	12/06/69 - 12/20/69
D-09846	C-07941	12/20/69 - 1/02/70
D-09847	C-07942	1/02/70 - 1/15/70
D-09848	C-07943	1/15/70 - 1/26/70
D-09849	C-07944	1/26/70 - 2/11/70
D-09851	C-07945	2/28/70 - 3/17/70

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-09852	C-07946	3/17/70 - 4/06/70
D-09853	C-07947	4/06/70 - 4/26/70
D-09854	C-07948	4/26/70 - 5/17/70
D-09855	C-07949	5/17/70 - 6/06/70
D-09856	C-07950	6/06/70 - 6/29/70
D-09857	C-07951	6/29/70 - 7/23/70
D-09858	C-07952	7/23/70 - 8/15/70
D-17890	C-15125	8/15/70 - 9/09/70
D-17891	C-15126	9/08/70 - 10/01/70
D-17892	C-15127	10/01/70 - 10/25/70
D-17893	C-15128	10/25/70 - 11/18/70
D-17894	C-15129	11/18/70 - 12/11/70
D-17895	C-15130	12/11/70 - 1/04/71
D-17896	C-15131	1/04/71 - 1/27/71
D-17897	C-15132	1/27/71 - 2/20/71
D-17898	C-15133	2/20/71 - 3/15/71
D-17899	C-15134	3/15/71 - 4/08/71
D-23795	C-17895	4/08/71 - 5/01/71
D-23796	C-17896	5/01/71 - 5/25/71
D-23797	C-17897	5/25/71 - 6/21/71
D-23798	C-17898	6/21/71 - 7/18/71
D-23799	C-17899	7/18/71 - 8/14/71
D-23800	C-17900	8/14/71 - 9/06/71
D-23801	C-17901	9/06/71 - 9/30/71
D-23802	C-17902	9/30/71 - 10/23/71
D-23803	C-17903	10/23/71 - 11/15/71
D-23804	C-17904	2/23/72 - 3/23/72

IMP-G
Explorer 41 #201

DESCRIPTION OF BTL EXPLORER 34 AND 41 REDUCED DATA TAPES

The reduced-data tapes contain, in a compacted and time ordered form, the telemetry and orbital information relevant to the Bell Laboratories experiments on the satellites Explorer 34 and 41 (IMP-F and IMP-G). They are 7-track digital magnetic tapes recorded at 800 b.p.i. in odd parity (binary mode). The tape format is the GECOS Standard System Format (see the appendix) in which information is grouped into logical records. Two tapes of logical records can appear on a reduced-data tape: packed telemetry records and orbital information records. The record type is determined by the record size: the packed telemetry records are ten words long while the orbital information records are 20 words long. The packing scheme for the telemetry records is found in Table 1; the scheme for the orbital information records is found in Table 2.

The orbit data are given every 10 minutes, except when $R < 42000$ km, when the orbit data are given every minute. The orbital information records giving the orbit data are interspersed on the tape among the packed telemetry records in a special order with respect to time. The time value of any packed-telemetry record read from the tape will lie between the time values of the middle two of the last four orbital-information records read from the tape. An immediate consequence of this is that the first four logical records on a reduced data tape are orbital information records. With this scheme, interpolation of the orbital data to the exact time of a telemetry sequence can be easily accomplished.

*Separate, nearly identical, Explorer 34 and 41 descriptions generated by BTL personnel and merged at NS3DC.

since there are always four relevant points equally spaced in time. Care must be used in doing this since some of the orbital data items may be flagged as bad or unavailable data.

(3)

TABLE 1
Packed Telemetry Record

<u>WORD</u>	<u>BITS</u>	<u>CONTENTS</u>
1	0-8	Day of the Year
	9-35	Millisecond of Day for Frame
2	0-3	Year (7=1967)
	4-5	Time Flag**
	6-7	Sequence Clock Flag
	8	Tape Read Error
	9	Experiment on/off Flag on = 0, off = 1
	10-18	0
	19-35	Satellite Sequence (see table 3)
3	0-2	0
	3	See Sun Flag
	4-17	See Sun Time (msec)
	18	0
	19	Register 1 Flag
	20-35	Register 1 Counts*

**1 Bit Flags: 0-Good, 1- Otherwise

Flags of 2 Bits: 11-Data Quality Good
10-Data Quality Fair
01-Data Quality Bad
00-Data Quality not Determined

TABLE 1 (CONT)

<u>WORD</u>	<u>BITS</u>	<u>CONTENTS</u>
4/5	0	0
	1	Register 2/4 Flag
	2-17	Register 2/4 Counts*
	18	0
	19	Register 3/5 Flag
	20-35	Register 3/5 Counts*
6	0-9	Real Flags for 5 Registers as they were read from telemetry record, 2 bits for each register
	10-11	0
	12-13	Pseudo-Sequence Clock Flag
	14-35	Pseudo-Sequence Clock
7	0-1	Optical Aspect Flag
	2-17	Optical Aspect Mean (0-180° Binary Point 5 Places to the Left)
	18-19	Spin Period Flag
	20-35	Spin Period (msec) (2000-3000 msec)

(Counts for 9.28 sec)

* In the 16 bits of the register counts, if bits 1 and 2 of those bits = 1, in order to determine the register counts use the following formula:

Counts = $16383 * RMAX / (RMAX - \text{contents of bits 3 through 16})$
 where RMAX = 14848. For example, if word 4 were 340,037,021,637 (octal), the 16 bits of the register count for register 2 would be 1100000000011111. Since bits 1 and 2 of these 16 bits are 1 the counts for register 2 would be calculated by

$$16383 * 14848 / (14848 - 31).$$

(5)
TABLE 1 (CONT)

<u>WORD</u>	<u>BITS</u>	<u>CONTENTS</u>
8	0-17	Optical Aspect 3 (0-20,000 msec)
	18-35	Optical Aspect 4 (0-300 msec)
9	0-17	Performance Parameters 7 (11.7 V)
	18-35	Performance Parameters 8 (28 V)
10	0-17	Performance Parameter (BTL Bias)
	18-35	Temperature-Even Sequence Skin Temperature-Odd Sequence

Orbital Information Record

<u>WORD</u>	<u>CONTENTS</u>	
1	Day of the Year (Bits 0-8) and msec of Day (Bits 9-35)	
2	Geocentric Longitude (Degrees)	
3	Geocentric Latitude (Degrees)	
4	R (km)	
5	X } Satellite Position- Solar Ecliptic (Earth Radii)	
6		Y }
7		Z }
8	X } Satellite Position-Solar Magnetospheric (Earth Radii)	
9		Y }
10		Z }
11	X } Moon Position-Solar Ecliptic (Earth Radii)	
12		Y }
13		Z }
14	RA-Right Ascension Inertial Ecliptic Satellite Position	
15	D-Declination	

$$\left(\begin{array}{l} X=R \cos D \cos RA \\ Y=R \cos D \sin RA \\ Z=R \sin D \end{array} \right)$$

(7)
TABLE 2 (CONT)

<u>WORD</u>	<u>CONTENTS</u>
16	L-McIlwain Parameter } Real Field Co-ordinate
17	B-Field Strength } System
18	L_{sep} Satellite-Earth-Sun-Angle
19	Right Ascension } of the Magnetic Vector
20	Declination }

Satellite Sequence and Calibrate Mode

If not in a calibrate mode, bits 31-35 of word 2 of a packed telemetry record determine the mode, according to the following table:

<u>Bits 31-35</u>	<u>Mode</u>	<u>Bits 31-35</u>	<u>Mode</u>
0	D	16	D
1	A	17	A
2	H	18	H
3	K	19	K
4	I	20	I
5	B	21	G
6	M	22	M
7	C	23	J
8	D	24	D
9	A	25	L
10	H	26	H
11	K	27	K
12	I	28	I
13	E	29	O
14	M	30	M
15	F	31	P

If in the calibrate mode, that is, if bits 25-29 of word 2 of a packed telemetry record are all ones,

bit 30=0 particle source in calibration

bit 30=1 test pulsar in calibration

If the satellite sequence (word 2) and pseudo-sequence clock (word 6) do not agree, use the satellite sequence for computations.

TABLE 4

Correspondence between Particles and Channels

CHANNEL	ENERGY (MeV/NUCLEON)	EFFICIENCY TO CNT MIX (cm ² sec.str. $\frac{\text{MeV}}{\text{Nucleon}}$) -1 (from cnts/sec)
<u>ALPHAS</u>		
A4*	Explorer 34 (IMP F)	Explorer 41
A5	1.0-1.6	10.3
B5	1.6-2.2	11.7
P3	2.2-3.0	8.2
P4	4.0-6.0	3.3
P5	6.0-11.8	1.1
<u>PROTONS</u>		
A1	56-.60	163
A2	.60-1.20	11.3
A3	1.2-2.4	5.2
B3	2.5-4.3	3.5
D1	4.4-5.0	11.7
D2	5.0-9.4	1.6
D3	9.4-17.4	0.8
D4	17.3-18.9	4.0
M1	4.3-8.2	1.7
M2	8.2-17.0	0.7
M3	17.0-19.7	2.4
	5.0-5.9	3.2
	5.9-8.8	1.0
	8.8-16.7	0.4
<u>ELECTRONS</u>		
H1	>0.30 MeV	57
H2	>0.50 MeV	7.2
H3	>1.0 MeV	7.2

* CHANNEL A4 ALPHAS FROM A, KESLER 4

(10)

APPENDIX

GECOS Standard System Tape Format

A tape written as a GECOS standard system tape has three files, the first and last file being header and trailer labels, each containing one fourteen-word (one word=36 bits) record. The header and trailer labels contain information for use by the BTL Computation Center.

The second file contains the telemetry and orbital information in data blocks (physical records) of up to 320 words. The first word of each block contains the block serial number: bits 0-17 is the block serial number, the sequential number of the block (physical record) and bits 18-35 contain the block size. The block size is the number of 36-bit words not including the block-serial-number word in the record (e.g. if the block had 320 words, the block size would be 319 as the first word is the block serial number).

The logical records contained within each block are variable length and have a record size control word as the first word of each variable-length record. The contents of bits 0-17 of this control word give the binary equivalent of the record size in words not including the record size control word. The remainder of the word contains information for the GECOS system.

FILE 0002 REC 0002 CH 1902

Table with 13 columns of alphanumeric data, containing entries from line 1 to 33. Each row contains 13 distinct values.

FILE 0002 REC 0003 CH 1896

Table with 13 columns of alphanumeric data, containing entries from line 34 to 65. Each row contains 13 distinct values.

FILE 0002 REC 0004 CH 1896

Table with 13 columns of alphanumeric data, containing entries from line 66 to 97. Each row contains 13 distinct values.

FILE 0001 REC 0007 CH 0918

0097	000001000020	053020000000	763416415573	005160004242	001646000000	000566001572	000212402400	000012000000
0145	373216563703	510000364070	777777377777	377777377777	377777377777	000056415574	777777777777	777777777777
0193	000566001572	000212005000	000012000000	373216607666	510000364071	777777377777	377777377777	377777377777
0241	000056415575	777777777777	777777777777	000566001572	000212005000	000024000000	373217217300	017345077150
0289	017306266202	034744377134	027120366177	030563371602	035047434243	027120366177	0332002266037	035106306376
0337	036753130037	046563216651	041357010210	016443320142	017305266205	010702226650	030736457271	016601442630
0385	016473105146	015000040364	000012000000	373216703620	516000364074	002470000002	000007000001	000001000000
0433	777416415600	005160004242	002603000005	000273001572	000212001066	000012000000	373216727603	516000364075
0481	002470000000	000000000000	000001000000	777416415601	005160004242	000000000000	000273001572	000212001066
0529	000120000000	373216753567	516000364076	001367000000	000000000000	000000000000	777436415602	005160004242
0577	001502000000	000566001572	000212402400	000012000000	37321677552	516000364077	001367000000	000000000000
0625	000000000000	776436415603	005160004242	001502000000	000566001572	000212402400	000012000000	373217023621
0673	522000364340	000266000000	000000000000	000211000140	252536415604	005160004242	000401000000	000566001572
0721	000134001066	000024000000	373217404440	017357542170	017312432321	034754070233	027161770241	030525763357
0769	035035736104	027161770241	033151132573	035102525721	036752221125	046563217263	041357014552	016456764531
0817	017312432323	010647562531	030705201206	016577153217	016501301414	015015356262	000012000000	373217047604
0865	522000364341	000266126000	130051044571	000015000000	252436415605	005160004242	000401000000	000566001572
0913	000134001066							