

Data Set Catalog # 62
Surveyor 5, 6, 7
Alpha scat

67-084A-02A

2 tapes

67-112A-02A

2 tapes

68-001A-03A

2 tapes

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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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

SURVEYOR 6

ALPHA SCATTER DATA (MAGTAPE)

67-112A-02A

THIS DATA SET HAS BEEN RESTORED. THERE WAS ORIGINALLY ONE
7-TRACK, 800 BPI TAPE WRITTEN IN BINARY. THERE IS ONE RESTORED
TAPE. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK,
6250 BPI. THE TIME SPAN COULD NOT BE VERIFIED. THE ORIGINAL TAPE
WAS CREATED ON AN IBM 7094 COMPUTER AND WAS RESTORED ON THE MRS
COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D
NUMBER AND TIME SPAN IS AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR005348	DS005348	D000183	1	11/10/67 - 11/19/67 (a)

(a) D000183 - 73 ERRORS, REC. 10, 266, 4797, 5032, 5093, 5124, 5171,
5179, 5266, 5270, 5274, 5291, 5299, 5308, 5312, 5316, 5320, 5324, 5337,
5341, 5345, 5358, 5362, 5366, 5370, 5374, 5387, 5391, 5395, 5399, 5407,
5416, 5420, 5424, 5428, 5432, 5436, 5440, 5444, 5445, 5449, 5453, 5457,
5461, 5465, 5469, 5473, 5477, 5481, 5485, 5489, 5493, 5497, 5501, 5505,
5509, 5513, 5517, 5521, 5525, 5529, 5531, 5533, 5537, 5553, 5561, 5565,
5568, 5581, 5584, 5593, 5605, 5609, FILE 1

SURVEYOR 7

ALPHA SCATTER DATA (MAGTAPES)

68-001A-03A

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY TWO
7-TRACK, 800 BPI TAPES WRITTEN IN BINARY. THERE IS ONE RESTORED
TAPE. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK,
6250 BPI. 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 NUMBER ALONG WITH THE
CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR005223	DS005223	D000184	1	01/10/68 - 01/22/68
		D000185	2	01/22/68 - 01/23/68

SURVEYOR 5

ALPHA SCATTER DATA

67-084A-02A

This data set has been restored. Originally there were three 7-track, 800 BPI tapes, written in Binary. There is one restored tape. The original tapes were created on a 7094 computer. When the original D tapes were processed, upon initial receipt by the data center, the C tapes were created with a program that deleted short (14 byte) records and in the case of one tape a file was shortened. (Documentation does not explain why this occurred) Therefore the C tapes were not a direct copy of the D tapes. For this restoration effort only the C tapes were copied. The DR tape is 3480 cartridge and the DS tape is 9-track, 6250 BPI. The DR and DS number along with their corresponding D numbers are as follows:

DR#	DS#	DD#	FILES	TIME SPAN
DR-005290	DS-005290	DD-000180	1	09/09/67 - 09/09/67
		DD-000181	2	09/17/67 - 09/23/67 (a)
		DD-000182	3	09/23/67 - 09/24/67

(a) DD-000181: 6 errors, rec 1843, 1866, 2000, 2006, 2011 and 2059, File 1.

SURVEYOR 5, 6, 7

ALPHA SCAT

67-084A-02A

800 BPI, 7-track, Binary, 7094 IBM

<u>D#</u>	<u>FILES</u>	<u>START</u>	<u>STOP</u>
D-00180	3	9/09/67	9/09/67
D-00181	3	9/17/67	9/23/67
D-00182	3	9/23/67	9/24/67
<u>C#</u>	<u>FILES</u>	<u>START</u>	<u>STOP</u>
C-03854	1	9/09/67	9/09/67
C-03855	1	9/17/67	9/21/67
C-03856	1	9/21/67	9/24/67

67-112A-02A

<u>D#</u>	<u>FILES</u>	<u>START</u>	<u>STOP</u>
D-00183	3	11/10/67	11/19/67
<u>C#</u>	<u>FILES</u>	<u>START</u>	<u>STOP</u>
C-03857	1	11/10/67	11/19/67

68-001A-03A

<u>D#</u>	<u>FILES</u>	<u>START</u>	<u>STOP</u>
D-00184	3	1/10/68	1/22/68
D-00185	3	1/22/68	1/23/68
<u>C#</u>	<u>FILES</u>	<u>START</u>	<u>STOP</u>
C-03858	1	1/10/68	1/22/68
C-03859	1	1/22/68	1/23/68

NOTE: The dupe tapes for these data sets were created from a program that handled the problem involving eliminating two-two word files and reduction in size of the one remaining file.

ALPHA SCATTERING EXPERIMENT

POST-MISSION DATA PROCESSING

ABSTRACT

This paper describes the format of the data from the Alpha Scattering Experiment which has been deposited with the NSSDC. Surveyor operations information pertinent to the use of the data and a summary of the data processing performed is also provided.

I. INTRODUCTION

This report serves to document the tapes deposited with the NSSDC which represent data recorded by the alpha scattering experiment on Surveyors 5, 6 and 7. It is divided into three parts: the first explains what is necessary to get data from the tapes, the second what the data means, and the last is reserved for sundry other comments and background material. The data consists of most of that which was telemetered from the spacecraft and commands sent from the several stations of the Deep Space Network operated by JPL, and is a subset of the data provided to The University of Chicago by JPL. It is these data which have been used as the basis for the final analyses (7, 8, 9). Although a brief description is given, familiarity with the alpha scattering experiment and the organization of the Surveyor spacecraft is assumed. For more detail, see references (1, 2, 3).

The alpha scattering experiment consists of an alpha source collimated to irradiate an opening in the bottom of the instrument where the sample is, and two parallel and independent charged particle detector systems, one to detect alpha particles scattered from the lunar surface and the other to detect protons produced via (α,p) reactions in the surface material. Each system consists of a detector assembly connected to a pulse height analyzer. There is, however, no memory on the spacecraft; hence data are continuously telemetered to earth whenever the experiment is operating. The analyzer has seven bit accuracy, i.e., 128 channels, and the addition of a parity bit and "sync"

or word identification bit means that each event reported, null event or not, requires nine bits. The bit transmission rates chosen, 2200 and 550 bits/sec respectively for alpha and proton data, imply maximum meaningful event rates of 244.44...and 61.11...events/sec for the alpha and proton data streams. Additionally, the instrument supplies to the spacecraft several measurements of voltage and temperature to be telemetered to earth along with other engineering data on a separate SCO.

II. "GRAMMAR"

The tapes being submitted to the NSSDC were written at 800 bpi in the binary mode using an IBM 7094 computer; thus the tapes are seven track. In all further references, a logical word is 36 bits or six bytes. Data are blocked 500 words to a physical record; however, the final record of the final tape may be less than 500 words. Further, each tape begins and ends with a two word label file which provides identification and reel sequencing information. The structure of the tape is:

- 1) Two word header label
- 2) EOF mark
- 3) One or more 500-word data records
- 4) EOF mark
- 5) Two word trailer label
- 6) EOF mark

Since these tapes are not finalized with a double EOF, care should be taken that reading is stopped after the third file mark. Data from each mission are recorded on a separate set of reels and the format of the label files is as follows:

	s,1	17 18	35	bit number
word 1	'MDT'		n	
word 2	c	k	M	
	s 3	17 18	35	

n is a reel sequence number (origin 1) it is identical in the header and trailer of each reel.

k = 0 ⇒ header label

k = 1 ⇒ trailer on final reel of data

k = 2 ⇒ trailer and more data follow

(with n' = n-1)

c = 0 for all labels

M is the mission identification (Surveyor 5, 6 or 7)

'MDT' is identically those letters in BCD: (442463)₈

The data are of several types. The spacecraft sends back data in three categories:

- 1) alpha scattering experiment (science) data
- 2) analog and digital engineering data
- 3) TV video.

Types 1) and 3) are physically incompatible, so TV video data will not be discussed at all. Data are sent to the spacecraft in the form of commands used to alter its mode of operation, these also appear on the tape. In addition, markers have been added to the data during the processing at the U. of C.

Each data item is a two word pair, the first word represents the time of receipt (or, in the case of commands, transmission) of the event as a binary integer, (in milliseconds from the beginning of the year) the second word is the data item itself. The format of the data word is given in Table 5. Those items which have been added at the U. of C. are listed in Table 9.

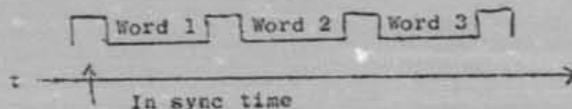
III. "SEMANTICS"

For each mission, the data being provided are a 'best' copy of all the alpha scattering data available. In addition, some of the engineering telemetry and all of the available commands sent to the spacecraft are present on the tapes. The ultimate source of these data is the recordings made at each of the DSIF stations or FRI400 analog recorders. The entire demodulated spacecraft signal was recorded, using a separate track for each SCC. Commands and a timing code were added on their own tracks. In order to provide 24 hour coverage, three tracking stations were utilized, each recording whenever the moon was locally visible. Recording was overlapped during transfer periods whenever it was feasible and necessary. Since each of the analog tapes was long enough to record only four hours of data, two or three reels were used during each station pass. These transitions, too, were generally overlapped, since two recorders were available.

These recordings were then sent to the JPL, where they were digitized using equipment on hand and maintained by the SSCP group. The resultant digital tapes consist of all data that could be taken from the original analog tape, regardless of their quality. It should be pointed out that not all of the data periods on the analog tapes were digitized. Rather, based on logs and the data actually observed to be on the tape, only those portions known to contain alpha scattering data were processed and the rest was usually skipped over. The digital tapes were then processed by the same group to select only those

portions of the data relevant to the alpha-scattering experiment and to format these in a standard manner. This process is called MDLing (MDL = Master Data Library) and the result of it is an MDL tape.

It is at this stage in the processing that sync is established, the telemetry frames are broken down to individual data items (decommutated), and time is assigned to each data item. For alpha and proton data, the condition to be met for declaring the data stream to be 'in sync' and data to be reported is to find three consecutive zero words having their four associated sync bits present. Word 1 is the first good word and its time is assigned to the 'in sync' indicator.



Sufficient cause to lose sync is for two consecutive sync bits to be missing. The last word to have a sync bit to its right is the last good word and its time is assigned to the out of sync indicator. Whenever a data stream is out of sync, of course, no data are reported. The sync indicators have been retained on the MDL exactly as described here.

The conditions for attaining and losing sync in the case of engineering telemetry are not so simple, but recovery of all the data is not important to the alpha scattering experiment. If engineering data are to be used, it is sufficient merely to use whatever data are present on the tape, since data

are recorded only during in-sync periods. For more information concerning the engineering telemetry system, see (1). As previously noted, the data presented have already been decommutated and each item in the composite frame is reported individually with its time interpolated appropriately within the telemetry frame. Engineering telemetry is further filtered in that after reporting initial values at in-sync time, further values are reported only when changes occur.

Time is assigned independently for each of the four data streams we are concerned with, alpha data, proton data, engineering, and commands. Each item is assigned a time interpolated from its position on the analog tape relative to the timing codes that were being simultaneously recorded. However, although each item has a correct time and each data stream is chronological, when the four data streams are combined onto one tape, the order is not always strictly chronological. The 'time' being considered here is GMT time of day; the day itself is assumed to be known already.

Each of the original analog tapes was processed in this way to yield an MDL file, each file was prefaced by a header record giving contextual information. Usually several such files were put on each MDL tape. It was these MDL tapes which were provided to the U. of C. by JPL; a complete list is provided in Table 1.

These tapes were then processed at The University of Chicago to correct any errors that may have crept in along the line and to put the data in a compact form more natural for the

merging operation. At this stage, a minor selection process took place; when more than two copies of a given data period were available, only two were selected to be used in the merging operation and certain MDL files or portions of files containing especially bad data were not included. Tables 2 through 4 list those files which were used as input to the merging program for each of the missions.

Since a large fraction, about one-fourth, of the data was overlapped, it is necessary to go into some detail of the philosophy of the merging program and the results which it produces. Stated generally, the problem is: given two independently recorded copies of what purport to be the same data, on what basis is it possible to efficiently choose between them when discrepancies arise. In designing the algorithm to be used, three restrictions were kept in mind.

- 1) The resultant tape should be no worse than the better of the inputs.
- 2) It should be possible to reconstruct the two input tapes from the information on the merged tape.
- 3) If the data degenerate markedly on one of the tapes or the program becomes hopelessly confused, it should be possible to abandon merging activities and continue, taking data only from the tape which is continuing.

The first step is to find an 'initial match' from which to begin comparing data. This is done by finding a

fixed number of successive pairs of items, usually five, which, considering sync states on both tapes, agree exactly. Reliance here is placed entirely on the data, and not on the assigned times, except that the time difference between the two tapes should be within certain limits. At this point an average time displacement is calculated and it is continually updated as further matches are found. The procedure now, is to pick up successive pairs of data items and to verify that they are identical and occur at the proper time. As long as there are no unmatched items, this continues until one of three things occurs:

- 1) There is no more data (EOF) on the outgoing tape (Tape I).
- 2) All three data streams go out of sync on one or both tapes.
- 3) There is a minimum period of time with data on only one tape. (This period is on the order of seconds.)

Provided the end of data time is not too close on Tape I, the program will attempt to find a new initial match in cases 2) and 3); otherwise an end-of-merge flag is put out and data transcription continues from the ongoing tape.

During overlap periods, three normally unused bits in the data word are utilized to indicate the source and 'reliability' of each item. All of these bits off implies that the item, whatever it happens to be, was present with proper time on both tapes. The reliability flag (Q) may take on

values 0 to 3. If $Q \geq 1$, then S , the source flag, is meaningful.

$S = 0 \Rightarrow$ data from tape I

$S = 1 \Rightarrow$ data from tape II

The placement of these bits within the data word are defined in Tables 5 and 6. For any pair of data items there are four possible outcomes.

1. Identical items occurring at the same time.
2. Identical items occurring at different times.
3. Different items occurring at the same time.
4. Different items occurring at different times.

Case 1. The item goes immediately on the output tape with no additional bits set.

Case 2. This is treated in the same manner as Case 4.

Case 3. The two items are considered to be either 2-bit errors of each other or totally unidentifiable and both put out with $Q = 3$, provided that neither of them is a sync item or parity incorrect and in any case, the corresponding data stream on the other tape is in sync. If, however, any of these conditions are met, that is, there is a sync or parity incorrect item, or either of the 'other' streams is out of sync, then the responsible item is put out according to this scheme:

Other tape status

Item	in sync	out'a sync
Data	Q = 3	Q = 1
Sync	ignored	Q = 1
parity	Q = 2	Q = 1
data flag		Q = 1
command		Q = 1

Then the next item is fetched from that tape only and a new comparison is made.

Case 4. The earlier of the pair is treated according to the following table:

Other tape's X status

Item	in sync	out'a sync
x data	Q = 3	Q = 1
x sync	ignored	Q = 1
x parity	Q = 2	Q = 1

where X may be any of the five possible data streams. By convention, the command and flag streams are always out of sync on the other tape. Again, the next item is fetched from the affected tape only and a new comparison is made.

A serious problem that arises when merging overlapped data is how to treat differences in time scale between the two tapes. It has been our experience that the time displacement between the two tapes can be as large as one second and that through the overlap period it can vary by an equal amount. In assigning time to merged data there are two boundary conditions

to meet: 1) assigned time should be near tape I time at the beginning of the overlap period and 2) assigned time should be near tape II time at the end of the overlap period. Further, it is desirable to avoid gross discontinuities or other unusual behavior of assigned times. What we have elected to do is to totally ignore these differences and use tape I time as accurate until an arbitrary point is reached (in fact, half way through the overlap period) and then consider tape II time as accurate. When the switch occurs, a word is put out whose value, Δt_s , is ten times the time displacement at that instant. All data items from that point until Δt_s milliseconds have elapsed are processed but not put on the output tape: this is done in order to prevent an incorrectly large gap in time or an apparent overlap in reported times. In order to achieve consistency, programs making use of this data should consider all data streams as being out of sync during this period.

IV. CONCLUSION

The MDT produced by the Merging program is a single continuous non-redundant record of the data from each of the missions. It is an essentially exact copy of the MDL tapes until an overlap period is reached; when an initial match is found, a merge flag is put out and all the following data are a combined version of the data from two MDL files. At the end of the overlap period a merge flag is put out indicating that fact. Any time that the match is lost or regained, an appropriate merge flag is put out reflecting the current status.

The data presented consist of those from the first lunar day of Mission V, from Mission VI up until the spacecraft translation which caused the sensor head to turn upside down, and from the first lunar day of Mission VII. Although data recorded during the second lunar day operations of Surveyor VII were utilized in the post-mission analysis, they were not included here, because their poor quality and fragmentary nature necessitates a significant amount of extra processing to make the data usable. The corresponding tapes are:

<u>Mission</u>	<u>Tape Designation</u>	<u>NSSDC Tape ID</u>
S/C V:	MDT - 1	A87474
	MDT - 2	A87475
	MDT - 3	A87473
S/C VI:	MDT - 1	A87470
S/C VII:	MDT - 1	A87471
	MDT - 2	A87472

The tape designated A87476 was not used.

Detailed descriptions of the alpha scattering operations for each of the missions are available in references (4, 5, 6). These descriptions can be used along with the commands on the tapes which are pertinent to the alpha scattering instrument to organize the processing of these tapes. Pertinent commands are listed in Table 7, showing both methods of identification. Table 8 shows the most useful engineering telemetry channels and their identification.

References

1. Surveyor Project Staff, Surveyor Project Final Report, Part I. Project Description and Performance, Volume II, JPL Technical Report 32-1265, Pasadena, California, 1969.
2. Surveyor Investigator Teams, Surveyor Project Final Report, Part II. Science Results, JPL Technical Report 32-1265, Pasadena, California, 1968.
3. Turkevich, A. L., Knolle, K., Franzgrote, E., Patterson, J. H., Chemical Analysis Experiment for the Surveyor Lunar Mission, J. Geophys. Res., 72, 831, 1967.
4. Turkevich, A. L., Franzgrote, E. J., and Patterson, J. H., Chemical Analysis of the Moon at Surveyor V Landing Site: Preliminary Results, Surveyor V Mission Report, JPL Technical Report 32-1246, Pasadena, California, 1967.
5. Turkevich, A. L., Franzgrote, E. J., and Patterson, J. H., Chemical Analysis of the Moon at Surveyor VI Landing Site: Preliminary Results, Surveyor VI Mission Report, Part II: Science Results, JPL Technical Report 32-1262, Pasadena, California, 1968.
6. Franzgrote, E. J., Patterson, J. H., and Turkevich, A. L., Chemical Analysis of the Moon at the Surveyor VII Landing Site: Preliminary Results, Surveyor VII Mission Report, Part II: Science Results, JPL Technical Report 32-1264, Pasadena, California, 1968.

References (continued)

7. Turkevich, A. L., Franzgrote, E. J. and Patterson, J. H.,
Chemical Composition of the Lunar Surface in Mare Tranquillitatis,
Science 165, 277, 1969.
8. Franzgrote, E. J., Patterson, J. H., Turkevich, A. L., Economou,
T. E., and Sowinski, K. P., Chemical Composition of the Lunar
Surface in Sinus Medii, Science 166, , 1970.
9. Patterson, J. H., Turkevich, A. L., Franzgrote, E. J., Economou,
T. E., and Sowinski, K. P., Chemical Composition of the Lunar
Surface in a Terra Region Near the Crater Tycho, (submitted
to Science January 30, 1970.)

Table 1

COMPLETE LIST OF MDL FILES RECEIVED FROM JPL

MISSION	MDL Type No.	File No.	Analogy Type No.	Year	Day	Start Time	End Time
MISSION V	N002A	1	S/C 5-42-006	1967	252	1028	1128
NOT USED	N200	1	S/C 5-11-018	1967	254	0334	0441
NOT USED	N002	2	S/C 5-42-018	1967	254	0722	0803
NOT USED	N002A	2	S/C 5-42-018	1967	254	0722	0803
NOT USED	N200	2	S/C 5-42-019	1967	254	0900	0915
NOT USED	N002	3	S/C 5-42-019	1967	254	0914	1207
NOT USED	N002A	3	S/C 5-42-019	1967	254	0914	1207
NOT USED	N002	4	S/C 5-42-020	1967	254	1211	1329
NOT USED	N002A	4	S/C 5-42-020	1967	254	1211	1329
NOT USED	N002	5	S/C 5-42-016	1967	254	1315	1505
NOT USED	N002A	5	S/C 5-42-016	1967	254	1315	1505
NOT USED	N002	6	S/C 5-61-019	1967	254	1500	1816
NOT USED	N002A	6	S/C 5-61-019	1967	254	1500	1816
NOT USED	N002	7	S/C 5-61-020	1967	254	1752	2131
NOT USED	N002A	7	S/C 5-61-020	1967	254	1752	2131
NOT USED	N002	8	S/C 5-61-021	1967	254	2106	2228
NOT USED	N002A	8	S/C 5-61-021	1967	254	2106	2228
NOT USED	N300	1	S/C 5-11-029	1967	255	0058	0159
NOT USED	N003	1	S/C 5-42-027	1967	255	0615	0925
NOT USED	N003A	1	S/C 5-42-027	1967	255	0618	0925
NOT USED	N003	2	S/C 5-42-029	1967	255	0909	1309
NOT USED	N003A	2	S/C 5-42-029	1967	255	0909	1309
NOT USED	N003	3	S/C 5-42-028	1967	255	1238	1606
NOT USED	N003A	3	S/C 5-42-028	1967	255	1238	1606
NOT USED	N003	4	S/C 5-61-025	1967	255	1557	1913
NOT USED	N003A	4	S/C 5-61-025	1967	255	1557	1913
NOT USED	N003	5	S/C 5-61-029	1967	255	1848	2231
NOT USED	N003A	5	S/C 5-61-029	1967	255	1848	2231
NOT USED	N003	6	S/C 5-61-027	1967	255	2206	2329
NOT USED	N003A	6	S/C 5-61-027	1967	255	2206	2329
NOT USED	N004	1	S/C 5-42-032	1967	256	0840	1004
NOT USED	N004	2	S/C 5-42-033	1967	256	1024	1417
NOT USED	N004	3	S/C 5-42-035	1967	256	1402	1654
NOT USED	N012	1	S/C 5-61-031	1967	256	1644	2000
NOT USED	N004	4	S/C 5-42-031	1967	256	1646	2000
NOT USED	N004	5	S/C 5-61-032	1967	256	1935	2315
NOT USED	N004	6	S/C 5-61-033	1967	256	2249	0020
NOT USED	N005	1	S/C 5-42-040	1967	257	0853	0953
NOT USED	N005	2	S/C 5-61-055	1967	259	1839	2155
NOT USED	N005	3	S/C 5-61-056	1967	259	2132	0124
NOT USED	N012	2	S/C 5-61-056	1967	259	2132	0125
NOT USED	N006A	1	S/C 5-61-057	1967	260	0052	0350
NOT USED	N006	1	S/C 5-61-057	1967	260	0056	0351
NOT USED	N006A	2	S/C 5-11-093	1967	260	0148	0543
NOT USED	N006	2	S/C 5-11-093	1967	260	0339	0543
NOT USED	N006	3	S/C 5-11-096	1967	260	0536	0942
NOT USED	N006A	3	S/C 5-11-096	1967	260	0536	0942
NOT USED	N200	3	S/C 5-11-091	1967	260	0941	0954
NOT USED	N006A	4	S/C 5-11-097	1967	260	0953	1215
NOT USED	N006	4	S/C 5-11-097	1967	260	0953	1215
NOT USED	N006	5	S/C 5-42-067	1967	260	1006	1409
NOT USED	N006A	5	S/C 5-42-067	1967	260	1006	1409
NOT USED	N006A	6	S/C 5-42-069	1967	260	1343	1739
NOT USED	N006	6	S/C 5-42-068	1967	260	1709	1855
NOT USED	N006A	7	S/C 5-42-068	1967	260	1709	1855

NOT USED
NOT USED

NOT USED

NOT USED

NOT USED

MISSION V - DAY 2
All the following data
from Mission V was not used

N006A	8	S/C	5	61-060	1967	260	1837	2036
N006	7	S/C	5	61-060	1967	260	1841	2114
N007	1	S/C	5	11-102	1967	261	0810	0853
N012	3	S/C	5	11-102	1967	261	0816	0854
N007	2	S/C	5	42-071	1967	261	1544	1724
N007	3	S/C	5	42-072	1967	261	1734	1951
N007	4	S/C	5	61-068	1967	261	1859	2215
N007A	1	S/C	5	61-068	1967	261	1859	2215
N007	5	S/C	5	61-069	1967	261	2151	0141
N008	1	S/C	5	61-070	1967	262	0117	0233
N008	2	S/C	5	11-113	1967	262	0803	1018
N200	4	S/C	5	11-117	1967	262	1015	1030
N008	3	S/C	5	11-114	1967	262	1028	1411
N008	4	S/C	5	42-073	1967	262	1247	1548
N008	5	S/C	5	42-074	1967	262	1518	1913
N012	4	S/C	5	42-074	1967	262	1518	1913
N012	5	S/C	5	42-075	1967	262	1846	1937
N008	6	S/C	5	61-083	1967	262	1919	2245
N008	7	S/C	5	61-084	1967	262	2215	0203
N009	1	S/C	5	61-085	1967	263	0142	0355
N300	2	S/C	5	11-127	1967	263	0600	0603
N300	3	S/C	5	11-128	1967	263	0746	0749
N300	4	S/C	5	11-129	1967	263	1027	1313
N300	5	S/C	5	42-076	1967	263	1449	1544
N300	15S/C	5	42-077	1967	263	1550	1604	
N300	6	S/C	5	42-078	1967	263	1606	1740
N009	2	S/C	5	42-078	1967	263	1830	2006
N009	3	S/C	5	61-090	1967	263	1935	2303
N009	4	S/C	5	61-091	1967	263	2237	0228
N010	1	S/C	5	61-092	1967	264	0157	0345
N300	7	S/C	5	11-134	1967	264	0500	0503
N300	8	S/C	5	11-137	1967	264	0720	1010
N200	5	S/C	5	11-138	1967	264	1114	1130
N010	2	S/C	5	42-080	1967	264	1334	1628
N012	6	S/C	5	42-082	1967	264	1641	2028
N010	3	S/C	5	42-082	1967	264	1642	2028
N010	4	S/C	5	61-106	1967	264	2001	2332
N010	5	S/C	5	61-107	1967	264	2307	0254
N300	9	S/C	5	61-104	1967	265	0341	0648
N300	16S/C	5	11-171	1967	265	0917	0922	
N300	10S/C	5	11-172	1967	265	1032	1415	
N300	11S/C	5	42-089	1967	265	1549	1714	
N300	12S/C	5	42-090	1967	265	1839	1848	
N011	4	S/C	5	42-090	1967	265	1847	1925
N011	1	S/C	5	61-116	1967	265	2039	2133
N011	2	S/C	5	61-116	1967	265	2209	2303
N011	3	S/C	5	61-117	1967	265	2342	0516
N300	14S/C	5	11-189	1967	266	0757	1033	
N300	13S/C	5	11-190	1967	266	1245	1312	
N011	5	S/C	5	42-094	1967	266	1548	1752
N140	1	S/C	5	61-159	1967	288	2315	0001
N140	2	S/C	5	11-213	1967	289	0945	1047
N141	1	S/C	5	42-105	1967	289	1049	1348
N140	3	S/C	5	11-214	1967	289	1054	1201
N141	2	S/C	5	42-107	1967	289	1323	1546
N142	1	S/C	5	61-168	1967	289	1734	2100
N302	1	S/C	5	61-169	1967	289	2100	2330
N302	2	S/C	5	61-158	1967	288	2304	2315
N142	2	S/C	5	61-170	1967	289	2336	0119
N142	3	S/C	5	61-182	1967	291	1925	2155

N142	4	S/C	5	61-183	1967	291	2132	2317
N143	1	S/C	5	61-187	1967	292	2028	2217
N143	2	S/C	5	61-188	1967	292	2207	2349
N143	3	S/C	5	61-199	1967	294	2033	2315
N143	4	S/C	5	61-200	1967	294	2247	0219
N143	5	S/C	5	42-114	1967	295	1402	1610
N143	6	S/C	5	42-115	1967	295	1600	1938

MISSION VI

N015	1	S/C	6	11-009	1967	314	0538	0645
N039	1	S/C	6	42-012	1967	314	0631	1014
N015	2	S/C	6	42-013	1967	314	1149	1433
N015	3	S/C	6	42-014	1967	314	1441	1534
N015	4	S/C	6	61-010	1967	314	1452	1808
N015	5	S/C	6	61-011	1967	314	1745	2104
N015	6	S/C	6	61-012	1967	314	2100	2245
N016	1	S/C	6	11-018	1967	315	0456	0605
N016	2	S/C	6	11-019	1967	315	0457	0902
N016	3	S/C	6	42-021	1967	315	0457	0739
N016	4	S/C	6	42-022	1967	315	0710	1110
N016	5	S/C	6	42-023	1967	315	1039	1446
N016	6	S/C	6	42-024	1967	315	1415	1559
N016	7	S/C	6	61-016	1967	315	1507	1822
N016	8	S/C	6	61-017	1967	315	1809	2159
N016	9	S/C	6	61-018	1967	315	2130	2315
N017	1	S/C	6	11-028	1967	316	0746	0955
N017	2	S/C	6	42-026	1967	316	0855	1234
N017	3	S/C	6	42-027	1967	316	1210	1600
N017	4	S/C	6	61-022	1967	316	1528	1853
N017	5	S/C	6	61-024	1967	316	1828	1957
N039	2	S/C	6	61-025	1967	316	2237	2340
N039	3	S/C	6	11-049	1967	316	2328	2340
N018	1	S/C	6	42-047	1967	320	1256	1604
N018	2	S/C	6	42-048	1967	320	1539	1815
N018	3	S/C	6	61-057	1967	320	1706	2045
N018	4	S/C	6	61-056	1967	320	2016	0005
N018	5	S/C	6	61-059	1967	320	2336	0325
N018	6	S/C	6	11-091	1967	321	0240	0333
N018	7	S/C	6	42-051	1967	321	1248	1254
N019	1	S/C	6	61-066	1967	322	0038	0111
N019	2	S/C	6	61-067	1967	322	0117	0219
N039	4	S/C	6	42-061	1967	322	1400	1438
N020	1	S/C	6	42-062	1967	322	1441	1850
N020	2	S/C	6	61-079	1967	322	1832	1931
N022	1	S/C	6	61-093	1967	323	0244	0400
N022	2	S/C	6	61-094	1967	323	0335	0422
N039	5	S/C	6	11-134	1967	324	1405	1422
N021	1	S/C	6	61-116	1967	326	0453	0620
N021	2	S/C	6	42-080	1967	326	1825	2220
N023	1	S/C	6	61-126	1967	326	2158	0133
N024	1	S/C	6	61-128	1967	327	0124	0459
N023	2	S/C	6	61-127	1967	327	0140	0450
N039	6	S/C	6	61-139	1967	327	2333	0253
N024	2	S/C	6	61-141	1967	328	0227	0602
N025	1	S/C	6	61-140	1967	328	0259	0543
N039	7	S/C	6	61-142	1967	328	0549	0710
N039	8	S/C	6	11-184	1967	328	0731	1011
N039	9	S/C	6	11-185	1967	328	1214	1407
N025	2	S/C	6	11-186	1967	328	1447	1801
N039	10	S/C	6	11-186	1967	328	1447	1804

SENSOR HEAD UPSIDE-DOWN

All the following data from Mission VI was not used

MISSION VII

N026	1	S/C	7	42-006	1968	010	0926	1307
N026	2	S/C	7	42-013	1968	010	1309	1448

N026	3	S/C	7	61-008	1968	010	1430	1766
N026	4	S/C	7	61-009	1968	010	1642	2027
N026	5	S/C	7	61-010	1968	010	1959	2234
N026	6	S/C	7	11-034	1968	010	2210	2234
N027	1	S/C	7	42-018	1968	011	1418	1426
N027	3	S/C	7	61-014	1968	011	1421	1718
N027	2	S/C	7	42-019	1968	011	1430	1520
N027	4	S/C	7	61-015	1968	011	1656	2033
N027	5	S/C	7	61-016	1968	011	2004	2309
N027	6	S/C	7	11-043	1968	011	2257	2311
N028	1	S/C	7	11-045	1968	012	0558	0911
N028	2	S/C	7	42-026	1968	012	0826	0844
N028	3	S/C	7	42-027	1968	012	1116	1131
N028	4	S/C	7	61-019	1968	012	1641	1827
N028	5	S/C	7	61-022	1968	012	1758	2147
N028	6	S/C	7	61-020	1968	012	2123	0019
N029	1	S/C	7	11-049	1968	013	0502	0708
N029	2	S/C	7	11-050	1968	013	0710	1055
N029	4	S/C	7	42-034	1968	013	1055	1430
N029	3	S/C	7	11-051	1968	013	1108	1141
N029	5	S/C	7	42-035	1968	013	1435	1644
N029	6	S/C	7	61-041	1968	013	1549	1929
N029	7	S/C	7	61-042	1968	013	1857	2248
N029	8	S/C	7	61-043	1968	013	2236	2334
N030	2	S/C	7	61-046	1968	014	1645	2019
N030	1	S/C	7	42-041	1968	014	1646	1740
N030	3	S/C	7	61-047	1968	014	2023	2300
N030	4	S/C	7	61-048	1968	014	2304	0116
N030	5	S/C	7	42-070	1968	020	2113	0011
N031	1	S/C	7	61-075	1968	020	2309	0240
N031	2	S/C	7	61-076	1968	021	0212	0246
N031	3	S/C	7	61-077	1968	021	0534	0755
N031	4	S/C	7	11-132	1968	021	0718	0851
N031	5	S/C	7	11-133	1968	021	1237	1349
N031	6	S/C	7	42-078	1968	021	2257	0100
N032	1	S/C	7	61-079	1968	022	0020	0354
N032	2	S/C	7	61-080	1968	022	0325	0715
N032	3	S/C	7	61-081	1968	022	0325	0715
N032	3	S/C	7	61-081	1968	022	0650	0936
N032	4	S/C	7	11-143	1968	022	0820	0954
N032	5	S/C	7	11-166	1968	022	1202	1453
N032	6	S/C	7	42-088	1968	022	2016	2120
N033	1	S/C	7	42-089	1968	022	2123	0120
N033	2	S/C	7	42-090	1968	023	0128	0224
N033	3	S/C	7	61-082	1968	023	0147	0459
N033	4	S/C	7	61-083	1968	023	0625	0837
N033	5	S/C	7	61-084	1968	023	0839	0945
N033	6	S/C	7	11-154	1968	023	0935	1104
N033	7	S/C	7	11-155	1968	023	1255	1537
N034	1	S/C	7	11-164	1968	044	0220	0321
N031	1	S/C	7	61-106	1968	049	0107	0116
N034	2	S/C	7	61-107	1968	049	0116	0458
N034	3	S/C	7	61-108	1968	049	0433	0719
N035	1	S/C	7	11-185	1968	049	0700	0918
N031	2	S/C	7	11-186	1968	049	0918	0924
N035	2	S/C	7	11-186	1968	049	0924	1245
N035	3	S/C	7	11-187	1968	049	1218	1540
N035	4	S/C	7	42-120	1968	049	1500	1824
N035	5	S/C	7	42-121	1968	049	1800	2153
N035	6	S/C	7	42-122	1968	049	2122	0003

MISSION VII - DAY 2

N036	1	S/C	7	61-109	1968	049	2345	0300
N036	2	S/C	7	61-110	1968	050	0255	0605
N036	3	S/C	7	61-111	1968	050	0600	0730
N036	4	S/C	7	11-180	1968	050	0725	1025
N037	1	S/C	7	11-189	1968	050	0954	1342
N037	2	S/C	7	11-190	1968	050	1313	1659
N037	3	S/C	7	42-123	1968	050	1655	1909
N037	4	S/C	7	42-124	1968	050	1906	2235
N038	1	S/C	7	42-125	1968	050	2230	0122
N038	2	S/C	7	61-112	1968	051	0048	0433
N038	3	S/C	7	61-113	1968	051	0404	0748
N038	4	S/C	7	61-114	1968	051	0745	0858
N038	5	S/C	7	11-192	1968	051	0855	1150

Table 2

HEADER CARDS OF FILES INPUT TO MERGE PROGRAM FOR MISSION V

BC0001002 5	42-006	42	252	1967	10	28	00	11	28	00	01	24	61225.
BC0001002 5	11-018	11	254	1967	03	34	00	04	41	00	04	01	61226.
BC0001002 5	42-016	42	254	1967	07	22	00	18	03	00	01	24	61225.
BC0001002 5	42-019	42	254	1967	09	01	17/12	08	02	04	01	61226.	
BC0001002 5	42-020	42	254	1967	12	11	00	13	29	00	01	24	61225.
BC0001002 5	42-016	42	254	1967	13	15	00	15	05	00	01	24	61226.
BC0001002 5	61-019	61	254	1967	15	00	06/18	16	10	01	24	61225.	
BC0001002 5	61-020	61	254	1967	17	52	00	21	31	00	01	24	61226.
BC0001002 5	61-021	61	254	1967	21	06	00	22	28	00	01	04	61225.
BC0001300 5	11-029	11	255	1967	00	58	00	01	59	00	05	08	61226.
BC0001003 5	42-027	42	255	1967	06	16	11/09	25	39	01	25	61225.	
BC0001003 5	42-029	42	255	1967	09	09	00/13	04	00	11	29	61226.	
BC0001003 5	42-028	42	255	1967	12	38	00	16	06	00	01	25	61225.
BC0001003 5	61-025	61	255	1967	15	57	00	19	13	00	11	29	61226.
BC0001003 5	61-026	61	255	1967	18	48	00	22	14	00	11	29	61225.
BC0001003 5	61-027	61	255	1967	22	06	00	23	29	00	11	29	61226.
BC0001004 5	42-032	42	256	1967	08	40	00/10	04	00	11	29	61225.	
BC0001004 5	42-033	42	256	1967	10	24	00	14	17	00	11	29	61226.
BC0001004 5	42-035	42	256	1967	14	02	00/16	54	00	11	29	61225.	
BC0001004 5	61-031	61	256	1967	16	44	00	20	00	00	01	29	61226.
BC0001004 5	61-032	61	256	1967	19	35	00/23	16	00	11	29	61225.	
BC0001004 5	61-033	61	256	1967	22	49	00/00	20	00	11	29	61226.	
BC0001005 5	42-040	42	257	1967	08	53	00/09	53	00	11	29	61225.	
BC0001005 5	61-055	61	259	1967	18	39	01/21	55	02	11	29	61226.	
BC0001005 5	61-056	61	259	1967	21	32	00	01	25	00	01	29	61225.
BC0001006 5	61-057	61	260	1967	00	52	04/03	50	34	01	26	61226.	
BC0001006 5	11-093	11	260	1967	01	48	00	05	43	00	01	26	61225.
BC0001006 5	11-096	11	260	1967	05	36	00	09	42	00	11	29	61226.
BC0001200 5	11-091	11	260	1967	09	41	00	09	54	00	04	01	61225.
BC0001006 5	11-097	11	260	1967	09	53	00	12	15	00	01	26	61226.
BC0001006 5	42-067	42	260	1967	10	06	00	14	09	00	11	30	61225.
BC0001006 5	42-069	42	260	1967	13	43	00	17	39	00	11	26	61226.
BC0001006 5	42-068	42	260	1967	17	09	00	18	55	00	11	30	61225.
BC0001006 5	61-060	61	260	1967	18	37	00	20	36	00	01	26	61226.
BC0001207 5	11-102	11	261	1967	08	16	00	08	54	00	01	29	61225.
BC0001007 5	42-071	42	261	1967	15	44	25/17	24	26	11	30	61226.	
BC0001007 5	42-072	42	261	1967	17	34	01/19	51	00	11	30	61225.	
BC0001007 5	61-068	61	261	1967	18	59	04/22	15	34	11	30	61226.	
BC0001007 5	61-069	61	261	1967	21	51	04/01	40	49	11	30	61225.	
BC0001008 5	61-070	61	262	1967	01	17	01/22	31	50	11	30	61226.	
BC0001008 5	11-113	11	262	1967	08	03	00	10	18	00	11	30	61225.
BC0001200 5	11-117	11	262	1967	10	15	00	10	30	00	04	01	61226.
BC0001008 5	11-114	11	262	1967	10	26	00	14	11	00	11	30	61225.
BC0001008 5	42-073	42	262	1967	12	47	00	15	48	00	12	01	61226.
BC0001008 5	42-074	42	262	1967	15	18	00	19	13	00	01	29	61225.
BC0001008 5	42-075	42	262	1967	18	46	00	19	37	00	01	29	61226.
BC0001008 5	61-083	61	262	1967	19	19	00	2	45	00	12	01	61225.
BC0001008 5	61-084	61	262	1967	22	15	00	02	03	00	12	01	61226.
BC0001009 5	61-085	61	263	1967	01	42	00	33	55	00	12	01	61225.
BC0001300 5	11-127	11	263	1967	06	00	00	06	03	00	05	08	61226.
BC0001300 5	11-128	11	263	1967	07	46	00	07	49	00	05	08	61225.
BC0001300 5	11-129	11	263	1967	10	27	00	13	13	00	05	08	61226.
BC0001300 5	42-076	42	263	1967	14	49	00/15	44	00	05	08	61225.	
BC0001300 5	42-077	42	263	1967	15	50	00/16	04	00	05	14	61226.	
BC0001009 5	42-078	42	263	1967	16	06	00/20	06	11	12	01	61225.	
BC0001009 5	61-090	61	263	1967	19	35	00	23	03	00	12	01	61226.
BC0001009 5	61-091	61	263	1967	22	37	00	02	28	00	12	01	61225.
BC0001010 5	61-092	61	264	1967	01	57	00	03	45	00	12	04	61226.

BCD001300 5	11-134	11	264	1967	05	00	00	05	03	00	05	08	61225.
BCD001300 5	11-137	11	264	1967	07	20	00	10	10	00	05	08	61226.
BCD001200 5	11-138	11	264	1967	11	14	00	11	30	00	04	01	61225.
BCD001010 5	42-080	42	264	1967	13	34	00	16	28	00	12	04	61226.
BCD001010 5	42-082	42	264	1967	16	41	00	20	28	00	01	29	61225.
BCD001010 5	61-106	61	264	1967	20	01	00	23	32	00	12	04	61226.
BCD001010 5	61-107	61	264	1967	23	07	00	02	54	00	12	04	61225.
BCD001300 5	61-104	61	265	1967	03	41	00	06	48	00	05	08	61226.
BCD001300 5	11-171	11	265	1967	09	17	00/09	22	00	05	05	11	225.
BCD001300 5	11-172	11	265	1967	10	32	00	14	15	00	05	08	61226.
BCD001300 5	42-089	42	265	1967	15	49	00	17	14	00	05	08	61225.
BCD001011 5	42-090	42	265	1967	18	39	00/19	25	00				1226.
BCD001011 5	61-116	61	265	1967	20	38	21/22	51	00				1225.
BCD001011 5	61-117	61	265	1967	23	42	00	05	16	00	12	05	61226.
BCD001300 5	11-189	11	266	1967	07	57	00	10	33	00	05	08	61225.
BCD001300 5	11-190	11	266	1967	12	45	00	13	12	00	05	08	61226.
BCD001011 5	42-094	42	266	1967	15	48	00	17	52	00	12	05	61225.

Table 3

HEADER CARDS OF FILES INPUT TO MERCE PROGRAM FOR MISSION VI

BCD001015 6	11-009	11	314	1967	05	38	00	06	45	00	02	01	61225.
BCD001039 6	42-012	42	314	1967	06	31	00	10	14	00	03	27	61226.
BCD001015 6	42-013	42	314	1967	11	49	00	14	33	00	02	01	61225.
BCD001016 6	42-014	42	314	1967	14	41	08	15	33	54	02	01	61226.
BCD001015 6	61-010	61	314	1967	14	52	01	16	08	00	02	01	61225.
BCD001015 6	61-011	61	314	1967	17	45	03/21	00	02	02	01	61226.	
BCD001015 6	61-012	61	314	1967	21	00	02	22	45	12	02	01	61225.
BCD001016 6	11-018	11	315	1967	04	56	40	06	05	24	02	02	61226.
BCD001016 6	11-019	11	315	1967	04	57	00	09	02	10	02	02	61225.
BCD001016 6	42-022	42	315	1967	07	10	00	11	10	00	02	02	61226.
BCD001016 6	42-023	42	315	1967	10	39	00	14	45	00	02	02	61225.
BCD001016 6	42-024	42	315	1967	14	15	00	15	59	00	02	02	61226.
BCD001016 6	61-016	61	315	1967	15	07	00	18	22	00	02	02	61225.
BCD001016 6	61-017	61	315	1967	18	09	00	21	59	00	02	02	61226.
BCD001016 6	61-018	61	315	1967	21	30	00	23	15	00	02	02	61225.
BCD001017 6	11-028	11	316	1967	07	46	00	09	55	00	02	05	61226.
BCD001017 6	42-026	42	316	1967	08	55	00/12	34	46	02	05	61225.	
BCD001017 6	42-027	42	316	1967	12	10	00	16	00	00	02	05	61226.
BCD001017 6	61-023	61	316	1967	15	28	00	18	53	00	02	05	61225.
BCD001017 6	61-024	61	316	1967	18	28	00	19	57	00	02	05	61226.
BCD001039 6	61-025	61	316	1967	22	37	00	23	40	00	03	27	61225.
BCD001039 6	11-049	11	316	1967	23	28	00	23	40	00	03	27	61226.
BCD001018 6	42-047		320	1967	12	56	00	16	10	00	03	29	61225.
BCD001018 6	42-048	42	320	1967	15	39	00	18	15	00	02	07	61226.
BCD001018 6	61-057	61	320	1967	17	06	54/20	45	00	02	07	61225.	
BCD001018 6	61-058	61	320	1967	20	16	00	00	05	00	02	07	61226.
BCD001018 6	61-059	61	320	1967	23	36	00	03	25	00	02	07	61225.
BCD001018 6	11-091	11	321	1967	02	40	00	03	33	00	02	07	61226.
BCD001018 6	42-051	42	321	1967	12	48	00	12	54	00	02	07	61225.

Table 4

HEADER CARDS OF FILES INPUT TO MERGE PROGRAM FOR MISSION VII

BCD001026 7	42-012	42	010	1968	05	26	00	13	07	00	03	04	61225.
BCD001026 7	42-013	42	010	1968	13	09	00	14	48	00	03	04	61226.
BCD001026 7	61-008	61	010	1968	14	30	00	17	11	00	03	04	61225.
BCD001026 7	61-009	61	010	1968	16	42	00	20	27	00	03	04	61226.
BCD001026 7	61-010	61	010	1968	19	59	00	22	34	00	03	04	61225.
BCD001026 7	11-034	11	010	1968	22	10	00	22	34	00	03	04	61226.
BCD001027 7	42-018	42	011	1968	14	18	00	14	26	00	03	05	61225.
BCD001027 7	61-014	61	011	1968	14	22	00/17	18	00				1226.
BCD001027 7	61-015	61	011	1968	16	56	00	20	33	00	03	05	61225.
BCD001027 7	61-016	61	011	1968	20	04	00	23	09	00	03	05	61226.
BCD001027 7	11-043	11	011	1968	22	57	00	23	11	00	03	05	61225.
BCD001028 7	11-045	11	012	1968	05	58	00	09	11	00	03	05	61226.
BCD001028 7	42-027	42	012	1968	11	16	00	11	31	00	03	05	61225.
BCD001028 7	61-019	61	012	1968	16	41	00	18	27	00	03	05	61226.
BCD001028 7	61-022	61	012	1968	17	58	00	21	47	00	03	05	61225.
BCD001028 7	61-020	61	012	1968	21	23	00	00	26	00	03	05	61226.
BCD001029 7	11-049	11	013	1968	05	02	00	07	07	00	03	06	61225.
BCD001029 7	11-050	11	013	1968	07	10	00	11	06	00	03	06	61226.
BCD001029 7	42-034	42	013	1968	10	55	00	14	30	00	03	06	61225.
BCD001029 7	42-035	42	013	1968	14	35	00	16	44	00	03	06	61226.
BCD001029 7	61-041	61	013	1968	15	49	00	19	29	00	03	06	61225.
BCD001029 7	61-042	61	013	1968	18	57	00	22	48	00	03	06	61226.
BCD001029 7	61-043	61	013	1968	22	36	00	23	34	00	03	06	61225.
BCD001030 7	42-041	42	014	1968	16	46	00	17	40	00	03	07	61226.
BCD001030 7	61-046	61	014	1968	16	45	00	20	19	00	03	07	61225.
BCD001030 7	61-047	61	014	1968	20	25	00	23	00	00	03	07	61226.
BCD001030 7	61-048	61	014	1968	23	04	00	01	19	00	03	07	61225.
BCD001030 7	42-070	42	020	1968	21	12	00	00	11	00	03	07	61226.
BCD001031 7	61-075	61	020	1968	23	09	00	02	40	00	03	07	61225.
BCD001031 7	61-076	61	021	1968	02	12	00	05	46	00	03	07	61226.
BCD001031 7	61-077	61	021	1968	05	34	00	07	55	00	03	07	61225.
BCD001031 7	11-132	11	021	1968	07	18	00	08	51	00	03	07	61226.
BCD001031 7	11-133	11	021	1968	12	37	00	13	49	47	03	07	61225.
BCD001031 7	42-078	42	021	1968	22	57	00	01	00	00	03	07	61226.
BCD001032 7	61-079	61	022	1968	00	20	00	03	54	00	03	09	61225.
BCD001032 7	61-080	61	022	1968	03	25	00	07	15	00	03	09	61226.
BCD001032 7	61-081	61	022	1968	06	50	00	09	36	00	03	09	61225.
BCD001032 7	11-143	11	022	1968	08	20	00	09	54	00	03	09	61226.
BCD001032 7	11-144	11	022	1968	12	02	00	14	53	00	03	09	61225.
BCD001032 7	42-088	42	022	1968	20	16	00	21	20	00	03	09	61226.
BCD001033 7	42-089	42	022	1968	21	23	00/01	20	00	03	1		61225.
BCD001033 7	42-090	42	023	1968	01	28	00/02	24	00	03	11		61226.
BCD001033 7	61-082	61	023	1968	01	47	00/04	59	00	03	11		61225.
BCD001033 7	61-083	61	023	1968	06	25	00/08	37	00	03	11		61226.
BCD001033 7	61-084	61	023	1968	08	39	00/09	45	00	03	11		61225.
BCD001033 7	11-154	11	023	1968	09	35	00/11	04	00	03	11		61226.
BCD001033 7	11-155	11	023	1968	12	55	00/15	37	00	03	11		61225.

Table 5
Format of General Data Word

8	1	2	7	8	17	18	25
Bit Type (2)	Project ID (6)	Channel Number (10)					Value (18)

Data Type	Channel Number	Value
00 - Engineering Telemetry	'T# . * Telemetry Channel	(T#) < 170 digital values: bit 18 off ↔ reset bit 18 on ↔ net
01 - UC Data Flugs	Definition *	Value
10 - Commands sent to the S/C	'C# * Command channel	Command Octal in the 10 rightmost bits
11 - 'Science' data	1, 4 2, 3	+ 0 a, or P out of sync - 0 a, or P in sync Analyzer channel number of data event in the a, or P mode as a right justified seven bit binary integer.

* These are defined in tables 7, 8, and 9.
† These are defined in table 6.

Table 6

Flag Bit Definitions:

bit	definition	when set	streams where applicable			
			Engineering telem.	Flags	Comms.	Science
2	item inserted in stage I	Stage I	X	X	X	X
3†	source flag on \Rightarrow tape II (S)	Merge	X	X	X	X
4	moon-earth link parity violation	KDL	X			X
5	last telemetry reading at out's sync time	KDL	X			
6,7	unreliability measure for overlapped data (Q)	Merge	X	*	*	X

† meaningful only if bits 6 and/or 7 are set

* only bit 7 is allowed

Table 7
 Commands Pertinent to the Alpha Scattering Experiment

SCCF ID (C#)	Command Octal ID	Description
049	0207	Pre-Summing Amplifier on
054	0214	Summing Amplifiers off
241	3501	Alpha Scattering Power on
242	3502	Alpha Scattering Power off
243	3503	Alpha Scattering Heater Power on
244	3504	Alpha Scattering Heater Power off
245	3505*	Deploy to Background
246	3506*	Deploy to Surface
247	3507	Alpha Detector 1 on
248	3510	Calibration Pulser on
249	3511	Proton Detector 4 on
250	3512	Proton Detectors 3 and 4 off
251	3515	Alpha Detectors 1 and 2 off
252	3516	Proton Detectors 1 and 2 off
253	3517	Proton Detector 1 on
254	3520	Calibration Pulser off
255	3522	Proton Detector 3 on
256	3523	Alpha Detector 2 on
300	3513	Proton Detector 2 on
008	3617	Interlock Command

* These must be immediately preceded by the interlock command (3617).

Table 8

Engineering Telemetry Channels Pertinent to the
Alpha Scattering Experiment

SCCF ID (T#)	Functional ID	Description
005	-	Sync Indicator
006	-	Out of Mode Indicator
142	AS - 06	Alpha Detector Status
143	AS - 07	Proton Detector Status
171	-	Current Telemetry Mode
172	-	Current Telemetry Bit Rate
430	AS - 03 *	Sensor Head Temperature
431	AS - 04 *	Electronics Compartment Temp.
432	AS - 05 *	Guard Event Rate
433	AS - 08 *	7 Volt Line Monitor
434	AS - 09 *	24 Volt Line Monitor

* Conversion coefficients for these channels are given in Table 10.

Coefficients for all other unlisted channels are available on request.

Table 9

U.C. DATA FLAGS
(Data Type '01')

Channel Number	Description	Value	
1	MDL Tape number	Analog	Right justified binary integer
2	File on this MDL tape	Analog	Right justified binary integer
3	Record in this file	Analog	Right justified binary integer
5	Station ID	Analog	Right justified binary integer
6	Analog tape number	Analog	Right justified binary integer
7	Mission ID	Analog	Right justified binary integer
8	Current day number	Analog	Right justified binary integer
10	Merge period flag	Digital	Set => merge starting
11	Time source switched	Analog	Number of milliseconds ignored at time source switch

Table 0

Telemetry Conversion Coefficients

SECF ID (T No.)	Functional ID	Description	S/C V	S/C VI	S/C VII
420	AS-03	Head Temperature (°F.)	$A(0) = .40161249$ $A(1) = .80322405$ $A(2) = .00073502638$	$-.39862023$ $.79681148$ $.000079404710$	-403.21760 $.81016909$ $.000066648247$
431	AS-04	Electronics Temp. (°F.)	$A(0) = .40298029$ $A(1) = .80317934$ $A(2) = .000068037760$	$-.40177866$ $.80165086$ $.000073536135$	-397.71669 $.197177$ $.00002075428$
432	AS-05	Guard Rate (Volts)	$A(0) = .0069995621$ $A(1) = .0048328126$	$.0054400414$ $.0048828126$	$.0014400482$ $.0048828126$
433	AS-08	7 Volts (Volts)	$A(0) = .012929965$ $A(1) = .007656250$	$.01087972$ $.0077656257$	$.0028300706$ $.0077656250$
434	AS-09	24 Volts (Volts)	$A(0) = .25739580$ $A(1) = .02859851$	$.46012074$ $.02859848$	$.43672195$ $.02859851$

Each of the analog telemetry readings is converted from BCD counts (0-1023) to engineering units by these coefficients, using the relation:

$$U = \sum_{L=0}^2 A_L N^L$$

where U is the reported reading and U is the value in engineering units. A_2 is assumed to be zero when not present.

REC 0001 CH

DAY 252

0001	24240031725	000125400000	24240031725	000125400000	24240031725	000127400000	24
0049	242400320566	000657000722	242400320616	000407000064	242400321315	000834001020	24
0097	242400321721	000435000001	242400322565	000402000210	242400323241	000661000000	24
0145	242400324062	000400001353	242400324455	000557000721	242400324535	000407000007	24
0193	242400326505	000402000207	242400327255	200003000003	242400327255	000075600000	24
0241	242400330405	000657000722	242400330455	000407000066	242400331751	000400001345	24
0289	242400333175	000075200000	242400333721	00040001351	242400334375	000407000007	24
0337	242400335671	00040001353	242400336346	000402000210	242400337021	000661000000	24
0385	242400341015	000534001020	242400341611	000400001355	242400343035	000076600000	24
0433	242400344235	000407000107	242400345031	000650000001	242400345531	000400001345	24
0481	242400346661	000661000001	242400346755	000076200000	242400347755	000075600000	24
0529	242400350155	000407000044	242400350751	000550000000	242400352601	000661000000	24
0577	242400353421	000400001352	242400354075	000407000007	242400356371	000400001354	24
0625	242400361311	000400001353	242400361765	000402000207	242400363261	000400001351	24
0673	242400365301	000422000005	242400366455	000075600000	242400367201	000400001347	24
0721	242400371151	000400001345	242400371221	000422000007	242400372375	000076600000	24
0769	242400373121	000400001351	242400373575	000407000007	242400374275	000534001020	24
0817	242400376315	000076200000	242400377041	000400001351	242400377515	000407000044	24
0865	242400402235	000075600000	242400405001	000422000007	242400406061	000661000001	24
0913	242400412001	000661000000	242400412075	000075200000	242400414571	200003000004	24
0961	242400416015	000076600000	242400420511	000400001352	242400421735	000076200000	24
1009	242400422461	000400001351	242400424431	000400001350	242400425105	000402000210	24
1057	242400427651	000660000001	242400431025	000402000207	242400431575	000075200000	24
1105	242400433571	000660000000	242400434271	000400001353	242400436241	000400001354	24
1153	242400441031	000377001121	242400441341	000551000001	242400441435	000076600000	24
1201	242400442161	000400001350	242400442635	000407000066	242400444131	000400001346	24
1249	242400445261	000661000000	242400445355	000076200000	242400446101	000400001347	24
1297	242400451275	000075200000	242400452021	000400001352	242400452475	000407000007	24
1345	242400454445	000402000210	242400456415	000407000044	242400457711	000400001353	24
1393	242400461135	000075600000	242400461661	000400001352	242400462335	000407000066	24
1441	242400465055	000076600000	242400465055	000075200000	242400465601	000400001346	24
1489	242400467551	000400001347	242400470775	000076200000	242400471521	000400001352	24
1537	242400472771	000660000001	242400473471	000400001354	242400475441	000400001353	24
1585	242400476711	000660000000	242400477411	000400001351	242400500635	000075600000	24
1633	242400502035	000407000065	242400502631	000660000001	242400504461	000661000001	24
1681	242400504555	000075200000	242400505301	000400001353	242400505755	000407000007	24
1729	242400507251	000400001354	242400507321	000422000006	242400510401	000661000000	24
1777	242400513171	000400001353	242400513241	000422000007	242400514415	000076600000	24
1825	242400515140	000400001347	242400515615	000407000066	242400517111	000400001346	24
1873	242400521061	000400001347	242400521534	000407000044	242400523030	000400001351	24
1921	242400524254	000075200000	242400525000	000400001353	242400525454	000407000007	24
1969	242400527425	000402000210	242400530101	000551000000	242400530721	000400001355	24
2017	242400533344	000402000207	242400534114	000075600000	242400534640	000400001350	24
2065	242400536610	000400001347	242400540034	000076600000	242400540560	000400001346	24
2113	242400542530	000400001351	242400543754	000076200000	242400543754	000075200000	24
2161	242400545154	000407000007	242400545750	000660000000	242400546450	000400001354	24
2209	242400551074	000407000044	242400552370	000400001350	242400553614	000075600000	24
2257	242400555014	000407000042	242400560734	000407000007	242400562230	000400001354	24
2305	242400563454	000075200000	242400564200	000400001350	242400564654	000407000066	24
2353	242400567300	000661000001	242400567374	000076200000	242400570120	000400001351	24
2401	242400573220	200003000005	242400573220	000551000000	242400573314	000075600000	24
2449	242400574514	000407000044	242400575310	000660000001	242400577234	000075200000	24
2497	2424005800434	000407000007	2424005801230	000550000000	2424005801730	000400001351	24
2545	242400605650	000400001352	242400605720	000422000006	242400606324	000402000273	24
2593	242400607620	000400001350	242400610274	000407000077	242400611570	000400001344	24
2641	242400612244	000402000271	242400612720	000661000001	242400613014	000076200000	24
2689	242400613540	000400001345	242400614214	000407000047	242400615510	000400001346	24
2737	242400616734	000075200000	242400620134	000407000056	242400620730	000660000001	24
2785	242400622104	000402000272	242400623400	000400001350	242400624054	000407000007	24
2833	242400625350	000400001351	242400625420	000422000007	242400626024	000402000273	24
2881	242400627774	000407000055	242400631270	000400001347	242400631340	000422000006	24
2929	242400632514	000075600000	242400633240	000400001345	242400633714	000407000126	24

00	242400317725	000125400006	242400317725	000127400000	242400320235	000656001004
01	242400320515	000407000044	242400321315	000534001020	242400321411	000650000000
02	242400322565	000402000210	242400323241	000661000000	242400323335	000076200000
03	242400324465	000657000721	242400324535	000407000007	242400326006	000176400000
04	242400327255	000001000003	242400327255	000075600000	242400330001	000400001347
05	242400330455	000407000066	242400331751	000400001345	242400333101	000651000001
06	242400333721	000400001351	242400334375	000407000007	242400335075	000534001017
07	242400336340	000402000210	242400337021	000661000000	242400337041	000400001354
08	242400341611	000400001355	242400343035	000076600000	242400343561	000400001353
09	242400345031	000660000001	242400345531	000400001345	242400346205	000402000207
10	242400346755	000076200000	242400347755	000075600000	242400347501	000400001347
11	242400350751	000660000000	242400352601	000661000000	242400352675	000075200000
12	242400354075	000407000007	242400355371	000400001354	242400356045	000402000210
13	242400361765	000402000207	242400363261	000400001351	242400363735	000407000066
14	242400366455	000075600000	242400367201	000400001347	242400370355	000534001017
15	242400371221	000422000007	242400372375	000076600000	242400372375	000075200000
16	242400373575	000407000007	242400374275	000534001020	242400375071	000400001353
17	242400377041	000400001351	242400377515	000407000044	242400401061	000422000006
18	242400405001	000422000007	242400406061	000661000001	242400410651	000400001353
19	242400412075	000075200000	242400414571	000003000004	242400414571	000400001350
20	242400420511	000400001352	242400421735	000076200000	242400421735	000075600000
21	242400424431	000400001350	242400425105	000402000210	242400427055	000407000007
22	242400431025	000402000207	242400431575	000075200000	242400432775	000407000044
23	242400434271	000400001353	242400436241	000400001354	242400436715	000407000007
24	242400441341	000661000001	242400441435	000076600000	242400441435	000075600000
25	242400442635	000407000066	242400444131	000400001346	242400444751	000377001120
26	242400445355	000076200000	2424004466101	000400001347	242400446555	000407000044
27	242400452021	000400001352	242400452475	000407000007	242400453771	000400001354
28	242400456415	000407000044	242400457711	000400001353	242400460365	000402000207
29	242400461661	000400001352	242400462335	000407000066	242400463631	000400001347
30	242400465055	000075200000	242400465601	000400001346	242400466255	000407000044
31	242400470775	000076200000	242400471521	000400001352	242400472175	000407000007
32	242400473471	000400001354	242400475441	000400001353	242400476115	000407000044
33	242400477411	000400001351	242400500635	000075600000	242400501361	000400001347
34	242400502631	000660000001	242400504461	000661000001	242400504555	000033000005
35	242400505301	000400001353	242400505755	000407000007	242400506551	000660000000
36	242400507321	000422000006	242400510401	000661000000	242400511675	000407000044
37	242400513241	000422000007	242400514415	000076600000	242400514415	000075600000
38	242400515615	000407000066	242400517111	000400001346	242400520334	000076200000
39	242400521534	000407000044	242400523030	000400001351	242400524161	000661000001
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