DATA SET CATALOG #75

Explorer 18 Solar & Galactic Protons
63-046A-03A 6 tapes

63-046A-03A
EXPLORER 18 SOLAR & GALACTIC PROTONS

This data set consists of six 7-track, 556 BPI, binary tapes. All tapes were generated on the IBM 7094 computer and each contain one file.

TAPE NO.	START	STOP
D-0081 (C-0032)	11/27/63	12/23/63
D-0129	12/24/63	01/24/64
D-0130	01/24/64	02/24/64
D-0131	02/25/64	03/26/64
D-0132	03/26/64	04/26/64
D-0133	04/26/64	06/07/64

UNIVERSITY OF CHICAGO DATA FORMATS FOR LIBRARY MAGNETIC TAPES

FROM SATELLITES IMP-I, IMP-II and IMP-III* Explorers 18, 21, 28

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63-046A-03A
64-060A-03A
and
65-042A-03A

IMP 1 (03)
IMP 2 (03)
IMP 3 (03)

Solar + Galactic Proton Exp.

Format in IMP 1 File

Laboratory for Astrophysics and Space Research

Preprint Number
EFINS-66-02

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Introduction

In accordance with NASA policy we have prepared for the use of the scientific community the data we obtained from the satellites IMP-I, IMP-II and IMP-III. The library magnetic tapes have been carefully edited over a period of at least one year and have been turned over to the NASA Data Library for release at times decided by mutual agreement. This docyment describes the format of the data found on the tapes and describes the relationship of the data words to the physical parameters which we were measuring. A reprint giving the main features of the IMP-I instrument is included with this document as well as a list of our scientific papers published in 1964-1965 which are based on the use of these data.

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1. The Data Processing System

The purpose of the data processing system is to produce magnetic tapes containing all the available data in chronological order, with errors either deleted or flagged. These tapes are intended to be in an efficient format for use by data analysis programs.*

The time base used is the Chicago sequence count. (See 4.6 below.) This is an integer which is approximately zero at time of launch, increasing by one for each spacecraft telemetry sequence. Unfortunately, a spacecraft sequence counter, as such, does not have a predictable relationship to real time over the lifetime of the satellite, since the spacecraft may turn off for varying lengths of time due to lack of power. The Chicago sequence count is artificially projected over periods when the spacecraft is off, the intent being to approximate as closely as possible a uniform time base whose unit value is an integral multiple of the time between telemetry readouts of the experiment.

The data processing system has four major parts:**

1) Reformatting the data and generating error flags.
2) Checking and correcting the sequence count, and deleting any large sections of the data which cannot be corrected.
3) Sorting the data.
4) Checking for and deleting errors in the processed data.

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*Actually there is a fair amount of unused space in the library tapes; this is primarily due to the desirability of retaining (so far as possible) a single tape format throughout the system.

**The Appendix gives a description of the programs involved. Figure 3 shows overall data flow.

Step four may involve reprocessing through steps two and three, depending on the number and seriousness of errors found.

In fact, it is possible that the library tapes produced may not in some cases completely fulfill the specifications of the system. This may be due either to human error, e.g., incorrect generation of a special sequence count correction for a case in which the standard procedures are not satisfactory; or to a decision that the cost (in personnel and machine time) of correcting some small amount of data would be greater than the data is worth.

2. General Description of Tape Format

The tapes are written at 556 BPI in IBM 7090 binary format; i.e., odd parity, 36 bits or six characters per word; standard 7090 BCD code for items in BCD. Physical records are 804 words (4824 characters) in length, divided into six logical records of 134 words each. Each logical record consists of a header of five words, three data blocks of 42 words each, and a trailer of three words. A tape is terminated by an end-of-file. One physical tape normally contains between one and two months of data. (See Figure 1.)

Logical records are sorted according to the Chicago sequence count (See 4.6 below.) of data block No. 1. This results in the data being effectively in increasing time order, although since all available data are included, more than one logical record covering a single time period may be present (if there was coverage by more than one tracking station for that time). A logical record contains all available data for a four spacecraft sequence period (format) from one tracking station. Only three

sequences are present in the record since every fourth sequence contains no Chicago data. These are referred to as sequence number one, sequence number two, and sequence number three.

Words or parts of words not specifically described herein do not necessarily contain zeros.

3. Itemization of Data within a Logical Record

3.1 Header Block — Words 1 - 5 of logical record

Word	Contents
1	EDT Number (4.1)*
2 - 3	Station ID (4.2)
4	Record Flag (4.3)
5	Input Flag 1 (4.4, 4.4.1)

3.2 Data Blocks

3.2.1 Data Block 1 - Words 6 - 47 of logical record. Contains data, if any, from sequence number 1. (4.9)+

3.2.2 Data Block 2 - Words 48 - 89 of logical record. Contains data, if any, from sequence number 2.

3.2.3. Data Block 3 - Words 90 - 131 of logical record. Contains data, if any from sequence number 3.

3.2.4 Itemization of data within any data block:

* See item descriptions in Section 4 below.

+ If the sequence number cannot be determined, the data for the sequence is in data block 1, and data blocks 2 and 3 immediately following contain no data.