DATA SET CATALOG #82

Explorer 18
Cosmic Ray 'A'

63-046A-04A 1 tape

EXPLORER 18 COSMIC RAY 'A'

(63-046A-04A)

This data set consists of one 556 BPI, Binary, 7-track tape created on an IBM 7094 computer. The time span for this data set is November 27, 1963 to May 26, 1964. All data for one day are contained in a logical record of 652 data words. The tape is blocked with a physical record length of 460 words.

The data on the tape include:

1) Time

2) Average height

3) Scintillator telescope and Geiger counter hourly average rates.

4) Error in hourly rates.

The following pages contain the format for this data set.

D-106 (C-2194)

4/22/73 - This 'D' tape has been sent to the Federal Records Center. Only the 'C' tape remains in the Data Center.

TRK

Explorer 18 Cosmic Ray 'A' (63-046A-04A) Tape Format

A logical data record of 652 words has been subdivided into two 256 word blocks and the balance of the data into a third block of 140 words. Each block has its own two word control information. Couple these control words together with the double control word preceeding each physical block, the total length of a data record totals 662 words instead of the original 652 as specified in the format write-up.

41-44	MCDE	Control for more parameter cards after finished this one: = 1, more cards; = 2, no cards
45-48	IRWD	If = 1, rewind encyclopedia tape before this run; = 2, do not rewind
49-52	ISPA	=1, space forward previously used output tape =2, rewind output tape before use
53-60		Dummy, left for later use
61-70	MTHN	Minimum height, in kilometers , for plots.

3.2.2 Input tapes

The program reads the IMP Edit output tape as described in the IMP Edit Documentation.

3.3 Output Specifications

3.3.1 Printed Output

The printed output consists of two pages per day of data. Each page contains twelve hours. Given for each hour are the average height; averages, errors, and number of data points for the six rates; and the number of good DE,E pairs.

3.3.2 Output Tapes

LOGBOOK TAPE

The logbook tape contains one logical record for each day of data. The logical record is in FORTRAN format and contains 632 words. The words are:

Word	Contents	Format
1	Year	I
2	Month	I
3	Day	I
4	ignore	-
5-26	Height for each hour	F

Word	Contents	Format
29-52	Sum of points for rate 1 for each hour	F
53-76	Average for rate 1 for each hour	F
77-100	Error for rate 1 for each hour	F
101-125	Number of points used for rate 1 for each hour	I

The preceeding 4 groups of words are repeated for rates 2 thru 6.

The six rates are, in order, AB, C, $AB\overline{C}$, X, Z, & Sum.

605-628	Number of DE, E pairs for each hour	I
629-652	Number of Good data blocks for each Hour	I

After the last data record in the tape there is a record where words 1, 2, and 3 are all 32767. Next in the tape is an end of file mark.

PLOT TAPES

The plot tapes are in the proper format for the EAI plotter. The PLOT documentation gives details.

Note that only ten plots will fit on each reel of output tape. Therefore, after twenty plots, special instructions will have to be given to the computer operator to mount a new tape in places of the first tape to be used for the third set of ten, and so forth.

DATA USERS' NOTE
NSSDC 67-37

EXPLORER 18 (1963 46A)

SOLAR AND GALACTIC PROTONS EXPERIMENT

EXPERIMENTERS
J. A. Simpson
C. Y. Fan
G. Gloeckler

AUGUST 1967

FOREWORD

This Data Users' Note is specifically designed to help potential data users decide if they can make use of the data obtained in the Explorer 18 (1963 46A) solar and galactic protons experiment. Once a data user decides that he requires the data, it will serve as the unifying element – the key – in the actual use of the data available at the National Space Science Data Center (NSSDC). To achieve these goals, the Note briefly describes the experiment, including the instrumentation and measurements, the telemetry, and the operational experience. All available details are then provided on the actual reduction techniques and format of recorded data. For those desiring more details, names and addresses of the experimenters are provided to facilitate direct contact. As a further aid, detailed references (and bibliography) are also included. When available, NASA accession numbers* are given. The primary purpose of these references is to identify the sources containing complete information concerning the subject under discussion. Most of these references are physically available at NSSDC – those that are not are readily obtainable.

Inquiries concerning the availability of data should be directed to:

National Space Science Data Center
Goddard Space Flight Center
Greenbelt, Maryland 20771
Area Code 301 982-6695

*For example, N64-2243 is an accession number for an article reported in the *Scientific and Technical Aerospace Reports* (STAR), and A63-5921 refers to an entry in the *International Aerospace Abstracts* (IAA).

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EXPLORER 18 (1963 46A)
SOLAR AND GALACTIC PROTONS

BACKGROUND

Scientists at the University of Chicago designed a solid-state, charged-particle telescope to measure the particle energy loss and to identify particles with $Z < 6$. The charged-particle telescope was one of six Explorer 18 experiments which are listed in Figure 1.

The Explorer 18 satellite, also known as IMP 1, was launched from Cape Canaveral (Cape Kennedy), Florida on November 27, 1963 at 0230 UT. The satellite achieved an initial apogee of 197 616 km (geocentric), and a perigee of 192 km. IMP 1 had an initial period of ~ 93.5 hr, an inclination to the earth's equator of 33.3 deg and an eccentricity of 0.937. The spacecraft was spin stabilized at an initial rate of 22.5 rpm with an initial spin-axis satellite-sun angle of 111 deg, measured by the spacecraft optical aspect sensor.

EXPERIMENTERS

*J. A. Simpson – University of Chicago
**C. Y. Fan – University of Chicago
*G. Gloeckler – University of Chicago

EXPERIMENT

Instrumentation and Measurements

The main axis of the charged-particle telescope on board IMP 1 was normal to the spin axis of the satellite. The telescope could detect and identify electrons, protons, helium nuclei, and some particles of higher charge number. The measurement of particles was accomplished by determining particle energy loss ($-dE/dx$), total kinetic energy (E), and/or particle residual range.[1,2]

The telescope consisted of two gold-silicon surface barrier detectors (D1 and D2), and a cesium iodide (Tl) crystal detector (D3) mounted in a plastic scintillator, which served as a fourth detector (D4). (See Figure 2.) Since the Au-Si detectors were sensitive to light, the aperture to these detectors was covered

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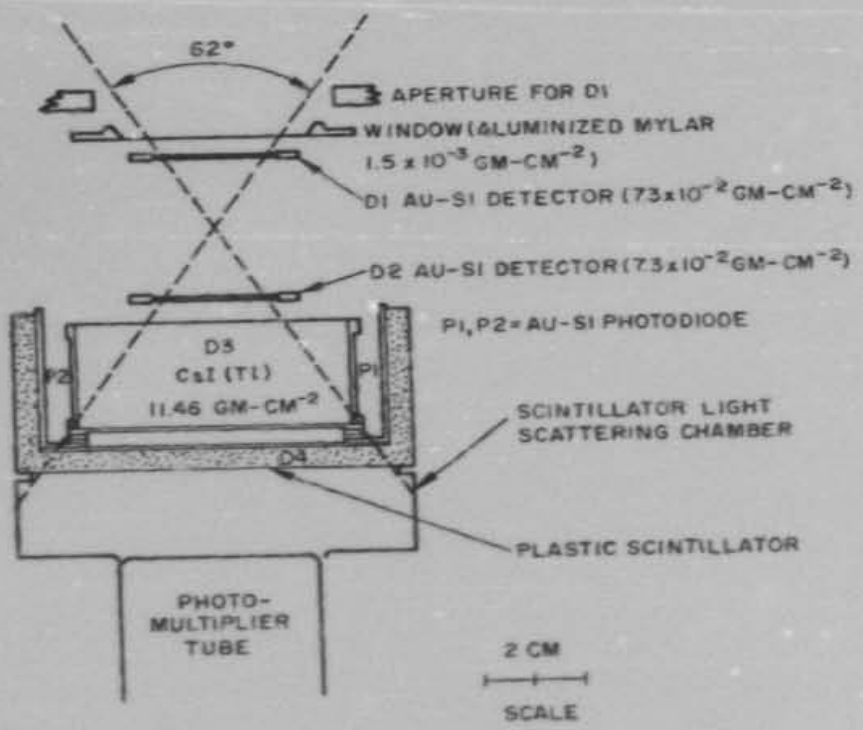
FIGURE 2
CROSS-SECTION OF IMP 1 CHARGED-PARTICLE TELESCOPE



GEOMETRICAL FACTOR = AΩ = 0.85 CM²-SR

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