DATA SET CATALOG #15

MAGNETOMETER AND EPHEMERIS DATA

64-060H-00C			1 tape
64-060H-	02	A	5 tapes
		C	1 tape
		D	1 tape
		E	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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

IMP-B

MULT-COORD SYS EPHEM & B-MODEL TAPE

64-060A-00G

THIS DATA SET HAS BEEN RESTORED. THERE WAS ORIGINALLY ONE 7-TRACK, 800 BPI TAPE WRITTEN IN BINARY. THERE IS ONE RESTORED TAPE, WHICH WAS PACKED DURING THE RESTORATION PROCESS. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK, 6250 BPI. THE ORIGINAL TAPE WAS CREATED ON AN IBM 7094 COMPUTER AND WAS RESTORED ON AN IBM 9021 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBER AND TIME SPAN ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR005847	DS005847	D001796	1	10/04/64 - 09/29/65

SPHE 00054

IMP B

5.46 MIN AVERAGE OF MAGNETIC FIELD

64-060A-02A

THIS DATASET HAS BEEN RESTORED. THERE WERE ORIGINALLY 5 9-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 TAPES WERE CREATED ON AN IBM 7094 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
DR02692	DS02692	DD 00237	1	10/04/64 - 11/02/64
		DD 00238	2	11/02/64 - 11/30/64
		DD 00239	3	12/20/64 - 01/18/64
		DD 00240	4	01/19/65 - 02/09/65
		DD 00241	5	03/07/65 - 04/05/65

IMP-B

5.46 MIN AVG BLCKD BCD VRSN OF 02A

5-MIN AVG C.R. CNT RATE SUMMARY TAPE

64-060A-02C

64-060A-03F

THESE DATA SETS HAVE BEEN RESTORED. THERE WAS ORIGINALLY ONE 7-TRACK, 556 BPI TAPE AND ONE 7-TRACK, 800 BPI TAPE, WRITTEN IN BCD. THERE IS ONE RESTORED TAPE, WRITTEN IN EBCDIC. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON A 7096 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR003454	DS003454	D006937	1-129	10/04/64 - 04/08/65 (03F)
		D000668	130	10/05/64 - 04/04/65 (02C)

IMP-B

MERGED MAGNETOMETER + EPHEMERIS

64-060A-02D

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 ORIGINAL TAPE WAS CREATED ON AN IBM 7094 COMPUTER AND WAS RESTORED ON AN IBM 9021 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBER AND TIME SPAN ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR005226	DS005226	D002892	1	10/04/64 - 04/05/65

IMP-B

5.46MIN AV BLCKD BIN VRSN OF 02A

64-060A-02E SPHE 00715

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 original tapes were created on a 7094 computer and the restored tapes were created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D numbers are as follows:

DR#	DS#	D#	FILES	TIME SPAN
DR005295	DS005295	D002899	1	10/04/64 - 01/18/65
		D002900	2	01/19/65 - 04/05/65

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EXPLORER 21 (IMP 2, IMP B) (64-060A)

SPACECRAFT BRIEF DESCRIPTION

Explorer 21 (IMP 2) is a 135 pound, spin-stabilized spacecraft instrumented for interplanetary studies of cosmic rays, magnetic fields, and plasmas. It was launched into an elliptical orbit on October 4, 1964, with apogee at 15.9 earth radii (half the planned value) near local noon. Spacecraft performance was normal for most of the first four months, and for the sixth month, after launch. Otherwise the data transmission was intermittent, with final transmission occurring on October 13, 1965.

[illegible]

Project Manager/Mr. Paul Butler/NASA-GSFC/Code 724
Project Scientist/Dr. Frank B. McDonald/NASA-GSFC/Code 560
Data Processing/Mr. C. J. Creveling/NASA-GSFC/Code 560
Orbital Computations/Mr. D. J. Stewart/NASA-GSFC/Code 552
Attitude Computations/Mr. E. J. Pyle/NASA-GSFC/Code 711

SPACECRAFT OBJECTIVES

Explorer 21 (IMP 2) was the second in the series of Interplanetary Monitoring Platforms. The objectives of this series are: (1) to study in detail the radiation environment of cislunar space, and to monitor this region over a significant portion of the solar cycle; (2) to study the coherent properties of the interplanetary magnetic field and its dynamical relationship with particle fluxes from the sun; (3) to develop a solar flare prediction capability for Apollo; and (5) to further the development of relatively inexpensive spin-stabilized spacecraft for interplanetary investigations.

SPACECRAFT FULL DESCRIPTION

Configuration

The main body formed a prism 12 inches long with octagonal faces 26 inches across. The axis of symmetry (spin axis) passed through the center of the faces. The main appendages were: four solar paddles, each being 20" by 26", with their long axes perpendicular to the spacecraft spin axis; four 16" antennas; a Rb-vapor magnetometer boom, 67" long mounted parallel to the spin axis; two fluxgate magnetometer booms, each 69" long, mounted perpendicular to the spin axis.

Power System

Power was supplied by P/N solar cell arrays mounted on both sides of the four paddles, and by a silver-cadmium battery pack. The average power produced by the solar cells was between 43 and 66 watts, depending on the spin axis-sun angle. The battery capacity was 5 ampere-hours at 14 volts. The average steady state spacecraft load was 37 watts; during each 82 second interval, a ten second, 42 watt power drain and two 50 watt transients (of a few milliseconds duration) occurred. An under-voltage system caused all systems to be turned off when the main system voltage (normally 19.6 volts) fell below 12 volts; a timer would turn the power back on after about 7.5 hours.

SPACECRAFT FULL DESCRIPTION

Onboard Propulsion

None

Communications

Data were telemetered to ground using pulse frequency modulation (PFM) of a 4 watt transmitter operating near 136 mc. A complete encoder sampling pattern was repeated every 327.7 seconds. A pattern consisted of three normal sequences followed by a Rb-vapor magnetometer sequence, each sequence being 81.9 seconds long. Each normal sequence consisted of 265 tone bursts in the frequency range 312.5 to 937.5 cps.

Information was conveyed by the frequency of the tone. Digital channels used eight discrete frequencies to telemeter three bits per burst. Analog channels used the full frequency range to represent the channel input voltage (0 to 5 volts). During each normal sequence a complete set of spacecraft performance parameters and data from all experiments except the Rb vapor magnetometer were telemetered. During the Rb vapor magnetometer sequence, the magnetometer output directly modulated the transmitter in the frequency range 20 to 1000 cps. A range and range-rate transponder, amplitude modulating the same transmitter, was included for tracking.

Attitude Control

The spacecraft was spin stabilized, with an initial spin rate of 14.6 rpm. There was no active attitude control system onboard.

Attitude Sensors

A digital solar-aspect sensor measured the spin axis-sun angle and the time the sensor meridian spun past the sun.

Command System

The spacecraft had a telemetry on/off command designed to be used only in the termination of the spacecraft mission. Range and range-rate functions could also be commanded.

Onboard Data Processing

None

SPACECRAFT PERFORMANCE

A malfunction of the third stage of the launch vehicle caused a number of actual spacecraft parameters to deviate significantly from their pre-launch nominal values. First, the apogee achieved (15.9 earth radii, near the local noon meridian) was less than half its nominal value; thus interplanetary measurements taken on IMP 2 are not nearly as extensive as on IMPs 1 and 3. Second, the spin axis direction (right ascension = 41.4°, declination 47.4° on October 4, 1964; right ascension = 76°, declination = 22° on April 7, 1965) was initially 78° removed from its nominal prelaunch value; this unfavorable attitude gave a wide range of incident sun angles which in turn caused overheating and a partial failure of the battery after two months operation. Third, the initial spin rate of 14.58 rpm (which decreased slightly and then increased to 18 rpm) was below the anticipated 23 rpm; in some cases,

SPACECRAFT ORBITAL PARAMETERS

	10/4/64	4/4/65	10/3/65
Apogee (geocentric, km)	101,778	100,394	100,023
Perigee (altitude, km)	193	1081	1465
Period (minutes)	2097	2077	2077
Inclination (degrees)	33.50	35.47	36.04
Eccentricity	0.88	0.862	0.855
Apogee Local Time	12:00	24:00	12:00

(100,000 km = 15.7 Earth Radii)

Source: IMP 2 Flight Report, Frank A. Carr, NASA TN D-3353 .

64-060A

NSSDC TECHNICAL REFERENCE FILE

ACCESSION ORDERED CATALOG 11/17/69 PAGE 1

A00034 MAZZA,F.D.
COMPUTER ANALYSIS OF INTERPLANETARY MONITORING PLATFORM (IMP) SPACECRAFT PERFORMANCE
ACCESS. NASA-GSFC, TN D-3363, MAR., 1966.
64-060A 64-060A 65-042A *CLASSC75 *EXPLORER 18, 21, 28
*DATA USERS NOTE 67-38
*JPKC90369
091069

A00044 MEDLIN,J.W., JR.
IMP ENVIRONMENTAL TEST PLAN
ACC063. GSFC THERMAL VACUUM TEST SECTION (UNPUBLISHED).
*EXPLORER 21 64-060A *EXPLORER 28 65-042A *CLASSH5
*JPKC90369
091069

A00048 KRLEGER,V.L.
MINUTES OF THE THIRD IMP 2 COORDINATION MEETING
ACC066. UNPUBLISHED MEMORANDUM FROM IMP COORDINATOR, JUNE 22, 1964.
*EXPLORER 21 *EXPLORER 18 *EXPLORER 28 63-046A 64-060A
65-042A *CLASSH5
*JPKC90369
091069

A00049 MORRIS,H.P.
ENVIRONMENTAL TEST SPECIFICATION COMPONENTS S-74 IMP
ACC060. S-2-001, FEB. 8, 1963, (UNPUBLISHED).
*EXPLORER 21 64-060A *CLASSH5
*JPKC90369
091069

A00405 CARR,F.A.
FLIGHT REPORT INTERPLANETARY MONITORING PLATFORM IMP-2
ACC073. NASA, TN D-3353, JUNE 1966.
*CLASSC5 *EXPLORER 21 64-060A *DATA USERS NOTE 69-03 *INCOMPLETE
*JPKC93869
091069

A01244 FAIRFIELD,D.H.
ORDERED MAGNETIC FIELD OF THE MAGNETOSHEATH
G72N03. J. GEOPHYS. RES., 72, 5865-5877, 1967.
AC1570. NASA-GSFC, X-612-67-174, APR. 1967.
*CLASSA2 *EXPLORER 18 63-046A-02 *EXPLORER 21 *IMP 1 DATA/MAGNETOSHEAT
*IMP 2 DATA/MAGNETOSHEAT *INTERPLANET MAGNETIC FD *GEOMAGNETIC FIELDS *MAGNETOS BOUNDARY PROC *NOCA
64-060A
*JPKC90369
091069

A01403 ANDERSON,K.A.
ENERGETIC PARTICLES IN THE EARTH'S MAGNETIC FIELD
ACC416. ANNUAL REV. NUCLEAR SCI., 16, 291-344, 1966.
*CLASSA4 *TERRESTRIAL TRAPPED RAD *EXPLORER 18 *EXPLORER 21 63-046A
64-060A
*JPKC90369
091069

this affected experiments' data analysis.

Despite the foregoing problems, the spacecraft telemetry system and all of the experiments functioned normally for several months from the October 4, 1964 launch date. After 57 days of normal operation, the battery proved incapable of sustaining spacecraft operation within the shadow of the earth; by 63 days after launch (December 6, 1964) the battery had failed completely. Thereafter, the spacecraft operated only during periods of favorable incident sun angles. Under these conditions, the spacecraft transmitted 56 days of data during the 59-day interval from December 12, 1964 to February 9, 1965 and 28 days of data during the 32-day interval from March 5, 1965 to April 5, 1965. The spacecraft continued to transmit intermittently until October 13, 1965, when one minute of data was received. All data acquisition efforts ceased as of November 1, 1965.

Between October 4, 1964 and April 5, 1965, apogee, perigee and orbital period changed from 9.54×10^4 km, 193 km and 34.95 hours to 9.40×10^4 km, 1081 km and 34.62 hours, respectively. During the same period, the spin axis-sun angle increased from 130° to 147° and then decreased to 60°.

A more complete discussion of the IMP 2 performance history is given in NASA TN D-3353, "Flight Report Interplanetary Monitoring Platform IMP-II (Explorer 21)", by Frank A. Carr (June 1966).

IMP 2 MAGNETOMETER (64-060A-02)

EXPERIMENT BRIEF DESCRIPTION

Each of two uniaxial fluxgate magnetometers, having dynamic ranges of ±40 gammas, samples the magnetic field 30 times within each of six 4.8 second intervals each 5.46 minutes. Detector sensitivities are ±0.25 gamma, and digitization uncertainty is ±0.40 gamma. A rubidium vapor magnetometer was used in calibrating the fluxgates, but did not produce an independently useful data set. The fluxgates functioned normally throughout the useful life of the satellite; last useful data was acquired on April 5, 1965.

PERSONNEL

Principal Investigator/Dr. Norman F. Ness/NASA-GSFC/Code 616
Investigator/Dr. Donald H. Fairfield/NASA-GSFC/Code 616

EXPERIMENT OBJECTIVES

The fluxgate magnetometers were intended to delineate precisely the vector characteristics of the interplanetary magnetic field and of the outer regions of the magnetospheric magnetic field.

EXPERIMENT FULL DESCRIPTION

One fluxgate magnetometer (0.75" diameter, 3" long) was mounted on each of two booms extending 69" from the main spacecraft body. A rubidium vapor magnetometer was included, but did not produce useful data due to poor signal to noise ratio. This detector is discussed in JGR, 69, p. 3531, and will not be further discussed here. (NSSDC does not expect to receive the Rb-vapor magnetometer data.)

The sensor of each fluxgate magnetometer was a saturable magnetic core which was driven at 10 kc/s from positive to negative saturation. Any second harmonic signal generated was due to the presence either of an ambient field component along the axis of the element or to permanent magnetization of the core material. The voltage output represents the discriminated second harmonic output which is calibrated to yield the field component parallel to the sensor axis, while the phase indicates the direction, parallel or anti-parallel.

Each magnetometer is calibrated in-flight, through a combined use of the Rb-vapor magnetometer data, for 0.25 second each time it is turned on.

The dynamic range of the fluxgates was ±40 gamma, with a sensitivity of ±0.25 gamma. Subsequent digitization by the use of "comb filters" on the ground led to uncertainties of ±0.4 gamma. Analysis of the data indicates that, to within the uncertainties just mentioned, the fields measured are indeed the ambient magnetic fields and are not contaminated by the spacecraft magnetic field.

The magnetic field is sampled by a single detector thirty times within each of six 4.8 second intervals each 5.46 minutes. A vector field is obtained from the 30 data points of each 4.8 second interval.

EXPERIMENT FULL DESCRIPTION

More detailed discussions of the instrumentation, spacecraft structure and magnetic cleanliness, data sampling, and the analytic means whereby vector information is gained from uniaxial fluxgate measurements, is given in Ness, Scearce and Seek, JGR, 69, 3631-69, 1964. Spin modulation was removed from the data by special techniques made necessary by the abnormally low spin rate of IMP 2; these are discussed in Fairfield and Ness, JGR, 72, 2379-2404, 1967.

EXPERIMENT PERFORMANCE

The two fluxgate magnetometers performed normally during the useful lifetime of the spacecraft, and provided good data until April 5, 1965. The vapor magnetometer operated intermittently because of poor signal-to-noise ratio and did not produce an independently useful data set.

64-060A-02

901549 FAIRFIELD,D.H.
POLAR MAGNETIC DISTURBANCES AND THE INTERPLANETARY MAGNETIC FIELD
A01979. NASA-GSFC, X-612-67-338, JULY 1967.
*CLASSC2 *EXPLORER 21 64-060A-02 $INTERPLANET MAGNETIC FD $GEOMAGNETIC FIELDS
*JHKC00869
091C69

901338 HOHANSON,K.W. NESS,N.F.
SATELLITE STUDIES OF THE EARTH'S MAGSETIC TAIL
A02631. PHYS. OF MAGNETOSPHERE, 409-434, 1968.
62-041A-01 63-046A-02 64-060A-02 65-042A-02 66-058A-01
*EXPLRS 14,18,21,28,33 66-076A-01 *PIONEER 7 *CLASSCA $GEOMAGNETIC FIELDS
*BOW SHOCK *MAGNETOTAIL *MAGNETOPAUSE
*JHKC72469
072565

901493 WILCOX,J.M. NORMARD,R.
SOLAR MAGNETIC PATTERN EXTENDING FROM 40 N TO 35 S
A02667, U. OF CALIF., TECH. RPT. NO. 9, APR. 1968.
*CLASSC2 *IMP 1 *IMP 2 *MARINER 4 63-046A-02
64-060A-02 64-077A-02 $SOLAR MAGNETIC FIELDS
*JAP002758
070565

901574 ANDERSON,K.A. SINSACK,J.H. FAIRFIELD,D.H.
HYDROMAGNETIC DISTURBANCES OF 3- TO 15-MINUTE PERIOD BY THE MAGNETOPAUSE AND THEIR RELATION TO BOW SHOCK SPIKES
A02585, J. GEOPHYS. RES., 73, 2371-2386, 1968.
*CLASSA2 *EXPLORER 21 64-060A-02 64-060A-07 64-060A-05
$MAGNETOSPHERIC BOUNDARY PROC *FARADAY CUP *FLUXGATE MAG *GEIGER TUBE
*JGR003958
071865

901576 FAIRFIELD,D.H. NESS,N.F.
MAGNETIC FIELD MEASUREMENTS WITH THE IMP 2 SATELLITE
A02663, J. GEOPHYS. RES., 72, 2379-2402, MAY 1967.
A02803, NASA-GSFC, X-612-66-930, NOV. 1966.
G72902, J. GEOPHYS. RES., 72, 2379-2402, MAY 1967.
*CLASSA2 $INTERPLANET MAGNETIC FD $GEOMAGNETIC FIELDS *EXPLORER 21 64-060A-02
*AVAILABLE AS G72902
*JHK003469
091C69

901700 NESS,N.F. WILCOX,J.M.
INTERPLANETARY SECTOR STRUCTURE, 1962-1966
A02697, SOLAR PHYS., 2, 351-359, 1967.
A02857, U. OF CAL., SER. 3, 155, 40, MAY, 1967.
*CLASSA2 *EXPLORER 18 *EXPLORER 21 *EXPLORER 28 *MARINER 2
*MARINER 4 63-046A-02 64-060A-02 65-042A-02 62-041A-03
64-077A-02 $INTERPLANET MAGNETIC FD
*JHKC00869
111469

901732 KASABUCHI,S.
ANALYSIS OF FLUCTUATIONS IN THE INTERPLANETARY MAGNETIC FIELD OBTAINED BY IMP-II
G74111, J. GEOPHYS. RES., 74, 225-230, 1969.
A02859, NASA-GSFC, X-616-68-271, JULY 1968.
64-060A-02 *IMP 2 *CLASSC2 $PI-PHU $PIONEER
*JHK041869
111769

801795 FAIRFIELD,D.H.
AVERAGE MAGNETIC FIELD CONFIGURATION OF THE OUTER MAGNETOSPHERE
ACCESS. J. GEOPHYS. RES., 73, 7329-7338, DEC. 1968.
ACCESS. NASA-GSFC, X-615-68-497, JUNE 1968.
*CLASSC2 +EXPLORER 18 63-046A-02 +EXPLORER 21 64-060A-02
+EXPLORER 28 $GEOMAGNETIC FIELDS 65-042A-02
120369

801815 CHASE,L.M.
SPECTRAL MEASUREMENTS OF AURORAL-ZONE PARTICLES
ACCESS. J. GEOPHYS. RES., 73, 3469-3476, JUNE 1968.
ACCESS. U. OF CALIF., PREPRINT, AUG. 1967.
*CLASS4C *ROCKET-FT. CHURCH 9/66 $ENERGETIC AURORAL PART +EXPLORER 21 64-060A-05
65-042A-02 $AURORA R5609-0101 R6609-0601 R6609-0602
R6609-1701
*JHK040869
071769

802738 FAIRCHILD,D.H.
MAGNETIC FIELD OF THE MAGNETOSPHERE AND TAIL
ACCESS. NASA-GSFC, X-615-69-124, APR. 1969.
*CLASSC4 66-110A-02 64-354A-02 65-075A-01 67-123A-01
$GEOMAGNETIC FIELDS 63-046A-02 64-063A-02 64-086A-03 65-042A-02
66-058A-01 66-058A-03 *MAGNETOTAIL *MSPHERE MAG FLUCTUATNS
*JHK050169
082869

803060 DUNGEY,J.W.
RECONNECTION MODEL OF THE MAGNETOSPHERE
ACCESS. EARTH'S PARTICLES AND FIELDS, 385-392, 1968.
*CLASS3G1 63-046A-02 64-060A-02 65-042A-02 +IMP-1
IMP-2 +IMP-3 $MAGNETOS BOUNDARY PROC *MSPHERE RECONVEXION MODEL
*JHK032769
091269

803466 WILCOX,J.M. HOWARD,R.
LARGE-SCALE PATTERN IN THE SOLAR MAGNETIC FIELD
ACCESS. SOLAR PHYS., 5, 564-574, 1968.
ACCESS. U. OF CALIF., TECH. RPT., JUNE, 1968.
63-046A-02 64-060A-02 +EXPLORERS 18,21[IMPS1,2 64-077A-02 +MARINER 4
$SOLAR MAGNETIC FIELDS $INTERPLANET MAGNETIC FD
*JHK072569
102469

804089 WILCOX,J.M.
ASYMMETRY IN GEOMAGNETIC RESPONSE TO THE POLARITY OF THE INTERPLANETARY MAGNETIC FIELD
ACCESS. U. CALIF., SER. A, ISS. 33, JULY 1968.
63-046A-02 64-060A-02 65-042A-02 +IMPS 1,2,3 $FI-/DE/OF
*JHK111469
111769

804090 WILCOX,J.M. HOWARD,R.
PERSISTENT SOLAR MAGNETIC PATTERN EXTENDING OVER EQUATORIAL LATITUDES
ACCESS. PHYS. REV. LETTERS, 20, 1252-1254, MAY 1968.
63-046A-02 64-060A-02 +IMPS 1,2 $FI-/TK/VI $SP-/IO
*JHK111469
111769

IMP-2, Explorer 21 64-060A

64-060A-00D Ephermis Tapes 7 track 556

64-060A-00E Merged Ephemeris Tapes 7 track 800

64-060A-00F Solar Ecliptic Ephemeris Tapes 7 track 556

64-060A-00G Merged Solar Ecliptic Ephemeris Tapes 7 track 800

64-060A-00A Fluxgate Magnetometer (originals) 9 track 800

64-060A-00B Packed bin mag Tape has been released from Files

64-060A-00C Packed BCD Flux Mag Tape 7 track 556

64-060-00D Merged Magnetometer and Ephemeris Tapes 7 track 800

64-060-00E Blocked Flux Magnetometer Tapes 7 track 800

IMP-2, EXPL

DESCRIPTION OF DATA	SATELLITE I.D.	D#	NO. OF TAPES	TRACK
SOLAR ECLIPTIC EPHEMERIS	64-060A-00F	D-01522 THRU D-01527	6	7
BLOCKED EPHEMERIS	64-060A-00G	D-01796	1	7
FLUXGATE MAGNETOMETER	64-060A-02A	D-00237 THRU D-00241	5	9
BLOCKED FLUX MAGNETOMETER	64-060A-02E	D-02899 D-02900	2	7
MERGED MAGNETOMETER AND EPHEMERIS	64-060A-02D	D-02892	1	7
PACKED BCD MAGNETOMETER	64-060A-02C	D-00668	1	7
	64-060A-02B	D-00667	1	7

IMP-2, EXPL 21

D#	NO. OF TAPES	TRACK	DEN.	MODE	REMARKS
01522 THRU 01527	6	7	556	BIN	
01796	1	7	800	BIN	
00237 THRU 00241	5	9	800	BIN	
02899 & 02900	2	7	800	BIN	
02892	1	7	800	BIN	
00668	1	7	556	BCD	
00667	1	7	556	BIN	TAPE HAS BEEN REMOVED FROM FILES

Problems Encountered on Merging the IMP 1, 2, and 3 Magnetometer and Ephemeris Data

The tape listing was in error. Binary 7 track magnetometer tapes existed for just some of the data, and not for all of it as stated in the listing. Also one of the formats for the existing 7 track binary tapes did not match what was actually on the tapes. As a result, 7 track binary tapes were made on the 360-75 from the original 9 track binary tapes and pifted for compatibility with the 7094.

The ephemeris tapes were in 7094-7044 DCS packed form and so they had to be unpacked for use. They were edited by removing any overlapping data in order to simplify the merge. While the unpacked tapes were being edited, some bad data were encountered. Upon trying to remake them from the originals, it was discovered that some of the original tapes were no good and that data had to be emitted from the merge.

Figure 4

Input Binary Tape Format

IMP 1, 2, and 3 Ephemeris

64-609-006

Word	Symbol	Description
**1	IYR	Year
**2	IDOY	Day count of year
**3	IHR	Hour (UT)
**4	IMIN	Minute (UT)
*5	GLAT	Geodetic latitude in degrees
*6	GLONG	Geodetic longitude in degrees
*7	RLAT	Geomagnetic latitude of satellite in degrees
*8	RLONG	Geomagnetic longitude of satellite in degrees
9	RAD	Radial distance from earth in earth radii
10	GMLONG	Geomagnetic longitude of sub-solar point
11	GMLAT	Geomagnetic latitude of sub-solar point
12	SUNA	Angle in degrees between probe spin axis and satellite sun vector
13	XSE	X solar ecliptic coordinate of satellite
14	YSE	Y solar ecliptic coordinate of satellite
15	ZSE	Z solar ecliptic coordinate of satellite

16	B	Magnitude of magnetic field
17	BPER	Perpendicular component of field (calculated perpendicular to spin axis)
18	BPAR	Parallel component of field (calculated parallel to spin axis)
*19	BSE	Magnetic field in solar ecliptic coordinates
*20	PHI	Angle between X and Y component of field in solar ecliptic in degrees
*21	THETA	Angle between field and projection on X-Y plane in solar ecliptic coordinates in degrees
22	PSI	Angle between payload X-axis and BPER in degrees
*23	XSOLM	Solar magnetospheric X-coordinate
*24	YSOLM	Solar magnetospheric Y-coordinate
*25	ZSOLM	Solar magnetospheric Z-coordinate
26	FMAT (1,1)	Rotation matrix to go from payload coordinates to solar ecliptic
27	FMAT (1,2)	
28	FMAT (1,3)	
29	FMAT (2,1)	
30	FMAT (2,2)	
	FMAT (2,3)	
32	FMAT (3,1)	

33	FMAT (3,2)	
34	FMAT (3,3)	
35	SESM (1,1) **	Rotation matrix to go from solar ecliptic to solar magnetospheric coordinates
36	SESM (1,2)	
37	SESM (1,3)	
38	SESM (2,1)	
39	SESM (2,2)	
40	SESM (2,3)	
41	SESM (3,1)	
42	SESM (3,2)	
43	SESM (3,3)	

* Written on output tape

** Used to determine if ephemeris data matches magnetometer data

Each physical record is 216 words long containing five 43-word logical records and a FORTRAN control word at the beginning.

1964 Oct. 4

FIRST 10 REC.

FILE 0001 REC 0001 CH 1296

0001	000327000001	000100000000	000426000000	000004000000	0
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0145	576445401752	176701725166	200614276361	000000000000	6
0193	177651276500	200602244550	200404077060	201400000000	0
0241	177567133415	000000000000	577567133415	200734313250	0
0289	202675341217	606416121727	204640000000	206441463146	2
0337	601404123737	600406771605	576717214511	217450273146	2
0385	207524553403	206731463146	601404123737	600437136106	5
0433	577751053365	200520011034	600453035136	177651322630	2
0481	000000000000	000000000000	200733422255	177573414256	0
0529	000426000000	000004000000	000005000000	603705075341	6
0577	210562217750	604777714121	210402314631	600731170727	6
0625	216505740000	216340760533	210657602642	206644266140	2
0673	200614257405	000000000000	600534077375	577751062231	2
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0769	577577675573	200732523307	000100000000	000426000000	0
0817	604426314631	206727146314	201615225350	210557540300	6
0865	600722255027	215732740000	212524663146	215731014631	2
0913	600620541307	601502567613	577737010530	200614250022	0
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1105	210402314631	600472321123	601453476426	601463750141	2
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0193	177651442735	200602211074	200404077060	201400000000	0
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0289	605637534121	204614631463	605571463146	207460314631	2
0337	576730365025	601563401203	601667213634	214576514631	2
0385	603910140104	211431631463	576730365025	602400753464	6
0433	577751115421	200520050602	600452753503	177651466737	2
0481	000000000000	000000000000	200727034670	177621176565	0
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0577	210545236535	605400564632	210402314631	573715263640	6
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0673	200614212056	000000000000	600524155162	577751124267	2
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0769	577625450333	200726101452	000100000000	000426000000	0
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FILE 0001 REC 0003 CH 1296

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D-01796

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IMP-2 MAGNETOMETER 5.46 MINUTE AVERAGED DATA

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280	18	1987	64	10	5	0	16.9	3.839	-3.729	-0.159	2.537	1.543	1.267
280	18	1991	64	10	5	0	22.3	1.795	-3.960	-0.380	1.853	1.810	1.736
280	18	1995	64	10	5	0	27.8	1.958	-4.238	-1.572	2.443	2.625	1.375
280	18	1999	64	10	5	0	33.2	1.209	-1.042	4.128	0.770	1.677	0.757
280	18	2003	64	10	5	1	5.1	3.644	-4.000	-1.698	1.134	2.555	1.171
280	18	2027	64	10	6	1	11.4	1.209	-1.409	-2.293	1.167	1.775	2.887
280	18	2031	64	10	6	1	16.9	1.518	-2.715	-1.672	1.641	3.138	2.736
280	18	2035	64	10	6	1	22.3	1.958	-3.405	2.092	0.989	0.676	1.439
280	18	2039	64	10	6	1	27.8	2.667	-3.788	2.781	0.436	0.540	0.562
280	18	2063	64	10	6	2	0.5	2.294	-0.272	1.053	1.273	1.207	2.270
280	18	2067	64	10	6	2	6.0	2.812	1.864	1.659	0.837	1.348	0.773
280	18	2071	64	10	6	2	11.5	2.409	-3.040	2.076	0.746	0.906	1.350
280	18	2075	64	10	6	2	16.9	1.471	-2.840	2.155	0.811	1.154	1.177
280	18	2079	64	10	6	2	22.4	1.911	-0.858	3.615	1.261	0.519	0.815
280	18	2103	64	10	6	2	55.1	-0.651	-1.843	2.319	1.981	2.822	0.804
280	18	2107	64	10	6	3	0.5	-0.246	-0.086	4.576	0.645	0.719	0.300
280	18	2111	64	10	6	3	6.0	-1.158	-1.106	3.467	1.535	1.243	2.361
280	18	2115	64	10	6	3	11.5	-0.159	-3.154	2.233	1.065	1.060	1.355
280	18	2119	64	10	6	3	16.9	2.019	-1.675	3.823	0.343	0.835	0.322
280	18	2143	64	10	6	3	49.7	1.519	-3.668	2.299	0.852	0.717	0.823
280	18	2147	64	10	6	3	55.1	0.934	-4.132	2.303	0.488	0.241	0.413
280	18	2151	64	10	6	4	0.6	0.574	-2.985	-2.222	0.598	1.316	1.844
280	18	2155	64	10	6	4	6.0	1.059	-4.622	-0.157	1.045	0.901	0.691
280	18	2159	64	10	6	4	11.5	0.571	-4.537	0.919	0.854	0.388	0.984
280	18	2183	64	10	6	4	44.2	0.638	-3.802	2.307	0.520	0.492	0.634
280	18	2187	64	10	6	4	49.7	-0.179	-4.401	0.269	1.196	1.106	2.402
280	18	2191	64	10	6	4	55.1	3.023	-1.261	1.513	1.123	0.983	1.486
280	18	2195	64	10	6	5	0.6	2.594	-1.898	1.568	1.213	1.268	1.809
280	18	2199	64	10	6	5	6.1	0.682	-2.263	2.802	1.265	0.972	1.451
280	18	2223	64	10	6	5	38.8	0.908	-3.490	-1.500	0.571	0.570	0.739
280	18	2227	64	10	6	5	44.3	1.744	-2.605	-1.346	0.633	1.246	0.901
280	18	2231	64	10	6	5	49.7	2.486	-1.808	1.555	0.796	1.387	1.034
280	18	2235	64	10	6	5	55.2	2.964	-2.018	0.701	1.667	1.588	1.473
280	18	2239	64	10	6	6	0.6	3.365	-1.647	-0.177	1.075	1.239	1.240
280	18	2263	64	10	6	6	33.4	3.427	-0.193	1.434	0.933	0.567	1.112
280	18	2267	64	10	6	6	38.8	2.646	-2.747	1.348	0.278	0.707	0.737
280	18	2271	64	10	6	6	44.3	2.399	-0.793	0.244	1.088	1.430	1.902
280	18	2275	64	10	6	6	49.7	2.787	-1.026	0.365	0.644	0.784	0.994
280	18	2279	64	10	6	6	55.2	0.472	-2.654	-1.738	2.389	4.767	4.383
280	18	2303	64	10	6	7	27.9	-0.235	-2.716	0.906	1.906	0.863	1.999
280	18	2307	64	10	6	7	33.4	1.836	-3.117	-0.132	0.	0.	0.
280	18	2311	64	10	6	7	38.8	2.047	-1.491	1.614	1.656	1.515	0.922
280	18	2315	64	10	6	7	44.3	-2.878	-3.599	-0.970	0.256	0.611	0.991
280	18	2319	64	10	6	7	49.8	-2.024	-3.868	0.504	1.087	0.993	1.613
280	18	2343	64	10	6	8	22.5	-1.914	-3.873	-1.486	0.629	0.555	0.857
280	18	2347	64	10	6	8	27.9	1.631	-3.561	1.617	1.341	1.339	1.045
280	18	2351	64	10	6	8	33.4	1.088	-3.960	-0.015	1.039	1.384	1.590
280	18	2355	64	10	6	8	38.9	2.124	-3.088	0.773	1.082	0.926	1.727
280	18	2359	64	10	6	8	44.3	1.076	0.073	4.617	0.570	0.497	0.298

FIELD S.E. COMPONENTS VARIANCES X	Y	Z	FIELD MAGNITUDE	FIELD THETA	FIELD PHI	SPACECRAFT RADIAL DISTANCE	GOOD POINTS
.533	0.261	0.969	4.623	-8.655	294.996	13.744	12
.537	1.543	1.267	5.354	-1.697	315.831	13.787	12
.853	1.810	1.736	4.364	-5.001	294.380	13.831	12
.443	2.625	1.375	4.926	-18.612	294.801	13.874	12
.770	1.677	0.757	4.426	68.869	319.226	13.974	12
.144	2.355	1.171	4.400	-22.694	279.129	14.233	12
.167	1.775	2.887	2.948	-51.066	310.748	14.279	12
.641	3.138	2.736	3.531	-28.258	299.215	14.324	12
.989	0.676	1.439	4.450	28.046	299.902	14.356	12
0.436	0.540	0.562	5.390	31.068	305.291	14.401	12
.273	1.207	2.270	2.538	24.501	353.246	14.663	12
.837	1.348	0.773	3.764	26.322	33.545	14.700	12
.746	0.906	1.350	4.399	28.151	308.395	14.733	12
0.811	1.154	1.177	3.856	33.970	297.390	14.771	12
.261	0.519	0.815	4.187	59.714	334.838	14.804	12
1.981	2.622	0.804	2.965	51.440	268.415	15.018	12
0.645	0.719	0.300	4.584	86.738	199.156	15.056	12
.535	1.243	2.361	3.819	65.209	223.670	15.081	12
1.065	1.060	1.355	3.868	35.263	267.117	15.106	12
0.343	0.835	0.322	4.636	55.543	320.328	15.139	12
0.852	0.717	0.923	4.588	30.072	292.497	15.316	12
0.468	0.241	0.413	4.822	28.526	282.742	15.341	12
0.598	1.316	1.844	3.765	-36.169	280.889	15.367	12
1.045	0.901	0.691	4.745	-2.014	282.902	15.392	12
0.854	0.388	0.984	4.664	11.363	277.169	15.404	12
0.520	0.492	0.634	4.493	30.899	279.529	15.550	8
1.196	1.106	2.402	4.413	3.492	267.671	15.567	12
1.123	0.983	1.486	3.608	24.800	337.363	15.585	12
1.213	1.268	1.809	3.577	26.010	323.813	15.598	12
1.265	0.972	1.451	3.666	49.849	286.765	15.624	12
0.571	0.570	0.739	3.906	-22.582	284.588	15.722	12
0.633	1.246	0.901	3.411	-23.232	303.809	15.735	12
0.796	1.387	1.034	3.444	26.836	323.968	15.744	12
1.667	1.588	1.478	3.653	11.062	325.750	15.758	12
1.075	1.239	1.240	3.754	-2.696	333.949	15.772	12
0.933	0.567	1.112	3.720	22.671	356.783	15.834	12
0.278	0.707	0.737	4.179	18.813	316.010	15.840	4
1.088	1.430	1.902	2.538	5.516	341.708	15.845	12
0.644	0.784	0.994	2.992	7.002	339.798	15.860	11
2.389	4.767	4.383	3.207	-32.783	280.091	15.865	12
1.906	0.863	1.999	2.874	18.367	264.629	15.887	4
0.	0.	0.	3.520	-2.083	300.500	15.890	1
1.656	1.515	0.922	3.003	32.513	323.941	15.887	12
0.266	0.611	0.991	4.709	-11.893	231.347	15.894	12
1.087	0.993	1.613	4.395	6.588	242.380	15.891	12
0.625	0.555	0.357	4.568	-18.956	243.709	15.886	12
1.341	1.339	1.045	4.537	22.430	294.613	15.883	12
1.039	1.384	1.590	4.106	-0.212	285.369	15.874	12
1.082	0.926	1.727	3.827	11.654	304.527	15.868	12
0.570	0.497	0.298	4.742	76.852	3.899	15.866	11

JDA	STA	SEQ NO.	YR	MO	DA	HR	MIN	FIELD COMPONENTS SCLAR ECLIPTIC X	Y	Z	FIELD S.E. VARIANCES X	Y	Z	FI MAGNI
279	16	1519	64	10	5	13	33.5	-34.236	-30.306	26.859	0.001	0.001	0.	53.(
279	16	1523	64	10	5	13	43.7	-34.238	-30.304	26.859	0.001	0.001	0.	53.(
279	16	1527	64	10	5	13	49.4	-34.240	-30.301	26.859	0.	0.	0.	53.(
279	8	1595	64	10	5	15	22.1	15.056	-71.689	-26.078	3.204	0.539	4.600	77.(
279	8	1599	64	10	5	15	27.6	21.469	-73.554	-25.125	0.536	0.379	0.505	80.(
279	8	1623	64	10	5	15	0.3	32.633	-62.349	-27.485	3.691	13.907	4.512	75.(
279	8	1627	64	10	5	16	5.8	34.283	-68.124	-29.994	3.209	10.864	2.531	81.(
279	8	1631	64	10	5	16	11.3	33.034	-60.550	-29.372	4.119	14.415	3.373	74.(
279	8	1635	64	10	5	16	16.7	37.656	-66.375	-27.442	3.793	10.614	3.026	81.(
279	8	1639	64	10	5	16	22.2	37.786	-62.495	-27.133	5.788	13.298	2.920	77.(
279	8	1663	64	10	5	16	54.9	47.497	-56.117	-13.719	1.911	0.374	2.880	83.(
279	8	1667	64	10	5	17	0.4	47.887	-66.242	-15.656	2.588	1.037	4.705	83.(
279	8	1671	64	10	5	17	5.8	50.119	-64.161	-11.779	2.108	2.213	3.150	82.(
279	8	1675	64	10	5	17	11.3	48.062	-64.786	-14.618	2.102	0.985	2.849	81.(
279	8	1679	64	10	5	17	16.7	49.221	-63.660	-12.700	1.425	0.625	2.282	81.(
279	8	1703	64	10	5	17	49.5	43.997	-57.231	4.378	0.770	2.053	2.534	75.(
279	8	1707	64	10	5	17	54.9	50.778	-55.835	3.083	1.487	1.727	2.198	75.(
279	8	1711	64	10	5	18	0.4	48.161	-56.514	3.845	2.564	1.686	3.699	74.(
279	8	1715	64	10	5	18	5.8	45.983	-54.814	4.829	1.637	1.668	4.187	72.(
279	8	1719	64	10	5	18	11.3	45.145	-52.938	8.206	0.933	2.829	3.309	70.(
279	8	1743	64	10	5	18	44.0	34.665	-44.883	14.159	1.713	1.780	2.837	58.(
279	8	1747	64	10	5	18	49.5	36.076	-38.764	20.920	0.525	4.608	6.437	56.(
279	8	1751	64	10	5	18	54.9	33.596	-41.486	13.644	2.174	0.966	2.767	55.(
279	8	1755	64	10	5	19	0.4	30.802	-40.106	12.750	3.447	1.402	2.130	52.(
279	8	1759	64	10	5	19	5.9	28.455	-37.437	19.578	0.450	2.715	4.089	50.(
279	77	1783	64	10	5	19	40.0	23.738	-33.033	22.989	0.023	2.106	0.786	46.(
279	77	1787	64	10	5	19	44.1	23.907	-33.575	22.225	1.288	3.221	3.775	46.(
279	77	1791	64	10	5	19	49.5	24.495	-31.010	23.824	0.598	0.565	0.550	46.(
279	77	1795	64	10	5	19	55.0	23.543	-36.635	23.319	2.171	2.087	1.711	49.(
279	77	1799	64	10	5	20	0.4	26.206	-26.807	25.259	5.248	7.752	6.997	45.(
279	77	1823	64	10	5	20	33.2	-3.504	-32.218	3.751	4.559	7.500	8.790	32.(
279	77	1827	64	10	5	20	38.6	-0.692	-25.409	7.511	3.770	5.155	3.141	26.(
279	77	1831	64	10	5	20	44.1	-1.936	-23.149	6.324	2.867	6.978	2.346	24.(
279	77	1835	64	10	5	20	49.5	-3.227	-19.366	4.728	5.813	8.931	6.719	16.(
279	77	1839	64	10	5	20	55.0	-3.245	-23.373	1.972	2.246	8.300	4.967	23.(
279	18	1863	64	10	5	21	27.7	-2.509	-21.977	4.519	2.471	5.375	4.897	22.(
279	18	1867	64	10	5	21	33.2	-6.446	-22.573	-1.006	2.753	5.655	3.259	23.(
279	18	1871	64	10	5	21	38.6	-4.387	-18.820	-0.280	3.275	2.618	3.048	19.(
279	18	1875	64	10	5	21	44.1	-5.920	-18.137	-0.965	2.741	3.021	5.848	19.(
279	18	1879	64	10	5	21	49.5	-5.665	-13.673	2.353	4.879	5.056	5.432	14.(
279	18	1903	64	10	5	22	22.3	-3.665	-4.822	-5.813	10.424	10.343	11.392	8.(
279	18	1907	64	10	5	22	27.7	2.685	-6.377	-0.052	8.043	5.920	9.735	7.(
279	18	1911	64	10	5	22	33.2	-1.121	-5.458	-0.146	4.018	6.126	2.949	5.(
279	18	1915	64	10	5	22	38.7	1.373	-2.441	-0.502	10.254	9.287	9.013	3.(
279	18	1919	64	10	5	22	44.1	3.740	2.582	-3.663	4.137	6.014	5.384	5.(
279	18	1943	64	10	5	23	16.9	0.543	-3.963	-0.250	2.210	3.081	4.570	4.(
279	18	1947	64	10	5	23	22.3	3.014	-2.387	0.591	8.025	10.799	7.598	5.(
279	18	1951	64	10	5	23	27.8	3.303	-3.951	1.622	7.248	2.949	7.564	5.(
279	18	1955	64	10	5	23	33.2	2.685	-1.255	4.600	2.344	0.870	4.290	5.(
279	18	1959	64	10	5	23	38.7	2.559	-2.095	4.001	5.226	2.593	4.735	5.(

FIELD S.D. COMPONENTS VARIANCES X	Y	Z	FIELD MAGNITUDE	FIELD THETA	FIELD PHI	SPACECRAFT RADIAL DISTANCE	GOOD POINTS
.001	0.001	0.	53.028	30.432	221.515	3.158	6
.001	0.001	0.	53.028	30.432	221.512	2.938	6
.	0.	0.	53.028	30.432	221.507	2.720	6
.204	0.[illegible]	4.800	77.941	-19.548	281.828	2.887	4
.536	0.379	0.505	80.637	-18.154	286.271	3.093	4
.691	13.907	4.512	75.550	-21.334	297.627	4.461	8
.209	10.864	2.531	81.907	-21.463	296.713	4.639	7
.119	14.415	3.373	74.968	-23.066	298.615	4.815	8
.793	10.614	3.026	81.097	-19.772	299.567	4.982	6
.788	13.298	2.920	77.908	-20.381	301.158	5.150	8
.911	0.374	2.880	83.724	-9.431	306.819	6.232	6
.588	1.037	4.705	83.224	-10.843	305.864	6.373	6
.108	2.213	3.150	82.263	-8.233	307.995	6.513	6
.102	0.985	2.849	81.917	-10.279	306.604	6.656	4
.425	0.625	2.282	81.466	-8.969	307.711	6.791	6
.770	2.053	2.534	75.467	3.325	310.568	7.703	4
.487	1.727	2.158	75.535	2.339	312.284	7.821	4
2.564	1.686	3.699	74.351	2.964	310.438	7.942	6
1.637	1.668	4.187	72.355	3.827	310.601	8.057	6
0.933	2.329	3.309	70.056	6.727	310.457	8.172	6
1.713	1.780	2.837	58.573	13.698	307.840	8.953	6
0.525	4.608	6.437	96.937	21.557	312.943	9.054	6
2.174	0.966	2.767	55.160	14.321	309.085	9.161	6
3.447	1.402	2.130	52.152	14.151	307.525	9.263	6
0.450	2.715	4.089	50.936	22.604	307.238	9.363	6
0.023	2.106	0.786	46.724	29.472	305.701	10.034	4
1.288	3.221	3.775	46.827	28.335	305.452	10.128	4
0.598	0.565	0.550	46.143	31.084	308.305	10.225	4
2.171	2.087	1.711	49.398	28.168	302.726	10.311	3
5.248	7.752	6.997	45.210	33.982	314.351	10.403	5
4.559	7.500	8.790	32.624	6.602	263.792	10.995	7
3.770	6.155	3.141	26.621	17.288	268.441	11.070	12
2.867	6.978	2.346	24.075	15.229	265.219	11.153	7
8.813	8.931	6.719	16.398	16.757	258.140	11.229	9
2.246	8.300	4.967	23.680	4.777	262.096	11.313	9
2.471	5.875	4.837	22.577	11.547	263.487	11.762	12
2.753	5.655	3.259	23.497	-2.455	254.063	11.902	12
3.275	2.618	3.048	19.326	-0.830	256.879	11.974	12
2.741	3.021	5.648	19.103	-2.895	251.922	12.043	12
4.879	8.055	5.432	14.986	9.034	247.494	12.113	8
0.424	10.343	11.392	8.395	-43.822	232.765	12.511	9
8.043	5.920	9.735	7.000	-0.423	294.344	12.566	12
4.018	6.126	2.949	5.578	-1.504	258.390	12.694	11
0.254	9.287	9.013	3.117	-9.270	307.503	12.759	12
4.137	6.014	5.384	5.837	-38.871	34.628	12.814	10
2.210	3.081	4.570	4.005	-3.712	277.809	13.160	12
8.025	10.799	7.398	5.585	6.073	334.547	13.218	12
7.248	2.949	7.664	5.399	17.481	309.897	13.269	12
2.344	0.870	4.290	5.575	55.601	336.523	13.378	11
5.226	2.593	4.735	5.191	50.426	320.684	13.436	10