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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 offline tape datasets have now been migrated from the original magnetic tape to magnetic disk (starting in mid-2004). Accordingly, statements in the format descriptions that address such tape relevant factors as blocking and bit density are no longer applicable. The paper documentation in the DSCs have been scanned and made into digital images of the pages, 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. But this inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system, and the user should go to that interface (JIN) if further information is desired on possible later changes to the inventory information. The information existing in the DSCs is now not needed for locating data files, but we did not go to the trouble of removing that inventory information.

2. CHANGE LOG

Version	Date	Person	Page	Description of Change
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01				
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3. LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

[NOTE: ANY OF THE INFORMATION FIELDS MIGHT BE BLANK.]

[THE “MATERIALS FOR DISTRIBUTION” FIELD IS HERE CALLED JUST “MATERIALS”]

“Remarks” for spacecraft SCNAME1”:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?sc=1977-102A--remark-->

“Materials” for spacecraft SCNAME1”:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?sc=1977-102A--mat-->

“Remarks” for SCNAME1 experiment EXNAME1:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?sc=1977-102A&ex=09--remark-->

“Materials” for SCNAME1 experiment EXNAME1:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?sc=1977-102&ex=09--mat-->

“Remarks” for EXNAME1 data set DSNAME1:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=SPHE-00677--remark-->

“Materials” for EXNAME1 data set DSNAME1:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=SPHE-00677--mat-->

“Remarks” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=SPHE-00677--remark-->

“Materials” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=SPHE-00677--mat-->

“Remarks” for EXNAME1 data set DSNAME3:

“Materials” for EXNAME1 data set DSNAME3:

“Remarks” for SCNAME1 experiment EXNAME2:

“Materials” for SCNAME1 experiment EXNAME2:

“Remarks” for EXNAME2 data set DSNAME1:

“Materials” for EXNAME2 data set DSNAME1:

“Remarks” for EXNAME2 data set DSNAME2:

“Materials” for EXNAME2 data set DSNAME2:

“Remarks” for spacecraft SCNAME2”:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?sc=1978-079A--??-->

“Materials” for spacecraft SCNAME2:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?sc=1978-079A--??-->

“Remarks” for SCNAME2 experiment EXNAME1:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?sc=1978-079A&ex=03--??-->

“Materials” for SCNAME2 experiment EXNAME1”

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?sc=1978-079A&ex=03--??-->

“Remarks” for EXNAME1 data set DSNAME1:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?ds=SPHE--00011--remark-->

“Materials” for EXNAME1 data set DSNAME1:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?ds=SPHE--00011--remark-->

“Remarks” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?ds=SPHE-00014--remark-->

“Materials” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MaterCatalog?ds=SPHE-00014--remark-->

“Remarks” for EXNAME1 data set DSNAME3:

“Materials” for EXNAME1 data set DSNAME3:

“Remarks” for SCNAME2 experiment EXNAME2:

“Materials” for SCNAME2 experiment EXNAME2:

“Remarks” for EXNAME2 data set DSNAME1:

“Materials” for EXNAME2 data set DSNAME1:

“Remarks” for EXNAME2 data set DSNAME2:

“Materials” for EXNAME2 data set DSNAME2:

“Remarks” for data set DSNAME3:

“Materials” for EXNAME data set DSNAME3:

“Remarks” for SCNAME2 experiment EXNAME3:

“Materials” for SCNAME2 experiment EXNAME3:

“Remarks” for EXNAME3 data set DSNAME1:

“Materials” for EXNAME3 data set DSNAME1:

“Remarks” for EXNAME3 data set DSNAME2:

“Materials” for EXNAME3 data set DSNAME2:

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ALTERNATE OPTION:

For SCNAME2:

“Remarks” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=SPHE-00014--remark-->

“Materials” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=SPHE-00014--mat-->

can be shown as

“Remarks” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=78-079A-03C--remark-->

“Materials” for EXNAME1 data set DSNAME2:

<http://nssdc.gsfc.nasa.gov/database/MasterCatalog?ds=78-079A-03C--mat-->

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4. CATALOG MATERIALS:

DATA SET CATALOG # 17

Explorer 28, Magnetometer and Ephemeris Data

65-042A-00 G			4 tapes
{	{	A	9 tapes
{	{	B	9 tapes
{	{	C	3 tapes
{	{	D	3 tapes
{	{	E	2 tapes
{	{	F	
{	{	G	1 tape
{	{	H	

IMP-G

MAGNETOSPHERIC B FIELD HOURLY AVGS.

65-042A-02G

THIS DATA SET HAS BEEN RESTORED. THERE WAS ORIGINALLY ONE
9-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 360 COMPUTER.
THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBER AND
TIME SPAN IS AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR002776	DS002776	D002906	1	05/29/65 - 05/10/67

IMP-C

INTERPLANETARY B. FIELD, HOURLY AVG.

65-042A-02E

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY TWO
7-TRACK, 800 BPI TAPES, 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
AN IBM 360 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE
CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR002743	DS002743	D002904	1	06/01/65 - 01/26/66
		D002905	2	07/01/66 - 01/29/67

IMP-C

FLUXGATE MAGNETOMETER, PACKED

65-042A-02D

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY THREE 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. WHEN VERIFYING THE TIME SPAN, THE YEAR COULD NOT BE VERIFIED. 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 NUMBERS AND TIME SPAN IS AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR005369	DS005369	D002888	1	05/29/65 - 03/09/66
		D002889	2	03/10/66 - 10/27/66
		D002890	3	10/27/66 - 05/11/67

IMP-C

MERGED MAGNETOMETER & EPHEMERIS

65-042A-02C

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY THREE
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 TAPE WAS CREATED ON AN IBM 7094 COMPUTER.
THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBERS AND
TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR003537	DS003537	D002893	1	05/29/65 - 05/01/66
		D002894	2	05/01/66 - 04/21/67
		D002895	3	04/21/67 - 05/11/67

IMP-C

BLOCKED BCD VERSION OF ORIG. TAPE

65-042A-02B

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY 9
7-TRACK, 556 BPI TAPES, WRITTEN IN BCD. THERE IS ONE RESTORED
TAPE, WRITTEN IN ASCII. THE DR TAPE IS A 3480 CARTRIDGE AND THE
DS TAPE IS 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED
ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE
CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR003536	DS003536	D001208	1	05/29/65 - 09/01/65
		D001209	2	09/01/65 - 12/04/65
		D001210	3	12/05/65 - 03/09/65
		D001212	4	03/10/66 - 06/12/66
		D001213	5	06/12/66 - 07/24/66
		D001211	6	07/25/66 - 10/27/66
		D001214	7	10/27/66 - 01/30/67
		D001215	8	01/30/67 - 05/05/67
		D001216	9	05/05/67 - 05/11/67

IMP-C

S ECLIPTIC & MSPHERIC EPHEMERIS TAPE

65-042A-00G

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

DR#	DS#	D#	FILES	TIME SPAN
DR004687	DS004687	D001797	1	05/29/65 - 02/10/66 (a)
		D001798	2	02/10/66 - 07/31/66 (b)
		D001799	3	07/31/66 - 03/18/67 (c)
DR004688	DS004688	D001800	1	03/18/67 - 05/11/67

- (a) D001797 - ONE READ ERROR, REC 186, FILE 1
- (b) D001798 - 3 ERRORS, REC. 1233, 1621, 3104, FILE 1
- (c) D001799 - 17 ERRORS, REC. 104, 977, 11141, 11162, 11280, 11469, 11490, 11552, 11702, 11708, 11722, 11729, 11735, 11736, 11742, 11762, 11803

65-042A-00G EXPLORER 28 EPHEMERIS SOLAR ECCLIPTIC
MERGED DATA

<u>D#</u>	<u>C#</u>
D-01797	C-06725
D-01798	C-06726
D-01799	C-06724
D-01800	C-06727

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 - 4. Partial Hex dump of D tapes.
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 - 2. Format
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 - 2. Format
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 - 2. Format
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 - 4. Partial listing of tapes D-2904, 2905.
 - H 65-042A02F
 - 1. Data set description.
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 - 1. Data set description.
 - 2. Format
 - 3. Listing of hourly average.
 - 4. Partial listing of tape D-02906.

J 65-042A-02H

1. Data set description.
2. Listing of program that generates microfilm for this data set.

III A Listing of program that merger 00H and 02A.

IV A IMP-3 magnetometer observations made within + -3,5 hrs. of local non and beyond 18 earth Radii.

EXPLORER 28 (IMP C, IMP 3) (65-042A)

SPACECRAFT BRIEF DESCRIPTION

Explorer 28 (IMP 3) is a 128 pound, spin-stabilized spacecraft instrumented for interplanetary studies of cosmic rays, magnetic fields and plasmas. It was launched May 29, 1965, into a highly elliptical orbit (apogee 41 earth radii at 21.50 hours local time). Performance was essentially normal until late April 1967, then intermittent until May 12, 1967, after which no further data were acquired.

PERSONNEL

Project Manager/Mr. Paul Butler/NASA-GSFC/Code 724
Project Scientist/Dr. Frank B. McDonald/NASA-GSFC/Code 611
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 28 (IMP 3) was the third 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 quiescent properties of the interplanetary magnetic field and its dynamic relationship with particle fluxes from the sun; (3) to develop a solar flare prediction capability for Apollo; (4) to extend knowledge of solar-terrestrial relationships; (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 in. long with octagonal faces 28 inches across. The axis of symmetry (spin axis) passed through the center of the faces. The main appendages were: four solar paddles, each 20 by 26 in. with a total solar-cell area of about 32.8 sq. ft.; four 16 in. antennas; an Rb-vapor magnetometer boom, 67 in. long, mounted on the top face parallel to the spin axis; and two fluxgate magnetometer booms mounted perpendicular to the spin axis, 69 in. long.

SPACECRAFT FULL DESCRIPTION

Power System

Power was supplied by N/P 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 45 and 64 w., depending on the spin axis-sun angle, while the battery capacity was 5 amp-hr at 14 v. An undervoltage system caused all systems to be turned off when the main system voltage (normally 18.3 v) fell below 11.5 v; the recycle time was 3 hours, after which the battery would have been 90% recharged under normal conditions.

Onboard Propulsion

None

Communications

Data were telemetered to ground using pulse frequency modulation (PFM) of a 4-w transmitter operating at 136.125 M/C. A complete encoder sampling pattern was repeated every 5.46 minutes. A pattern consisted of three normal sequences followed by an Rb-vapor magnetometer sequence, each sequence being 81.9 sec. 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 v). During each normal sequence, a complete set of spacecraft performance parameters and data from all experiments except the Rb magnetometer were telemetered. During the Rb 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 23.7 rpm. There was no active attitude control system on board.

Attitude Sensors

Using an optical aspect system sensitive to both the sun and the earth, the spin axis-sun angle and the time the sensor meridian spins past the sun have been determined.

Command System

There were two commands possible, one for the range, range-rate function and the other for the transmitter.

SPACECRAFT FULL DESCRIPTION

Onboard Data Storage

Twelve accumulators were incorporated into the encoder to accommodate the experiments having digital outputs.

Onboard Data Processing

None

SPACECRAFT PERFORMANCE

The spacecraft performance was normal from launch to May 12, 1966 (346 days), except for two 3-hour intervals on April 7, and May 4, 1966, during which no signal was received. From mid-May to mid-June 1966, a signal was received only about 80% of the time; the no-signal periods were due mainly to unfavorable satellite attitude. From mid-June 1966 to late April 1967, performance was normal except for three no signal periods in October. Between April 26, 1967, and May 12, 1967, the date of the last transmission from the spacecraft, there were frequent no signal periods. All attempts at further data acquisition were terminated on July 15, 1967. The no-signal periods are due to the functioning of the undervoltage system and the permanent cessation of signals has been attributed to battery failure. Reentry occurred on July 4, 1968.

The initial spin axis-sun angle was about 31° ; the spin axis had right ascension $+64.87^\circ$ and declination -10.9° . The spin axis remained fixed in inertial space for the first year of operation, except for the period September 15, 1965, thru January 12, 1966. During this time, a coning motion was experienced; the maximum full cone angle was 3° . The spin rate during the first year began at 23.7 rpm, reached minimum and maximum values of 18.25 and 27.4 rpm, and finished the year at 22.4 rpm.

A more complete discussion of the IMP 3 performance history is given in "Interim Flight Report - Interplanetary Monitoring Platform IMP III - Explorer XXVIII." NASA X Documents X 724-66-121 and X 724-66-354, by Frank A. Carr (March 1966, July 1966).

SPACECRAFT ORBITAL PARAMETERS

	5/29/65	12/25/65	4/21/66
Apogee (geocentric, km)	267,155	251,486	243,315
Perigee (altitude, km)	205	15,918	24,435
Period (minutes)	8399	8400	8416
Inclination (degrees)	33.8	46.2	51.5
Eccentricity	0.952	0.837	0.775
Apogee Local Time	20:20	09:20	21:20

(250,000 km = 39.3 Earth Radii)

Source: Interim EMP 3 Flight Report, Frank A. Carr,
NASA/GSFC X-724-66-354

65-042A

NSDDC TECHNICAL REFERENCE FILE

100031 PIZZA, F. D. ACCESSION ORDERED CATALOG 11/17/69 PAGE 1
 COMPUTER ANALYSIS OF INTERPLANETARY MONITORING PLATFORM (IMP) SPACECRAFT PERFORMANCE *EXPLORER 10, 21, 26
 200001. NASA-GSFC, 14-D-3440, N.M.P., 1966. 65-042A *CLASS575
 *LATA USERS NOTE 67-29 65-042A
 *JHK050869
 091065
 800004 UELIN, J. W., JR. IMP ENVIRONMENTAL TEST PLAN *EXPLORED 2B *CLASS5HS
 ACC003. GSFC THERMAL VACUUM TEST SECTION (UNPUBLISHED). 65-042A
 *EXPLORER 21 65-042A
 *JHP092069
 091069
 800045 KRUEGER, V. L. MINUTES OF THE THIRD IMP 2 COORDINATION MEETING *EXPLORED 2B *CLASS5HS
 A00064. UNPUBLISHED MEMORANDUM FROM IMP COORDINATOR, JUNE 22, 1968. 65-046A
 *EXPLORER 21 *EXPLORED 2B
 *C. 45515
 *JHK050869
 091069
 800421 NASA XIL - AJNCH THIRD INTERPLANETARY MONITORING PLATFORM *EXPLORED 2B
 A00066. NASA PRESS KIT. RELEASE NO. 65-164. MAY 24, 1965. *EXPLORED 2B
 *CLASS5C *INCOMPLETE 65-042A
 *JHK090959
 091069
 800426 FADGACK, S. J. 54JFE, D. E. IMP-C ORBIT AND LAUNCH TIME ANALYSIS *EXPLORED 2B
 ACC010. NASA-GSFC, X-643-09-10, JAN. 1969. 65-17261.
 C00196. NASA-GSFC, X-643-65-40, JAN. 1965. 65-12261.
 *CLASS5C *INCOMPLETE 65-042A
 *JHK050869
 102469
 801016 LOWREY, O. E. INTERIM FLIGHT REPORT. INTERPLANETARY MONITORING PLATFORM IMP 3-EXPLORER 2B
 A03289. NASA-555. X-643-68-117. FEB. 1963. 65-042A
 *CLASS5C *EXPLORED 2B
 *JHK090859
 091065
 803411 CARP, F. A. INTERIM FLIGHT REPORT. INTERPLANETARY MONITORING PLATFORM IMP 3-EXPLORER 2B
 A03115. NASA-GSFC, X-724-66-121. MAR. 1966. *PARTICLES *FIELDS
 *EXPLORER 20 65-042A
 *JHK070869
 091269
 803419 CARP, F. A. INTERIM FLIGHT REPORT 43-2. INTERPLANETARY MONITORING PLATFORM IMP 3-EXPLORER 2B
 A03116. NASA-GSFC, X-724-66-304. JULY 1966. *PARTICLES *FIELDS *CLASS5C
 *EXPLORER 2B 65-042A
 *JHK090859
 070869

Should News article on "Initial Results of IMP 1 Rejected Fuel Exp."
 be included in TRF Bk., also Firstfield News which in Memphis
 was included in TRF 7/1/69

65-0424

EXPLORER 28, IMP C, IMP 3 05/29/65 NASA/OSFC

SPACECRAFT AND ORBIT DESCRIPTION

LAUNCH DATE - 05/29/65
 DATE ABANDONED - 07/15/67
 DESIGN LIFE/TIME - 12 MONTHS
 PRIMARY LAUNCH VEHICLE - DELTA 31
 WEIGHT - 58.1 KG.
 APPROXIMATE ORBITAL PERIOD - 287155 KM
 ORBIT TYPE - EARTH
 SEMI-MAJOR AXIS - KM
 INCLINATION - 55 AT DEG
 ARGUMENT OF PERIGEE -
 RA OF ASCENDING NODE -

DATE OF LAST USEFUL DATA - 0
 STATUS - FAILED
 INITIAL FUNDING ACCT - 4554
 LAUNCH SITE - USARP
 ANOMALISTIC PERIOD - 8400 M
 PERIOD OF ORBITAL PERIOD - 6343
 EPOCH DATE/TIME - 05/29/65
 REL. VELOCITY - 0.952
 ORBIT ANOMALY - DEG
 ORBIT PERIOD ROTATION - DEG
 ORBIT PERIOD PRECESSION OF NODES -

SPACECRAFT OBJECTIVES

SEE TELESCRIPT ENTRY IN NOTEBOOK

FAIL DESCRIPTION

SEE TELESCRIPT ENTRY IN NOTEBOOK

PERFORMANCE

SEE TELESCRIPT ENTRY IN NOTEBOOK

ACQUISITION MANAGEMENT INFORMATION

GROUP B	AGENT	CHK	RANK
TOTAL ACQ. HOURS SPENT	0		EXPERIENCE DOG
ACQ. HOURS SPENT LAST 90	0		CALIBRATION DOG
LAST VISIT			DATA SET DOG
LAST CONTACT			DATA RECEIVED
NEXT CONTACT			PROGRESSING
DATE DATA FIRST ACQ'D	/		PROGRESSING
DATE ACQUISITION COMPLETE	/		PUBLICATIONS
FILE			5 81228
DATE LAST			

DATE OF UPDATE

DATE OF LAST ENTRY - 04/21/70
 DATE OF LAST ACQUISITION ENTRY - 03/10/70

EXPLORER 28 MAGNETOMETERS (65-042A-02)

EXPERIMENT BRIEF DESCRIPTION

Each of two uniaxial fluxgate magnetometers has a dynamic range of $\pm 40\gamma$ and sensitivity of $\pm 0.25\gamma$. One fluxgate failed at launch, but the other performed normally, sampling the magnetic field thirty times within each of six 4.8 second intervals each 5.46 minutes. Uncertainties in data values, transmitted until May 11, 1967, are $\pm 1.0\gamma$. A rubidium vapor magnetometer was included, but produced no useful data.

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. One magnetometer failed at launch. A rubidium vapor magnetometer was also included, but did not yield useful data due to causes not clear to the principal investigators.

The magnetometer sensor was a saturable magnetic core which was driven at 10 KHz 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 of permanent magnetization of the core material. The voltage output (0 to +5) represents the discriminated second harmonic output which is calibrated to yield the magnitude of the field component parallel to the sensor axis, while the phase indicates the direction, parallel or anti-parallel.

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. The dynamic range of the fluxgates is $\pm 40\gamma$ with a sensitivity of $\pm 1/4\gamma$. Subsequent digitization by the use of "comb filters" on the ground led to uncertainties of $\pm 0.4\gamma$. The fluxgate zero level was calibrated in flight by comparison of the

EXPERIMENT FULL DESCRIPTION

Explorer 28 data with that of other spacecraft (Pioneers 6, 7; Explorer 33) making interplanetary magnetic field measurements. On these latter spacecraft, on board zero level determinations were possible. This procedure yielded an uncertainty of $\pm 1\gamma$ for the Explorer 28 data. 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 spacecraft magnetic field.

More detailed discussions of the instrumentation, spacecraft structure and magnetic cleanliness, and data sampling, and the analytic means whereby vector information is gained from uniaxial fluxgate measurements, is given in Ness, Searce and Seek, J.G.R., 69, 3531-69, 1964. This article was written to discuss the Explorer 18 (IMP 1) experiment, which is essentially the same as that flown on Explorer 28 (IMP 3).

EXPERIMENT PERFORMANCE

Of the two fluxgate magnetometers flown on Explorer 28, one failed at launch, while the other continued to return high quality data as long as the spacecraft continued to telemeter information to earth. The performance of the rubidium vapor magnetometer was such that no useful information was obtained.

65-042A-02

NSASDC TECHNICAL REFERENCE FILE

801247 NESS, N.F. TAYLOR, H. T. 11/17/69 PAGE 1
 OBSERVATIONS OF THE INTERPLANETARY MAGNETIC FIELD JULY 9-12, 1966
 AC1573, NASA-GSFC, A-612-67-043, JULY 1967.
 *CLASS5C2 *EXPLORER 20 65-042A-02
 66-060A-01 *EXPLODER 20
 *JFK020000 *MAGNETIC FIELD

801238 DEHANN, K.M. NESS, N.F.
 SATELLITE STUDIES OF THE EARTH'S MAGNETIC TAIL
 A02021, PHYS. OF MAGNETOSPHERE, 409-636, 1968.
 62-051A-01 *EXPLODER 7 65-042A-02
 *EXPLODER 14, 18, 21, 20, 23 66-075A-01 *GEOMAGNETIC FIELDS
 *DEN STOCK *MAGNETOSPHERE
 *JFK020000 *MAGNETOSPHERE

801212 FAIRFIELD, D.H.
 SIMULTANEOUS MEASUREMENTS ON THREE SATELLITES AND THE OBSERVATION OF THE GEOMAGNETIC TAIL AT 1000 EAST-H RADI
 A02494, J. GEOPHYS. RES., 73, 6179-6187, 1968.
 A02404, NASA-GSFC, X-612-68-124, APP. 1968.
 *CLASS5A2 *EXPLODER 7 65-075A-01 *GEOMAGNETIC TAIL
 65-042A-02 *EXPLODER 28
 *JFK020000 *INTERPLANET MAGNETIC FIELD GEOMAGNETIC FIELDS

801750 NESS, N.F. *L.COX, J.M.
 INTERPLANETARY SECTION STRUCTURE, 1967-1966
 A02657, SOLAR PHYS., 2, 351-359, 1967.
 A02617, U. OF CALIF. BERK., 8, 155, 40, MAY, 1967.
 *CLASS5A2 *EXPLODER 10 65-046A-01 *GEOMAGNETIC TAIL
 *EXPLODER 4 66-060A-02 *EXPLODER 20
 64-077A-02 *INTERPLANET MAGNETIC FIELD 65-042A-02
 *JFK020000

801704 NESS, N.F.
 GEOMAGNETIC TAIL
 A02069, NASA-GSFC, X-610-68-045, SEPT. 1968.
 *CLASS5C4 *EXPLODER 19 63-046A-01 *EXPLODER 26
 *EXPLODER 33 66-052A-01 *INTERPLANET MAGNETIC FIELD GEOMAGNETIC FIELDS
 *JFK020000

801795 FAIRFIELD, D.H.
 AVERAGE MAGNETIC FIELD CONFIGURATION OF THE OUTER MAGNETOSPHERE
 A02063, J. GEOPHYS. RES., 73, 7320-7330, DEC. 1968.
 A02465, NASA-GSFC, X-515-68-197, JUNE 1968.
 *CLASS5C2 *EXPLODER 16 63-046A-02
 *EXPLODER 26 65-042A-02
 100369 *GEOMAGNETIC FIELDS

NSDDC TECHNICAL REFERENCE FILE

005001 WILCOX, J.M., NELSON, F., SCHATTIN, C.S.,
ACTIVE REGIONS AND THE INTERPLANETARY MAGNETIC FIELD
ACROSS A CORONAL HOLE PULSING SOLAR ACTIVE REGIONS, 393-399, 1968, (IAJ, SYMP. NO. 36, PROC. HELD IN BUENOS AIRES, ARGENTINA,
4-8 SEP, 1967), 1-072, 65-062A-02 4195 1.3 *CLASSAB 811-71671/88

PAGE 3

11/17/69

ACCESSION ORDERED CATALOG

63-060A-02
*J0111520
111769

005009 WILCOX, J.M.,
ASYMMEY IN GEOMAGNETIC RESPONSE TO THE POLARITY OF THE INTERPLANETARY MAGNETIC FIELD
ACROSS U. CALIF., SER. 9, 155, 33, JULY 1968, 65-062A-02 4195 1.3 *CLASSAB 811-71671/88

*J0111520
111769

11/17/69

ACCESSION ORDERED CATALOG

IMP-3 EXPLORER 28 65-042A

65-042A-00D	Ephemeris tapes 7 track 556 BCD
65-042A-00E	Ephemeris merged 7 track 556 BCD
65-042A-00F	Solar Ecliptic Ephemeris 7 track 556
65-042A-00G	Merged Solar Ecliptic Ephemeris 7 track 800
65-042A-02A	Fluxgate magnetometer (originals) 9 track 800
65-042A-02B	BCD Fluxgate magnetometer 7 track 556
65-042A-02C	Merged magnetometer and S.E. Ephemeris 7 track 800
65-042A-02D	Blocked magnetometer 7 track 800
65-042A-02E	Interplanetary 'B' Field - Hourly Averages 9 track 800
65-042A-02F	Interplanetary 'B' Field - Hourly Averages Microfilm
65-042A-02G	Magnetospheric 'B' Field - Hourly Averages 9 track 800
65-042A-02H	Magnetospheric 'B' Field - Hourly Averages Microfilm

IMP-3, EXPL R.

DESCRIPTION OF DATA	SATELLITE ID.	D#	NO. OF TAPES	TRACK
SOLAR ECLIPTIC EPHEMERIS	65-042A-00F	D-01495 THRU D-01514 + D-01667	21	7
BLOCKED EPHEMERIS WITH OVERLAPS	65-042A-00G	D-1789 THRU D-1800	4	7
BLOCKED EPHEMERIS	65-042A-00H	D-02896 - D-02898	3	7
FLUXGATE MAGNETOMETER	65-042A-02A	D-00986 THRU D-00994	9	9
BCD FLUX MAGNETOMETER	65-042A-02B	D-01208 THRU D-01216	9	7
BLOCKED FLUX MAGNETOMETER	65-042A-02D	✓ D-02888 THRU D-02890	3	7
MERGED MAGNETOMETER AND EPHEMERIS	65-042A-02C	✓ D-02893 THRU D-02895	3	7

IMP-3, EXPL RB

D#	NO. OF TAPES	TRACK	DEN.	MODE	REMARKS
01495 THRU -01514 + 01667	21	7	556	BIN	
1791 THRU -1800 02896 - -02898	4	7	800	BIN	RELEASE
	3	7	800	BIN	WITHOUT OVERLAYS
X00986 THRU -00994	9	9	800	BIN	
-01208 THRU -01216	9	7	556	BCD	KEEP BECAUSE OF ACTIVITY BY DR. NISHIDA
-02888 THRU -02890	3	7	800	BIN	
02893 THRU -02895	3	7	800	BIN	

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

65-042A-006

<u>Word</u>	<u>Symbol</u>	<u>Description</u>
**1	IYR	Year
**2	IDCY	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	BPAP	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 mag- netospheric 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.

FILE 0001 REC 0001 CH 1296

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0193	200646617375	176632620504	600415724630	201400000000	0000
0241	174565502046	000000000000	574565502046	200777357150	0001
0289	175753412172	605723412172	204443146314	206503146314	2014
0337	201402442315	600437334700	577501660166	217404067146	2167
0385	207506507721	205413146314	201402442315	600446163623	5774
0433	176532305172	600765453766	575672227771	200646611732	1766
0481	000000000000	000000000000	200777402547	174550022524	0000
0529	000225000000	000014000000	000024000000	604477270243	6047
0577	207420323303	205647317404	206404631463	201454617753	5775
0625	214506354631	216476122672	211524741213	206524250716	2055
0673	200423414525	000000000000	200657426351	176532421103	6007
0721	600415724630	201400000000	000000000000	000000000000	0000
0769	574531452400	200777426506	000101000000	000225000000	0000
0817	604560000000	206755463146	201640465234	207413245143	2056
0865	601402043403	215655331463	215521131463	215411734631	2156
0913	201506046347	576434423343	601400660205	200423417176	0000
0961	575672545412	200646576623	176633243441	600415724630	2014
1009	200777452703	174512205066	000000000000	574512205066	2007
1057	000036000000	605532314631	202647534121	605431463146	2074
1105	206404631463	201524363432	176437101477	601517147544	2154
1153	211547252547	203634351027	202614631453	201524363432	1755
1201	200657423122	176532650774	600765435710	575672714244	2006
1249	000000000000	000000000000	000000000000	200777477210	1744

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FILE 0001 REC 0002 CH 1296

0001	000327000001	000101000000	000225000000	000014000000	0000
0049	207446314631	202417516126	207401066452	205662436274	2064
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0145	177512702304	601627663326	200423424321	000000000000	2006
0193	200646563504	176633532650	600415724630	201400000000	0000
0241	174451021747	000000000000	574451021747	200777523475	0001
0289	605663024365	204716560507	605623146314	207467146314	2024
0337	201540402254	200471400503	601724436177	214522554631	2135
0385	604400221354	211513146314	201540402254	200431308522	6017
0433	176533100621	600765424373	575673231654	200646556034	1766
0481	000000000000	000000000000	200777547616	174427103704	0000
0529	000225000000	000014000000	000055000000	605715341217	2054
0577	206755532020	205671633010	206404631463	201540247443	2006
0625	213703746314	214406724673	205444523200	604601734175	2114
0673	200423431446	000000000000	200657416155	176533214536	6007
0721	600415724630	201400000000	000000000000	000000000000	0000
0769	574404300611	200777573432	000101000000	000225000000	0000
0817	605726314631	207517463146	202555702753	206743276506	2054
0865	602443532577	213641146314	212700146314	213537714631	2130
0913	201534576504	200773674264	602447422631	200423431122	0000
0961	575673547270	200646542712	176634155524	600415724630	2014
1009	200777616575	173741435010	000000000000	573741435010	2007
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1105	206404631463	201526563576	201503763237	602475054356	2135
1153	205667264641	605417722410	211454463146	201526563576	2014
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0097	213425263146	212517200000	212671746314	213425267676	205
0145	201552637247	602531651672	200423441253	000000000000	200
0193	200646527561	176634444721	600415724630	201400000000	000
0241	173616047641	000000000000	573616047641	200777662471	000

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1-1797

J00014000000	00J012000000	204653412172	606603075341	205603146314
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217746424704	210404015165	200550224277	211476000000	200611109072
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201454617753	577537534666	600532772714	216475123146	164634100000
206524250716	205551463146	201454617753	577574511627	600523206613
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600415724630	201400000000	000000000000	000000000000	000000000000
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FILE 0001 REC 0003 CH 1292

0289	605401463146	205677146314	606406314631	207546000000
0337	201507214623	201656720474	602554423721	212716546314
0385	605467305675	211443400000	201507214623	201637037146
0433	176533674125	600765374753	575674233541	200646522106
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0529	000225000000	000015000000	000012000000	606404702436
0577	206671706120	205713075501	206404631463	201475456364
0625	212443231463	212606707060	206455376256	605501531307
0673	200423446406	000000000000	200657405747	176534010010
0721	600415724630	201400000000	000000000000	000000000000
0769	573463745305	200777721541	000101000000	000225000000
0817	605420000000	207556631463	202775156640	206657346027
0865	602626334505	212515746314	211717400000	211741000000
0913	201463712262	202402673155	602632461612	200423451065
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1153	206527063267	605516174142	211434546314	201450772507
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0193	200646473603	176635356641	600415724630	201400000000
0241	172500765255	000000000000	572590765255	200777763333
0289	606414121727	206404365605	606430000000	207566314631
0337	201422730264	202517760536	602720227503	211670146314
0385	605520635756	211432231463	201422730264	202514714044
0433	176534467313	600765345301	575675235421	200646466111
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0529	000225000000	000015000000	000043000000	606415075340
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0625	210751463146	211605042046	206507470173	605520363255
0673	200423463364	000000000000	200657375531	176534603150
0721	600415724630	201400000000	000000000000	000000000000
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0817	606433146314	207570631463	203477513531	206572700430
0865	602762336721	211532000000	211422314631	210645463146
0913	200762307022	202574366203	602762317725	200423466044
0961	575675553042	200646452745	176636001404	600415724630
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1057	000055000000	606416243656	206412631463	606434000000
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1153	206640735471	605513427235	211430146314	200733424630
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FILE 0001 REC 0005 CH 1296

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0193	200646437565	176636270447	600415724630	201400000000
0241	571723000763	000000000000	171723000763	200777771200
0289	605416702436	206412702436	606434000000	207571146314
0337	200643175216	202674141042	603421335166	210767146314
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0529	000225000000	000016000000	000000000000	606417024300
0577	206520263741	205751435463	206404631463	200611753300
0625	207753463146	210710466037	206700000047	605500213500

207546000000	202705757122	206704230661	205707602031	206404631463
212716546314	212446546314	212544600000	212716565415	206425315263
201637037146	602561066635	200423443730	000000000000	200657407467
200646522106	175634600371	600415724630	201400000000	000000000000
173541662143	000000000000	573541662143	200777702666	000101000000
606404702436	205725341217	606414000000	207552631463	202741305304
201475456364	201737336414	602602044715	212606714631	212404814631
605501531307	211440546314	201475456364	201720654414	602606404674
176534010010	600765370176	575674402346	200646514426	176634734043
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002250000000	000015000000	000017000000	606407341217	205747146314
206657346027	205716336205	206404631463	201463712262	202411267637
211741000000	212515772063	206503412213	605511725512	211436314631
200423451065	000000000000	200657404230	176534123711	600765363417
600415724630	201400000000	000000000000	000000000000	000000000000
573404320655	200777736705	000101000000	000225000000	000015000000
606424000000	207552000000	203414061353	206644772361	205721542330
602652217504	212440114631	211635714631	211621000000	212440113104
201450772507	202433664737	602655763722	200423453544	000000000000
575674717771	200646501265	176635223166	600415724630	201400000000
200777752151	172646413602	000000000000	572646413602	200777752151
000015000000	000031000000	606412753412	206400243655	606426314631
205724712306	206404631463	201437031544	202470150070	602676102502
211765546124	206550567653	605517743260	211433314631	201437031544
000000000000	200657400771	176534353440	600765352062	575675066607
201400000000	000000000000	000000000000	000000000000	200777763330
200777763330	000101000000	000225000000	000015000000	000036000000
207566314631	203446533434	206617767141	205730024463	206404631463
211670146314	211516314631	211436231463	211670157075	206570665577
202514714045	602722401545	200423460703	000000000000	200657377250
200646466117	176635512306	606415724630	201400000000	000000000000
171660407010	000000000000	571660407010	200777772224	000101000000
606415075341	206407463146	606431463146	207570000000	203463203600
201405452727	202546070431	602741747715	211605063146	211456314631
605520363253	211431314631	201405452727	202544406756	602743105230
176534603154	600765340517	575675404220	200646460433	176635645735
000000000000	000000000000	200777776440	170661574500	000000000000
000225000000	000015000000	000050000000	606415635075	206411463146
206572700433	205736113461	206404631463	200762307022	202574342476
210645463146	211532013650	206624731062	605516640321	211430546314
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600415724630	201400000000	000000000000	000000000000	000000000000
163502600000	200777777777	000101000000	000225000000	000015000000
606434000000	207571146314	203513674663	206560220326	205741067105
603401352752	211465463146	210763631463	210555314631	211465440224
200733424620	202623325636	603400574410	200423470527	000000000000
575575721644	200646445256	176636135030	600415724630	201400000000
200777776257	570722077400	000000000000	170722077400	200777776257
000015000000	000062000000	606416507534	206413146314	606434000000
205744000615	206404631463	200676332742	202647366671	603411344060
211426247036	206554243052	605510655502	211427546314	200676332742
000000000000	200657370544	176535146511	600765322364	575676070443
201400000000	000000000000	000000000000	000000000000	200777771260
200777771260	000101000000	000225000000	000015000000	000067000000
207571146314	203544111006	206533012771	205746650572	206404631463
210767146314	210642463146	210427146314	210767126225	206666276047
202702040067	603417012364	200423475674	000000000000	200657367022
200646432076	176636424077	600415724630	201400000000	000000000000
572541356312	000000000000	172541356312	200777760576	000101000000
606417024365	206412000000	606434000000	207570631463	203557731174
200611753330	202721055333	603430651571	210710463146	210600631463
605500213562	211427063146	200611753330	202731150417	603425327627

IMP 3 MAGNETOMETER OBSERVATIONS MADE WITHIN ± 3.5 HOURS OF LOCAL NO

YR	DAY	HR	MIN	SEQ NO	MAG F	THETA	PHI	XSE	YSE	ZSE
65	214	11	42.16	68563.	5.7	-65.	288.	0.8	-2.3	-5.2
65	214	11	47.62	68567.	5.2	-85.	292.	1.2	-2.8	-4.4
65	214	11	53.08	68571.	6.2	-64.	292.	1.0	-2.5	-5.5
65	214	11	58.54	68575.	4.8	-53.	333.	2.5	-1.3	-3.8
65	214	12	4.00	68579.	7.3	-9.	55.	4.1	5.9	-1.1
65	214	12	9.46	68583.	7.6	-15.	57.	4.0	6.2	-2.0
65	214	12	14.92	68587.	7.6	-17.	50.	4.7	5.6	-2.2
65	214	12	20.38	68591.	6.2	-23.	34.	4.7	3.2	-2.5
65	214	12	25.85	68595.	6.0	-40.	359.	4.6	-0.1	-1.8
65	214	12	31.31	68599.	5.6	-46.	9.	3.7	0.6	-4.2
65	214	12	36.77	68603.	6.8	-37.	6.	5.4	0.5	-4.1
65	214	12	42.23	68607.	7.5	-34.	15.	6.0	1.6	-4.2
65	214	12	47.69	68611.	7.2	-40.	22.	5.1	2.1	-4.7
65	214	12	53.15	68615.	7.3	-41.	25.	5.0	2.3	-4.8
65	214	12	58.61	68619.	8.1	-47.	17.	5.3	1.6	-5.9
65	214	13	4.07	68623.	8.5	-46.	26.	5.3	2.6	-6.1
65	214	13	9.53	68627.	8.8	-19.	66.	3.4	7.6	-2.8
65	214	13	15.99	68631.	8.4	-33.	65.	2.8	6.4	-4.6
65	214	13	20.46	68635.	6.9	11.	103.	-1.5	6.6	1.3
65	214	13	25.92	68639.	7.7	12.	110.	-2.5	7.1	1.6
65	214	13	31.38	68643.	7.6	-3.	119.	-3.7	6.7	-0.4
65	214	13	36.84	68647.	6.8	4.	127.	-4.1	5.5	0.5
65	214	13	42.30	68651.	7.5	10.	137.	-5.4	5.0	1.3
65	214	13	47.76	68655.	9.1	-13.	88.	0.2	8.8	-2.0
65	214	13	53.22	68659.	8.4	-29.	82.	1.0	7.3	-4.1
65	214	13	58.68	68663.	9.0	-47.	73.	1.8	5.9	-6.6
65	214	14	4.15	68667.	9.3	-46.	72.	2.0	6.1	-5.7
65	214	14	9.61	68671.	9.3	-41.	65.	3.0	6.3	-6.1
65	214	14	15.07	68675.	8.3	-36.	66.	2.7	6.1	-4.9
65	214	14	20.53	68679.	7.0	-30.	62.	2.8	5.4	-3.5
65	214	14	25.99	68683.	7.0	-34.	60.	2.9	5.0	-3.8
65	214	14	31.45	68687.	7.0	-39.	57.	3.0	4.6	-4.4
65	214	14	36.91	68691.	7.0	-36.	56.	3.2	4.7	-4.1
65	214	14	42.37	68695.	8.8	-29.	73.	2.2	7.4	-4.3
65	214	14	47.83	68699.	8.7	-17.	82.	1.1	8.3	-2.5
65	214	14	53.29	68703.	9.1	-12.	51.	-0.2	8.9	-1.9
65	219	20	29.50	74223.	5.4	2.	303.	2.9	-4.5	0.2
65	219	20	35.22	74227.	5.4	2.	306.	3.1	-4.4	0.1
65	219	20	40.48	74231.	5.8	1.	295.	2.5	-5.2	0.1
65	219	20	45.95	74235.	5.4	-5.	311.	3.5	-4.1	-0.5
65	219	20	51.41	74239.	5.0	-2.	302.	2.6	-4.3	-0.2
65	219	20	56.87	74243.	5.4	-1.	298.	2.5	-4.7	-0.1
65	219	21	2.33	74247.	4.7	-4.	311.	3.1	-3.5	-0.3
65	219	21	7.79	74251.	4.8	-6.	315.	3.4	-3.3	-0.5
65	219	21	13.25	74255.	5.1	-7.	328.	4.3	-2.7	-0.7
65	219	21	18.71	74259.	4.5	-9.	324.	3.9	-2.8	-0.8
65	219	21	24.17	74263.	4.6	-9.	325.	3.7	-2.6	-0.8
65	219	21	29.63	74267.	4.8	-5.	324.	4.3	-2.1	-0.5
65	219	21	35.09	74271.	4.4	-20.	354.	4.1	-0.5	-1.5
65	219	21	40.56	74275.	6.1	-34.	354.	5.0	-0.5	-3.4
65	219	21	46.02	74279.	5.8	-26.	5.	5.2	0.5	-2.5
65	219	21	51.48	74283.	5.4	-10.	357.	5.3	-0.2	-1.0
65	219	21	56.94	74287.	4.2	-5.	5.	4.1	0.4	-0.3
65	219	22	2.46	74291.	4.2	2.	19.	3.9	1.3	0.2
65	219	22	7.86	74295.	4.9	17.	12.	4.6	1.0	1.4
65	219	22	13.32	74299.	6.5	24.	355.	4.4	-0.4	2.0
65	219	22	18.78	74303.	5.7	-7.	304.	3.7	-5.5	-0.9

XSE	YSE	ZSE	XSEV	YSEV	ZSEV	GP	GDL T	GDLN	RE
0.8	-2.3	-5.2	0.5	0.5	0.4	6	-30.3	41.0	27.3
1.2	-2.8	-4.4	0.7	0.6	1.0	6	-30.2	38.6	27.4
1.0	-2.5	-3.5	0.5	0.8	0.4	6	-30.2	37.3	27.5
2.5	-1.3	-3.8	1.3	4.0	1.4	6	-30.2	36.1	27.5
4.1	5.9	-1.1	0.4	0.4	0.4	6	-30.2	34.9	27.6
4.0	6.2	-2.0	0.3	0.2	0.4	6	-30.1	33.7	27.6
4.7	5.6	-2.2	1.7	1.2	1.2	6	-30.1	32.5	27.7
4.7	3.2	-2.5	0.7	1.3	1.1	6	-30.1	31.3	27.7
4.6	-0.1	-1.8	1.0	2.2	1.8	6	-30.1	30.1	27.8
3.7	0.6	-4.2	1.2	2.6	0.8	6	-30.0	28.9	27.8
5.4	0.5	-4.1	0.3	0.6	0.7	6	-30.0	27.7	27.9
6.0	1.6	-4.2	0.5	1.1	0.3	6	-30.0	26.5	28.0
5.1	2.1	-4.7	1.0	0.3	1.0	6	-30.0	24.1	28.1
5.0	2.3	-4.8	0.8	0.9	0.8	6	-29.9	22.9	28.1
5.3	1.6	-5.9	1.5	1.3	1.4	6	-29.9	21.7	28.2
5.3	2.6	-6.1	0.9	1.5	0.8	6	-29.9	20.5	28.2
3.4	7.6	-2.8	0.7	0.4	0.9	6	-29.9	19.3	28.3
2.8	6.1	-4.6	0.5	0.5	0.9	6	-29.9	18.1	28.3
1.5	6.6	1.3	1.5	1.0	2.6	6	-29.8	16.9	28.4
2.5	7.1	1.6	0.3	0.4	0.2	6	-29.8	15.7	28.4
3.7	6.7	-0.4	1.0	1.0	1.3	6	-29.8	14.5	28.5
4.1	5.5	0.5	1.8	1.7	1.7	6	-29.8	13.2	28.5
5.4	5.0	1.3	0.3	0.4	0.5	6	-29.8	12.0	28.6
0.2	8.8	-2.0	0.4	0.3	0.7	6	-29.7	9.6	28.7
1.0	7.3	-4.1	1.2	1.5	2.2	6	-29.7	8.4	28.7
1.8	5.9	-6.6	0.6	0.5	0.4	6	-29.7	7.2	28.8
2.0	6.1	-5.7	0.3	0.2	0.2	6	-29.7	6.0	28.8
3.0	6.3	-8.1	0.4	0.3	1.4	6	-29.6	4.8	28.9
2.7	6.1	-4.9	0.3	0.4	0.4	6	-29.6	3.6	29.0
2.8	5.4	-3.5	0.2	0.2	0.2	6	-29.6	2.4	29.0
2.9	5.0	-3.8	0.5	0.5	0.4	6	-29.6	1.2	29.1
3.0	4.6	-4.4	0.5	0.4	0.5	6	-29.6	-0.0	29.1
3.2	4.7	-4.1	0.7	0.6	0.7	6	-29.5	-1.2	29.2
3.2	7.4	-4.3	0.7	1.5	0.7	6	-29.5	-2.5	29.2
3.1	8.3	-2.5	0.5	0.4	0.7	6	-29.5	-4.9	29.3
3.2	8.9	-1.9	0.2	0.2	0.4	6	-29.5	-6.1	29.4
3.9	-4.5	0.2	0.4	0.4	0.2	6	-34.2	-108.6	18.0
3.1	-4.4	0.1	0.4	0.3	0.2	6	-34.2	-109.7	18.1
3.5	-5.2	0.1	0.7	0.2	0.4	6	-34.1	-110.8	18.2
3.5	-4.1	-0.5	0.7	0.9	1.0	6	-34.1	-112.0	18.3
3.6	-4.3	-0.2	0.2	0.5	0.3	6	-34.1	-113.1	18.4
3.5	-4.7	-0.1	0.3	1.5	0.5	6	-34.0	-114.2	18.4
3.1	-3.5	-0.3	0.2	0.1	0.2	6	-34.0	-115.3	18.5
3.4	-3.3	-0.5	0.3	0.2	0.2	6	-33.9	-117.6	18.7
3.3	-2.7	-0.7	0.1	0.4	0.3	6	-33.9	-118.7	18.8
3.9	-2.8	-0.8	0.4	0.5	0.1	6	-33.8	-119.9	18.9
3.7	-2.6	-0.8	0.3	0.4	0.3	6	-33.8	-121.0	19.0
3.3	-2.1	-0.5	0.2	0.2	0.2	6	-33.8	-122.1	19.0
3.1	-0.5	-1.5	0.9	2.1	1.0	6	-33.7	-123.3	19.1
3.0	-0.5	-3.4	2.4	1.2	2.5	6	-33.7	-124.4	19.2
3.2	0.5	-2.5	0.7	0.7	1.3	6	-33.7	-125.5	19.3
3.3	-0.2	-1.0	1.2	1.0	1.2	6	-33.6	-126.7	19.4
3.1	0.4	-0.3	0.9	1.4	1.3	6	-33.6	-127.8	19.5
3.9	1.3	0.2	0.7	1.7	1.1	6	-33.5	-129.0	19.5
3.6	1.0	1.4	0.4	1.0	1.0	6	-33.5	-131.2	19.7
3.4	-0.4	2.0	0.9	1.1	0.7	6	-33.4	-132.4	19.8
3.7	-5.5	-0.9	1.3	0.4	0.4	6	-33.4	-133.5	19.9

IMP 3 MAGNETOMETER OBSERVATIONS MADE WITHIN +/- 3.5 HOURS OF LOCAL

YR	DAY	HR	MIN	SEQ NO	MAG F	THETA	PHI	XSE	YSE	ZSE
65	219	22	24.24	74307.	5.6	-6.	293.	2.1	-5.2	-0.6
65	219	22	29.71	74311.	5.7	-7.	250.	-1.9	-5.4	-0.7
65	219	22	35.17	74315.	5.4	-9.	296.	2.3	-4.8	-0.9
65	219	22	40.63	74319.	5.2	-8.	311.	3.4	-3.8	-0.8
65	219	22	46.09	74323.	5.7	-5.	280.	0.9	-5.6	-0.5
65	219	22	51.55	74327.	4.6	-9.	296.	2.0	-4.1	-0.7
65	219	22	57.01	74331.	5.3	7.	268.	-0.2	-5.2	0.6
65	219	23	2.47	74335.	5.0	-9.	287.	1.4	-4.7	-0.9
65	219	23	7.93	74339.	4.9	7.	266.	-0.3	-4.9	0.5
65	219	23	13.39	74343.	5.7	12.	251.	-1.8	-5.3	1.2
65	219	23	18.86	74347.	5.5	19.	245.	-2.2	-4.7	1.3
65	219	23	24.32	74351.	3.5	12.	283.	0.9	-3.7	0.8
65	219	23	29.78	74355.	4.7	40.	265.	-0.2	-3.6	3.0
65	219	23	35.24	74359.	3.6	24.	261.	-0.5	-3.3	1.5
65	219	23	40.70	74363.	4.5	-5.	317.	3.3	-3.1	-0.4
65	219	23	46.16	74367.	5.7	-15.	341.	5.2	-1.8	-1.5
65	219	23	51.62	74371.	5.7	-17.	343.	5.2	-1.6	-1.5
65	219	23	57.08	74375.	5.2	-7.	327.	4.4	-2.8	-0.7
65	220	0	2.54	74379.	5.3	13.	326.	4.3	-2.9	1.1
65	220	0	8.01	74383.	5.2	23.	312.	3.2	-3.6	2.0
65	220	0	13.47	74387.	5.5	53.	308.	2.0	-2.6	1.4
65	220	0	18.93	74391.	5.5	19.	288.	1.6	-5.0	1.8
65	220	0	24.39	74395.	5.3	10.	294.	2.1	-4.8	0.9
65	220	0	29.85	74399.	5.1	-5.	280.	0.9	-5.0	-0.4
65	220	0	35.31	74403.	5.0	-9.	304.	2.7	-4.0	-0.8
65	220	0	40.77	74407.	5.4	12.	298.	2.5	-4.7	1.1
65	220	0	46.23	74411.	6.7	-11.	334.	5.9	-2.8	-1.2
65	220	0	51.69	74415.	5.6	-9.	348.	5.4	-1.1	-0.9
65	220	0	57.15	74419.	5.1	-9.	355.	5.0	-0.4	-0.8
65	220	1	2.62	74423.	4.8	-15.	5.	4.7	0.4	-1.3
65	220	1	8.08	74427.	5.2	-30.	362.	5.3	-0.7	-3.1
65	220	1	13.54	74431.	3.2	-25.	21.	2.7	1.0	-1.4
65	220	1	19.00	74435.	2.7	-36.	4.	2.2	0.1	-1.5
65	220	1	24.46	74439.	2.6	9.	297.	1.2	-2.3	0.4
65	220	1	29.92	74443.	3.3	33.	258.	-0.6	-2.7	1.3
65	220	1	35.38	74447.	3.1	22.	150.	-2.8	-0.5	1.2
65	220	1	40.84	74451.	6.2	25.	168.	-5.5	1.2	2.6
65	220	1	46.31	74455.	7.3	32.	175.	-6.1	0.5	3.8
65	220	1	51.77	74459.	6.8	26.	167.	-5.9	1.4	2.9
65	220	1	57.23	74463.	6.8	27.	151.	-5.8	2.0	3.0
65	220	2	2.69	74467.	7.6	25.	162.	-6.5	2.1	3.2
65	220	2	8.15	74471.	7.2	25.	168.	-6.4	1.4	3.1
65	220	2	13.61	74475.	6.1	17.	133.	-5.3	-0.3	1.7
65	220	2	19.07	74479.	5.8	28.	180.	-5.1	0.0	2.7
65	220	2	24.53	74483.	4.2	-10.	356.	4.1	-0.3	-0.7
65	220	2	29.99	74487.	4.8	-16.	2.	4.6	0.2	-1.3
65	220	2	35.45	74491.	5.2	-13.	9.	5.0	0.8	-1.1
65	220	2	40.92	74495.	6.0	-11.	12.	5.3	1.2	-1.1
65	220	2	46.38	74499.	5.0	-15.	6.	4.8	0.5	-1.2
65	220	2	51.84	74503.	4.0	-15.	10.	3.8	0.6	-1.1
65	220	2	57.30	74507.	4.2	-8.	5.	4.1	0.4	-0.6
65	220	3	2.76	74511.	5.6	3.	358.	5.6	-0.2	0.3
65	220	3	8.22	74515.	5.4	5.	350.	5.3	-1.0	0.5
65	220	3	13.68	74519.	5.7	4.	338.	5.3	-2.1	0.4
65	220	3	19.14	74523.	5.9	1.	336.	5.4	-2.4	0.1
65	220	3	24.60	74527.	5.6	10.	318.	4.1	-3.7	1.2
65	220	3	30.07	74531.	4.8	14.	314.	3.2	-3.4	1.1

YSE	ZSE	XSEV	YSEV	ZSEV	GP	GDL T	GDLN	RE
-5.2	-0.6	1.2	0.5	0.5	6	-33.4	-134.7	19.9
-5.4	-0.7	1.0	0.5	0.8	6	-33.3	-135.8	20.0
-4.8	-0.9	1.9	0.9	0.5	6	-33.3	-137.0	20.1
-3.8	-0.8	1.1	0.8	0.2	6	-33.3	-138.1	20.2
-5.6	-0.5	1.9	1.1	0.8	6	-33.2	-139.3	20.3
-4.1	-0.7	1.8	1.3	1.3	5	-33.2	-140.4	20.3
-5.2	0.6	1.1	0.1	0.5	6	-33.2	-141.6	20.4
-4.7	-0.8	0.6	0.5	0.9	6	-33.1	-142.7	20.5
-4.9	0.5	2.1	0.4	1.0	6	-33.1	-145.0	20.6
-5.3	1.2	0.4	0.2	0.7	6	-33.0	-146.2	20.7
-4.7	1.3	2.1	0.3	1.2	6	-33.0	-147.3	20.8
-3.7	0.8	1.3	0.9	1.3	6	-33.0	-148.5	20.9
-3.6	3.0	0.8	1.1	1.4	6	-32.9	-149.7	20.9
-3.3	1.5	1.6	1.0	1.1	6	-32.9	-150.8	21.0
-3.1	-0.4	1.7	0.3	0.7	6	-32.9	-152.0	21.1
-1.8	-1.5	0.5	0.4	0.6	6	-32.8	-153.1	21.2
-1.6	-1.5	0.5	0.7	0.8	6	-32.8	-154.3	21.2
-2.8	-0.7	0.7	0.8	0.9	6	-32.8	-155.5	21.3
-2.9	1.1	0.4	0.4	0.4	6	-32.7	-157.8	21.5
-3.6	2.0	0.4	0.4	0.0	6	-32.7	-158.9	21.5
-2.6	1.4	0.8	1.0	2.9	6	-32.7	-160.1	21.6
-5.0	1.8	0.2	0.2	0.7	6	-32.6	-161.3	21.7
-4.8	0.9	0.5	0.4	0.4	6	-32.6	-162.4	21.8
-5.0	-0.4	0.6	0.2	0.8	6	-32.6	-163.6	21.8
-4.0	-0.8	0.6	0.6	0.8	6	-32.5	-164.8	21.9
-4.7	1.1	0.6	0.5	0.6	4	-32.5	-165.9	22.0
-2.8	-1.2	0.7	0.2	1.1	6	-32.5	-167.1	22.1
-1.1	-0.9	0.3	0.7	0.8	6	-32.4	-168.3	22.1
-0.4	-0.8	0.8	1.0	1.1	6	-32.4	-169.4	22.2
0.4	-1.3	0.5	1.2	1.4	6	-32.4	-171.8	22.3
-0.7	-3.1	0.6	0.6	0.7	6	-32.3	-173.0	22.4
1.0	-1.4	3.5	2.2	2.8	6	-32.3	-174.1	22.5
0.1	-1.5	0.9	1.4	1.7	6	-32.3	-175.3	22.6
-2.3	0.4	1.5	0.9	1.1	6	-32.2	-176.5	22.6
-2.7	1.8	1.6	0.3	1.0	6	-32.2	-177.6	22.7
-0.5	1.2	2.1	2.5	2.0	6	-32.2	-178.8	22.8
1.2	2.6	0.6	1.0	0.4	5	-32.1	-180.0	22.8
0.5	3.8	0.8	2.0	1.0	6	-32.1	178.8	22.9
1.4	2.9	0.6	0.9	1.8	6	-32.1	177.7	23.0
2.0	3.0	1.0	0.7	0.8	6	-32.1	176.5	23.0
2.1	3.2	0.4	0.9	1.2	6	-32.0	174.1	23.2
1.4	3.1	0.7	1.1	0.8	6	-32.0	172.9	23.2
-0.3	1.7	0.7	0.9	1.8	6	-32.0	171.8	23.3
0.0	2.7	1.3	1.5	0.9	6	-31.9	170.6	23.4
-0.3	-0.7	0.6	1.7	1.4	6	-31.9	169.4	23.4
0.2	-1.3	0.8	1.1	1.2	6	-31.9	168.2	23.5
0.8	-1.1	0.9	0.9	0.9	6	-31.8	167.1	23.6
1.2	-1.1	0.4	0.5	0.6	5	-31.8	165.9	23.6
0.5	-1.2	1.4	1.7	2.1	6	-31.8	164.7	23.7
0.6	-1.1	2.4	1.7	3.0	6	-31.8	163.5	23.8
0.1	-0.6	0.4	1.0	0.6	6	-31.7	162.3	23.9
-0.2	0.3	0.1	0.9	0.8	5	-31.7	160.0	24.0
-1.0	0.5	0.4	0.8	0.6	6	-31.7	158.8	24.1
-2.1	0.4	0.6	0.8	0.7	6	-31.6	157.6	24.1
-2.4	0.1	0.5	0.8	0.5	6	-31.6	156.4	24.2
-3.7	1.2	0.7	0.6	0.6	5	-31.6	155.2	24.3
-3.4	1.1	0.8	0.3	0.2	6	-31.6	154.1	24.3