#783

ISEE 1 & 2

4-sec Magnetometer data on O/D
60-sec Magnetometer Data on O/D
4-sec magnetometer Data on O/D
60-sec Magnetometer Data on O/D

77-102A-04Y, 04Z
77-102B-04T, 04[redacted]

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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

ISEE-1 & 2

THIS DATA CONSISTS OF 1 OPTIMEM 1000M WRITE –ONCE –READ MANY (WORM) OPICAL DISKS. D# FOLLOWS:

DD#	DATA SET ID	DSC#		TIME SPAN
DD109636	ISEE-1 77-102A-04Z	783	SPMS-00410	
	ISEE-1 77-102A-04Y	783	SPMS-00234	
	ISEE-1 77-102A-04V	710		10/22/77 – 03/01/80
	ISEE-1 77-102B-04R	710	SPMS-00482	
	ISEE-1 77-102B-04S	783	SPMS-00405	
	ISEE-1 77-102B-04T	783	SPMS-00161	

CONTAINS 7 OPTICAL PLATTERS SIDES

SPMS-00669

FILES: 27,390

ISEE 1 & 2

4-SEC MAGNETOMETER DATA ON O/D
60-SEC MAGNETOMETER DATA ON O/D
4-SEC MAGNETOMETER DATA ON O/D
60-SEC MAGNETOMETER DATA ON O/D

77-102A-04Y, 04Z
77-102B-04T, 04U

THIS DATA SET CONSISTS OF 4 OPTIMEM 1000M WRITE-ONCE-READ-MANY (WORM) OPTICAL DISKS. THE KV NUMBERS FOLLOW:

KF000053-56

77-102A-04Y, 04Z
77-102B-04T, 044

UNIVERSITY OF CALIFORNIA, LOS ANGELES UCLA

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INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS
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FAX: (213) 206-3051

March 22, 1995

Enclosed in this box are 4 Optimem 1000M Write-Once-Read-Many (WORM) optical disk platters containing International Sun-Earth Explorer #1 and #2 (ISEE-1 and ISEE-2) averaged fluxgate magnetometer data at 4-second and 60-second resolutions, the latter including Multi-Coordinate Ephemeris (MCE) data.

These disks were written using NSSDC SOAR software and may be accessed using DEC/VMS files-11 commands, for example, "MOUNT/NOWRITE DUC0: ISEE1" or "MOUNT/NOWRITE DUC0: ISEE2". Each disk logical volume (one side of a disk) contains a volume description file in Standard Formatted Data Units (SFDU) that has the file name "[000000]VOLDESC.SFD". Also, each logical volume includes files containing the structure of the data files in SFDU format. These files are named "[000000]4SECOND.SFD" for the 4-second averaged data files and "[000000]60SECOND.SFD" for the 60-second averaged data files. Also included are files describing the UCLA/IGPP flat file system, which was used to create these data files. These files are called "[000000]FFHEADER.SFD" and "[000000]FFDATA.SFD". Finally, software has been archived on each logical volume that demonstrates how to read these datasets. For a description of the software see the file "[SOURCE]00README.TXT" on each logical volume. Printed copies of all the VOLDESC.SFD files, along with one copy of each of the other SFDU files and the 00README.TXT file have been included for reference.

Please note that each logical volume has an NSSDC logical volume identification number. Technical support for the preparation of SFDU documentation was provided by John Garrett and Don Sawyer of the NSSDC Standards Office. Included on the next page is a list of logical volume ID numbers and the data coverage on each logical volume.

If you have any questions please contact:

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NSI=hherbert@igpp.ucla.edu
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FAX: (213) 206-3051

ISEE-1 AVERAGED MAG DATA	DATA ORBITS	TIME COVERAGE
USA_NASA_NSSD_IC1D_0010A	0001 - 0380	10/22/77 14:49 - 04/17/80 21:02
USA_NASA_NSSD_IC1D_0010B	0381 - 0760	04/17/80 21:02 - 10/13/82 01:45
USA_NASA_NSSD_IC1D_0011A	0761 - 1140	10/13/82 01:45 - 04/08/85 06:46
USA_NASA_NSSD_IC1D_0011B	1141 - 1517	04/08/85 06:46 - 09/26/87 06:38

ISEE-2 AVERAGED MAG DATA	DATA ORBITS	TIME COVERAGE
USA_NASA_NSSD_IC2D_0010A	0001 - 0380	10/22/77 14:49 - 04/17/80 21:02
USA_NASA_NSSD_IC2D_0010B	0381 - 0760	04/17/80 21:02 - 10/13/82 01:44
USA_NASA_NSSD_IC2D_0011A	0761 - 1140	10/13/82 01:44 - 04/08/85 06:42
USA_NASA_NSSD_IC2D_0011B	1141 - 1517	04/08/85 06:42 - 09/26/87 06:38

[000000.SOURCE]00README.TXT

```
* ------------------------------------------------------------------------ *
*                                                                          *
* 00readme.txt - This file contains a list of the documentation files in the*
*                [000000] and the [SOURCE] directories of the Optimem 1000  *
*                Write-Once Read-Many disk platters containing the 4-second *
*                and 60-second averaged magnetic field data sets of the     *
*                International Sun-Earth Explorers (ISEE) 1 and 2 spacecraft*
*                of the United States National Aeronautics and Space        *
*                Adminstration (NASA).                                      *
*                                                                          *
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* LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS        *
* FOR A PARTICULAR PURPOSE.                                                *
*                                                                          *
* For information about this software please contact:                      *
*                                                                          *
*   Principal Investigator:                                                *
*     Christopher Russell                                                  *
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*     Los Angeles, Ca. 90024-1567                                          *
*     INTERNET e-mail:    ctrussell@igpp.ucla.edu                          *
*     NSI/DECnet e-mail:  BRUNET::CTRUSSELL                                *
*     Telephone:          (310) 825-3188                                   *
*                                                                          *
*   Programmer:                                                            *
*     Harry Herbert                                                        *
*     UCLA - Institute of Geophysics and Planetary Physics                 *
*     5833 Slichter Hall                                                   *
*     Los Angeles, Ca. 90024-1567                                          *
*     INTERNET e-mail:    hherbert@igpp.ucla.edu                           *
*     NSI/DECnet e-mail:  BRUNET::HARRY                                    *
*     Telephone:          (310) 825-9030                                   *
*                                                                          *
* ------------------------------------------------------------------------ *
```

00README.TXT

This file contains a map showing how the files in the [000000] and [SOURCE] directories of the ISEE 1 and 2 4-second and 60-second averaged magnetic field WORM disks are used to read and interpret the datasets. Included herein is a brief description of the purpose of each file. The files themselves contain more complete documentation.

Documentation files:

voldesc.sfd	-	SFDU volume description file for this disk. This file contains spacecraft and instrument descriptions, an overview of the 4-second and 60-second averaged magnetic field datasets, a list of the data files included on the disk with their start and stop times, and a list of the support files that have been included on the disk. These support files are described more fully in this 00README.TXT file.
4second.sfd	-	SFDU detailed dataset description. This file provides the layout of the 4-second averaged magnetic field dataset including a description of each item.
60second.sfd	-	SFDU detailed dataset description. This file provides the layout of the 60-second averaged magnetic field dataset including a description of each item.
errata.txt	-	Known problems description. This file contains a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset.

ffheader.sfd - UCLA/IGPP header flat file description. This SFDU compliant document contains a detailed description of the meta data file used with the UCLA/IGPP flat file data storage system. This system was used for storing the ISEE 4-second and 60-second averaged magnetic field data. As detailed in this document, a UCLA/IGPP flat file is made up of a pair of files: an ASCII file containing meta data with the file type extension ".ffh" (for flat file header); and a data file containing binary values with the file type extension ".ffd" (for flat file data).

ffdata.sfd - UCLA/IGPP header data file description. This SFDU compliant document contains a detailed description of the binary data file used with the UCLA/IGPP flat file data storage system. This system was used for storing the ISEE 4-second and 60-second averaged magnetic field data. As detailed in this document, a UCLA/IGPP flat file is made up of a pair of files: an ASCII file containing meta data with the file type extension ".ffh" (for flat file header); and a data file containing binary values with the file type extension ".ffd" (for flat file data).

DEC VMS files:

4s2asc - Program to read ISEE 1 and 2 4-second averaged magnetic field data files in UCLA/IGPP format and write their contents to a user specified ASCII text file. It is contructed from these files:

4S2ASC.COM - Compile and link command file 4S2ASC.FOR
4S2ASC.FOR - FORTRAN program to write out ISEE 4-second data
CTIME.FOR - FORTRAN time subroutines used by 4S2ASC.FOR

60s2asc - Program to read ISEE 1 and 2 60-second averaged magnetic field data files in UCLA/IGPP format and write their contents to a user specified ASCII text file. It is contructed from these files:

60S2ASC.COM - Compile and link command file 60S2ASC.FOR
60S2ASC.FOR - FORTRAN program to write out ISEE 60-second data
CTIME.FOR - FORTRAN time subroutines used by 60S2ASC.FOR

Sun UNIX files:

Makefile - Input file for the UNIX "make" command. It compiles and links the Sun/UNIX programs.

4s2asc - Program to read ISEE 1 and 2 4-second averaged magnetic field data files in UCLA/IGPP format that have been FTPed from VMS and write their contents to a user specified ASCII text file. The program includes routines to convert the binary data from VMS to IEEE floating point formats. It is contructed from these files:

4s2asc.f - FORTRAN program to write out ISEE 4-second data
convert.c - FORTRAN callable C data conversion functions
ctime.c - FORTRAN callable C time functions

60s2asc - Program to read ISEE 1 and 2 60-second averaged magnetic field data files in UCLA/IGPP format that have been FTPed from VMS and write their contents to a user specified ASCII text file. The program includes routines to convert the binary data from VMS to IEEE floating point formats. It is contructed from these files:

60s2asc.f - FORTRAN program to write out ISEE 60-second data
convert.c - FORTRAN callable C data conversion functions
ctime.c - FORTRAN callable C time functions

USAGE NOTES - To use the DEC VMS programs, copy the source code off the WORM disk then type "@4S2ASC" and "@60S2ASC" to compile and link both of the flat file to ASCII programs. Both programs can read the data directly from the WORM disk and write their output to a user specified file on a magnetic disk.

To use the Sun UNIX programs, FTP in ASCII mode the source code from VMS to UNIX. Type "make all" to compile and link both of the flat file to ASCII programs. To move the ISEE 4-second and 60-second data files use the BINARY mode of FTP

for both the ".ffh" files and the ".ffd" files.

DSC # 783
ISEE

```
CCSD3ZF0000100000001CCSD3FF0000500000001CCSD3CS00004markeraa
ADIDNAME = NSSD0061;
SUPID = NSSD0211;
DDRID = NSSD0211;
CCSD$$MARKERmarkeraaNSSD3KS00020markerbb
```

This is in file [000000]4SECOUD.SFD

```
ADIDNAME = "NSSD0061";
REVISION_NUMBER = 1;
SUBMISSION_DATE = 1994-09-21;
REGISTRATION_DATE = 1995-03-17;
REVISABLE = Y;
RELEASABLE= Y;
EXPECTED_RELEASE_DATE = 1995-03-17;

BRIEF_TITLE = "ISEE 4-second Magnetometer data";

BRIEF_DESCRIPTION = "ISEE 4-second averaged magnetic field data
including the magnetic total field value and the magnetic field
vector values (Bx, By, and Bz) in the spacecraft coordinates.";

REVISION_COMMENT =  "No data was ever released with Revision 0. This
revision combines the date and time fields into a single time field.
Corrects field descriptions and adds DATA_ORGANIZATION_NOTE to
description.";

GROUP = REGISTRANT;
  TITLE = Mr.;
  FIRST_NAME = Harry;
  MIDDLE_NAME =  "";
  LAST_NAME = Herbert;
  AFFILIATION = "Univ. of California";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::HARRY";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "hherbert@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-825-9030";
    FAX   = "+1-310-206-3051";
END_GROUP;

GROUP = REVISOR;
  TITLE = Mr.;
  FIRST_NAME = Harry;
  MIDDLE_NAME =  "";
  LAST_NAME = Herbert;
  AFFILIATION = "Univ. of California";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::HARRY";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "hherbert@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-825-9030";
    FAX   = "+1-310-206-3051";
END_GROUP;

REFERENCED_ADID = NSSD0211;

PROJECT_NAME = "";
```

MISSION_NAME = "International Sun Earth Explorer (ISEE)";
INSTRUMENT_NAME = "Fluxgate Magnetometer";

CCSD$$MARKERmarkerbbCCSD3DS00002markercc

TYPE OF FILE NAME: 4-SECOND DATA
RECORD_TYPE_NAMES: MAGNETIC_FIELD

FILE ATTRIBUTES: SEQUENTIAL, FIXED_RECORD_LENGTH
FIXED RECORD TYPE LENGTH: 24 BYTES
NUMBER OF DATA FIELDS: 5
FIELD SYNTAX OF DATA FIELD 001: 8-BYTE VMS_FLOATING_POINT
FIELD SYNTAX OF DATA FIELDS 002 THRU 005:
4-BYTE VMS_FLOATING_POINT

CONTENTS_OF_EACH_DATA_POINT_RECORD:

NUM	NAME	UNITS	FIELD DESCRIPTION
001	TIME	SECONDS	Seconds since Jan. 1, 1966 at 00:00:00.000
002	BX SC	NT	4 second average of Bx in spacecraft coordinates
003	BY SC	NT	4 second average of By in spacecraft coordinates
004	BZ SC	NT	4 second average of Bz in spacecraft coordinates
005	BT	NT	4 second average of total field

RECORD_TYPE_ALGORITHMS:
The 4-byte fields of a 4-second data record are initialized with a fill value greater than 1.0E30, usually 1.0E34, and subsequently the geophysical values are inserted. Thus if there is no data available for a given parameter that particular field will contain the fill data value.

DATA_ORGANIZATION_NOTE:
In the ISEE 4-second averaged magnetic field data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second averaged magnetic field data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record. The time associated with each observation corresponds to the mid-point of the observation interval.

CCSD$$MARKERmarkercc

[000000]60SECOND.SFD

```
CCSD3ZF0000100000001CCSD3FF0000500000001CCSD3CS00004markeraa
ADIDNAME = NSSD0062;
SUPID = NSSD0211;
DDRID = NSSD0211;
CCSD$$MARKERmarkeraaNSSD3KS00020markerbb

ADIDNAME = "NSSD0062";
REVISION_NUMBER = 1;
SUBMISSION_DATE = 1994-09-21;
REGISTRATION_DATE =  1995-03-17;
REVISABLE = Y;
RELEASABLE = Y;
EXPECTED_RELEASE_DATE = 1995-03-17;

BRIEF_TITLE = "ISEE 60-sec Magnetometer data";

BRIEF_DESCRIPTION = "ISEE 60-second averaged magnetic field data."

REVISION_COMMENT =  "No data was ever released with Revision 0. This
revision combines the date and time fields into a single time field.
Adds DATA_ORGANIZATION_NOTE to description.";

GROUP = REGISTRANT;
  TITLE = Mr.;
  FIRST_NAME = Harry;
  MIDDLE_NAME =  "";
  LAST_NAME = Herbert;
  AFFILIATION = "Univ. of California";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::HARRY";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "hherbert@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-825-9030";
    FAX   = "+1-310-206-3051";
END_GROUP;

GROUP = REVISOR;
  TITLE = Mr.;
  FIRST_NAME = Harry;
  MIDDLE_NAME =  "";
  LAST_NAME = Herbert;
  AFFILIATION = "Univ. of California";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::HARRY";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "hherbert@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-825-9030";
    FAX   = "+1-310-206-3051";
END_GROUP;


REFERENCED_ADID = NSSD0211;

PROJECT_NAME = ;
MISSION_NAME = "International Sun Earth Explorer (ISEE)";
INSTRUMENT_NAME = "Fluxgate Magnetometer";
```

CCSD$$MARKERmarkerbbCCSD3DS00002markercc

TYPE_OF_FILE_NAME: 60-SECOND_DATA
RECORD_TYPE_NAMES: MAGNETIC_FIELD

FILE_ATTRIBUTES: SEQUENTIAL, FIXED_RECORD_LENGTH
FIXED_RECORD_TYPE_LENGTH: 392 BYTES
NUMBER_OF_DATA_FIELDS: 97
FIELD_SYNTAX_OF_DATA_FIELD_001: 8-BYTE VMS_FLOATING_POINT
FIELD_SYNTAX_OF_DATA_FIELDS_002_THRU_097: 4-BYTE VMS_FLOATING_POINT

CONTENTS_OF_EACH_DATA_POINT_RECORD:

NUM	NAME	UNITS	FIELD DESCRIPTION
001	TIME	SECONDS	Seconds since Jan. 1, 1966 at 00:00:00.000
002	BT	NT	60 second average of total field
003	BX SC	NT	60 second average of Bx in spacecraft coordinates
004	BY SC	NT	60 second average of By in spacecraft coordinates
005	BZ SC	NT	60 second average of Bz in spacecraft coordinates
006	SDX	NT	Standard deviation of Bx values
007	SDY	NT	Standard deviation of By values
008	SDZ	NT	Standard deviation of Bz values
009	SDT	NT	Standard deviation of total field
010	SDC	NT	SQRT(SDx**2 + SDy**2 + SDz**2 - SDt**2)
011	BX GSM	NT	Bx in GSM coordinates
012	BY GSM	NT	By in GSM coordinates
013	BZ GSM	NT	Bz in GSM coordinates
014	BX DIP	NT	Bx minus model(IGRF 75+OP 77) in dipole coord.
015	BY DIP	NT	By minus model(IGRF 75+OP 77) in dipole coord.
016	BZ DIP	NT	Bz minus model(IGRF 75+OP 77) in dipole coord.
017	B	NT	Total field (model)
018	B/BO	NT	Ratio of local total field to model field at equator
019	BINT	NT	Model internal field - total
020	BXIM GSM	NT	Model internal field - Bx in GSM coordinates
021	BYIM GSM	NT	Model internal field - By in GSM coordinates
022	BZIM GSM	NT	Model internal field - Bz in GSM coordinates
023	BINTEXT	NT	Model internal+external field - total
024	BXIE GSM	NT	Model internal+external field - Bx in GSM coord.
025	BYIE GSM	NT	Model internal+external field - By in GSM coord.
026	BZIE GSM	NT	Model internal+external field - Bz in GSM coord.
027	NLAT GEO	DEGREES	North geographic latitude of field intercept
028	NLON GEO	DEGREES	North geographic longitude of field intercept
029	SLAT GEO	DEGREES	South geographic latitude of field intercept
030	SLON GEO	DEGREES	South geographic longitude of field intercept
031	LONG GEO	DEGREES	Sub-spacecraft geographic longitude
032	LAT GEO	DEGREES	Sub-spacecraft geographic latitude
033	R	RE	Radial distance to spacecraft (geocentric)
034	X GSE	RE	GSE X position (Re)
035	Y GSE	RE	GSE Y position (Re)
036	Z GSE	RE	GSE Z position (Re)
037	X GSM	RE	GSM X position (Re)
038	Y GSM	RE	GSM Y position (Re)
039	Z GSM	RE	GSM Z position (Re)
040	ZNS GSM	RE	Z position of nominal Russell/Brody neutral sheet
041	TILT	DEGREES	Dipole tilt angle
042	L		L parameter
043	LT	HR	Local time of spacecraft
044	MLAT	DEGREES	Latitude of spacecraft from magnetic equator
045	SES	DEGREES	Sun-Earth-Satellite angle
046	PHI	DEGREES	Clock angle from Y GSM axis (positive toward +Z GSM)
047	SPIN	SECONDS	Spin period of spacecraft
048	SLNG GSM	DEGREES	Longitude of spinaxis of spacecraft in GSM
049	SLT GSM	DEGREES	Latitude of spinaxis of spacecraft in GSM
050	SLNG GSE	DEGREES	Longitude of spinaxis of spacecraft in GSE
051	SLT GSE	DEGREES	Latitude of spinaxis of spacecraft in GSE
052	VX GSM	KM/SEC	X component of velocity in GSM (km/s)
053	VY GSM	KM/SEC	Y component of velocity in GSM (km/s)
054	VZ GSM	KM/SEC	Z component of velocity in GSM (km/s)
055	V	KM/SEC	Total velocity
056	DVX GSM	KM/SEC	X component of vel. in GSM relative to other craft
057	DVY GSM	KM/SEC	Y component of vel. in GSM relative to other craft
058	DVZ GSM	KM/SEC	Z component of vel. in GSM relative to other craft
059	DV	KM/SEC	Total relative velocity
060	DX GSM	KM	Separation of craft in X GSM (ISEE-2 to ISEE-1)
061	DY GSM	KM	Separation of craft in Y GSM (ISEE-2 to ISEE-1)
062	DZ GSM	KM	Separation of craft in Z GSM (ISEE-2 to ISEE-1)
063	DX GSE	KM	Separation of craft in X GSE (ISEE-2 to ISEE-1)

```
064 DY GSE      KM          Separation of craft in Y GSE (ISEE-2 to ISEE-1)
065 DZ GSE      KM          Separation of craft in Z GSE (ISEE-2 to ISEE-1)
066 DR          KM          Total separation of spacecraft
067 NMPX GSE                X component GSE of model normal to magnetopause
068 NMPY GSE                Y component GSE of model normal to magnetopause
069 NMPZ GSE                Z component GSE of model normal to magnetopause
070 MPS         KM          Component of separation vector along this normal
071 NSX GSE                 X component GSE of model normal to bow shock
072 NSY GSE                 Y component GSE of model normal to bow shock
073 NSZ GSE                 Z component GSE of model normal to bow shock
074 SS          KM          Component of separation vector along this normal
075 EM22                    Rotation matrix from GSE to GSM
076 EM23                        (    1     0     0 )
077 EM32                        (    0   EM22  EM23 )
078 EM33                        (    0   EM32  EM33 )
079 IE11
080 IE12                    Rotation matrix from geocentric inertial (GEI)
081 IE13                                    to geocentric solar ecliptic (GSE)
082 IE21
083 IE22                        ( IE11  IE12  IE13 )
084 IE23                        ( IE21  IE22  IE23 )
085 IE31                        ( IE31  IE32  IE33 )
086 IE32
087 IE33
088 SE11
089 SE12                    Rotation matrix from spacecraft coordinates to GSE
090 SE13
091 SE21                        ( SE11  SE12  SE13 )
092 SE22                        ( SE21  SE22  SE23 )
093 SE23                        ( SE31  SE32  SE33 )
094 SE31
095 SE32
096 SE33
097 QUAL                    Quality flag
```

RECORD_TYPE_ALGORITHMS:
The 4-byte fields of a 60-second data record are initialized with a fill value greater than 1.0E30, usually 1.0E34, and subsequently the geophysical values are inserted. Thus if there is no data available for a given parameter that particular field will contain the fill data value.

DATA_ORGANIZATION_NOTE:
In the ISEE 4-second averaged magnetic field data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second averaged magnetic field data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record. The time associated with each observation corresponds to the mid-point of the observation interval.

CCSD$$MARKERmarkercc

[000000] FFHEADER.SFD

```
CCSD3ZF0000100000001CCSD3FF0000500000001CCSD3CS00004markeraa
ADIDNAME = NSSD0210;
CCSD$$MARKERmarkeraaNSSD3KS00020markerbb

ADIDNAME = "NSSD0210";
REVISION_NUMBER = 0;
SUBMISSION_DATE = 1994-09-21;
REGISTRATION_DATE = 1995-03-17;
REVISABLE = Y;
RELEASABLE = Y;
EXPECTED_RELEASE_DATE = 1995-03-17;

BRIEF_TITLE = "UCLA IGPP Flat File - Header Format";

BRIEF_DESCRIPTION = "A flat file system is a two-dimensional data base
system developed at UCLA/IGPP. Flat files are used to store data
composed of multiple records consisting of one or more data fields.
This describes the header portion.";

REVISION_COMMENT =  "Original";

GROUP = REGISTRANT;
  TITLE =  Mr.;
  FIRST_NAME =  Bryan;
  MIDDLE_NAME = "";
  LAST_NAME =  Littlefield;
  AFFILIATION =  "UCLA";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::BRYAN";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "bryan@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-206-9955";
    FAX   = "+1-310-206-3051";
END_GROUP;


GROUP = REVISOR;
  TITLE =  Mr.;
  FIRST_NAME =  Bryan;
  MIDDLE_NAME = "";
  LAST_NAME =  Littlefield;
  AFFILIATION =  "UCLA";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::BRYAN";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "bryan@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-206-9955";
    FAX   = "+1-310-206-3051";
END_GROUP;


GROUP = REVISOR;
  TITLE = Mr.;
  FIRST_NAME = Harry;
  MIDDLE_NAME =  "";
  LAST_NAME = Herbert;
```

```
  AFFILIATION = "Univ. of California";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::HARRY";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "hherbert@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-825-9030";
    FAX   = "+1-310-206-3051";
END_GROUP;

REFERENCED_ADID = 0;

PROJECT_NAME = "";
MISSION_NAME =  "";
INSTRUMENT_NAME = "";

CCSD$$MARKERmarkerbbCCSD3SS00002markercc
```

UCLA IGPP FLAT FILE SYSTEM OVERVIEW

The flat file system is a two-dimensional data base system developed at UCLA/IGPP. Flat files are useful for storing data which exists as multiple records, called rows, each consisting of one or more data fields, called columns. Here it is most often used for time series lists of real numbers, but because the data fields can contain most common computer data types - floating point, integer, character, logical - the system is quite flexible.

A flat file consists of two data objects, each typically in a separate file:

1. An ASCII character header object containing meta data, i.e., information that describes the values in the binary data object. This header object contains such information as: record length, number of rows, creation date, description of each data field or column, and room for a user-written abstract about the data. Please refer to the Data Description Record Object in the CCSDS registered description whose ADID=NSSD0210 for a complete description of the format and information in a header object. On the Sun/UNIX and VAX/VMS systems this object is typically found in a file with a type extension of '.ffh' or '.FFH'. Future mentions of this file will use the lower case style.

2. A binary data object containing the actual data values. The data object is handled as a fixed record length binary file. This structure provides for the following features: it allows the data to be access either randomly or sequentially, there is no need to interpret character strings before numerically manipulating the data, and the storage requirements are much lower than they would be for data stored as character strings. On the Sun/UNIX and VAX/VMS systems this object is typically found in a file with a type extension of '.ffd' or '.FFD'. Future mentions of this file will use the lower case style.

UCLA has developed a number of software packages to manipulate flat files. Descriptions of those packages available at the time of registration of this description are found in another supplementary object in this description. This software matches the header object (file) and data object (file) by matching the file names whose type extensions are ".ffh" and ".ffd" respectively.

CCSD$$MARKERmarkerccCCSD3DS00002markerdd

HEADER FILE: DETAILED DESCRIPTION

The header object portion of a flat file system is an ASCII character object that describes the contents of the data object. The header object contains information about the data object's physical characteristics (name, size, record length, etc). It also contains descriptions and locations of data columns, and a semi-free-form abstract, which may consist of start and stop times, owner, description of the data, etc., along with information about any changes to the data or other activities involving the data.

The header object is made up of ASCII characters. Each line is 72 characters long including trailing blanks as needed. There are no line delimiters, the object may be thought of as a fixed record length file. This design was selected so that a header object has the identical format regardless of file system or operating system. Since there are no line delimiters, the header object is NOT a standard text file. On Sun/UNIX systems the header file may be converted to a text file using the program "ffhcat". On VAX/VMS systems, the header file may be read directly by the VMS editors and written out as a text file.

Listed below is a sample header object, with line numbers added for reference on the left side. Following this listing is a detailed description of the components of the flat file system header object.

```
 LINE
  #    HEADER RECORDS
-----  ------------------------------------------------------------------------
  1    DATA  = myfile.ffd
  2    CDATE =  86 003 JAN  3  14:21:49      UPDATE = 86 336 DEC  2  14:21:05
  3    RECL  =     24
  4    NCOLS =      5
  5    NROWS =         146
  6    OPSYS =  SUN/UNIX
  7      # NAME      UNITS      SOURCE                      TYPE  LOC
  8    001 UT        SEC        UNIVERSAL TIME              T       0
  9    002 BX ROT    nT         PVO OMAG                    R       8
 10    003 BY ROT    nT         PVO OMAG                    R      12
 11    004 BZ ROT    nT         PVO OMAG                    R      16
 12    005 BT        nT         PVO OMAG                    R      20
 13    ABSTRACT
 14    FIRST TIME          =  86 068 MAR  9  04:30:30.000
 15    LAST TIME           =  86 068 MAR  9  07:18:30.000
 16    OWNER               = C. T. RUSSELL
 17    MISSING DATA FLAG   =  1.0000000E+34
 18    AVERAGE INTERVAL    =     00:01:00.000
 19    ORBIT NUMBER(S)     =   2650
 20    PVOFF: 86 003 JAN  3 14:21:49
 21      Data request for Dr. Russell
 22    FFROT: 86 336 DEC  2 14:21:05
 23      BX ROT            .9630   .2660   .0014     BX VSO
 24      BY ROT        =  -.2656   .9625   .0544  X  BY VSO
 25      BZ ROT            .0132  -.0528   .9985     BZ VSO
 26    END
```

The flat file system header object has three parts:

1. Physical description of the data object. Lines 1 to 6 above.
2. Data column descriptions. Lines 7 to 12 above.
3. Semi-free-form textual abstract. Lines 13 to 26 above.

NOTE: The abstract always begins with a line containing only the keyword "ABSTRACT", line 13 above, and it always ends with a line containing only the keyword "END", line 26 above, which also indicates that the end of the flat file system header object has been reached. Also, while there are no requirements for the abstract, certain semi-standard formats have been developed which are described below.

NOTE: The spacing of "KEYWORD =" information is significant in the physical description section and abstract section. The spacing is also significant in the data column description section. In general, each line of the physical description section begins with 8 character keywords (include blanks and "=") and each line of the abstract keyword information begins with 21 character keywords (again including blanks and "="). FORTRAN formatting information for writing and reading each of these lines is included below with the description of each keyword.

NOTE: For all time references that include a Day-Of-Year (DOY) value, the DOY for January 1 is "001" and the range of values is "001" to "366". Please refer to the "CTIME quick reference guide" included in this document for a description of how time is represented and manipulated in UCLA/IGPP flat files.

The following is a detailed description of the various components of the flat file system header object, using the example above as a reference.

Line 1: "DATA ="

The "DATA =" line of the flat file system header object contains the name of the binary data file associated with this header object. This item is included as reference information, it is NEVER used by the UCLA/IGPP software to determine the name of the data file that is associated with the header object. The UCLA/IGPP software always assumes that the names of the header file and data files are identical, except for the type extension, "ffh" for header files and "ffd" for data files.

The FORTRAN formats used with this keyword are:
```
WRITE:('DATA  = ',a)   READ:(8x,a)
```

Line 2: "CDATE ="

The "CDATE =" line gives the creation date of the flat file. There is an optional "UPDATE =" field permitted on the same line which indicates the LAST TIME the flat file was updated, if at all. The "CDATE = " and "UPDATE =" strings always begin at the same character positions in the line (characters #1 and #39). Since these times are only included as reference information for the user and are not utilized by the UCLA/IGPP software, there are no absolute format requirement for the time. However, in actual use, the time is always written as shown in the sample above, namely, " YY DOY MMM DD HH:MM:SS ".

The FORTRAN formats used with this keyword are ("UPDATE =" is optional):
```
WRITE:('CDATE = ',a24)   READ:(8x,a24)
--OR--
WRITE:('CDATE = ',a24,6x,'UPDATE =',a24)   READ:(8x,a24,14x,a24)
```

Line 3: "RECL ="

The "RECL =" line gives an integer value that is the length of each fixed-length record in the flat file system data object, measured in bytes. This information is used by UCLA/IGPP software to access the data object.

The FORTRAN formats used with this keyword are:
```
WRITE:('RECL  = ',i6)   READ:(8x,i12)
```

Line 4: "NCOLS ="

The "NCOLS =" line gives an integer value that is the number of columns in each record in the flat file system data object. This information is used by UCLA/IGPP software to access the data object.

The FORTRAN formats used with this keyword are:
```
WRITE:('NCOLS = ',i6)   READ:(8x,i12)
```

Line 5: "NROWS ="

The "NROWS =" line gives an integer value that is the number of rows, also referred to as records, in the flat file system data object. This information is used by UCLA/IGPP software to access the data object.

The FORTRAN formats used with this keyword are:
```
WRITE:('NROWS = ',i11)   READ:(8x,i12)
```

Line 6: "OPSYS ="

The "OPSYS =" line contains a character string that identifies which operating system's data storage format the flat file system data object is written in. This information is used by UCLA/IGPP software to determine if the data requires conversion of floating point and integer values before it can be correctly accessed. The valid entries for this field are currently "SUN/UNIX" and "VAX/VMS". Please refer to the

"DATA REPRESENTATIONS GUIDE" included in this document for a description of the integer and floating-point formats used in UCLA/IGPP flat files.

The FORTRAN formats used with this keyword are:
  WRITE:('OPSYS = ',a) READ:(8x,a)

Line 7: Data column description header line

The next line contains a header line for the data column description lines. This line is included to help the user to read the data column description lines, it is not used by UCLA/IGPP software. The allowed format of the lines is as follows:

```
"  # NAME      UNITS     SOURCE                    TYPE  LOC            "
```

Lines 8 to "ABSTRACT": Data column description lines

These lines are used to describe the data columns in the flat file system data object. There is one line per data column so there should be as many data column descriptor lines as the value indicated in Line 4 for the NCOLS item. The following is a sample of the column description header line with a column descripter included. Above these are lines showing the character position of the items in the line. Following this is a description of each of the items along with their character position in the line:

```
         1         2         3         4         5         6         7
1234567890123456789012345678901234567890123456789012345678901234567890123456789012
  # NAME      UNITS     SOURCE                    TYPE  LOC
001 UT        SEC       UNIVERSAL TIME            T       0
```

The FORTRAN formats used with the column description lines are:
  WRITE:(i3.3,1x,a10,a10,a24,2x,a4,i5) READ:(i3.3,1x,a10,a10,a24,2x,a4,i5)

CHARACTERS 1-3:
- The column number in the data object, with leading zeroes as needed. There are only three character positions for this field and in fact the UCLA/IGPP software only supports from 1 to 999 data columns.

CHARACTER 4:
blank - Character 4 is a field separator. It is always blank.

CHARACTERS 5-13:
NAME - The name of the data column. This is a short but meaningful title identifying the data column. Any ASCII characters, including blanks, are permitted. This field is often used by the UCLA/IGPP software to locate particular data items in the data object and for labelling of plots and listings.

CHARACTER 14:
blank - Character 14 is a field separator. It is always blank.

CHARACTERS 15-23:
UNITS - The units of measurement of the data column. Any ASCII characters, including blanks, are permitted. This field is often used by the UCLA/IGPP software for labelling plots and listings.

CHARACTER 24:
blank - Character 24 is a field separator. It is always blank.

CHARACTERS 25-49:
SOURCE - This field may be used to indicate the source of the data or to provide any additional useful information. Any ASCII characters, including blanks, are permitted. This field is not typically used by the UCLA/IGPP software and is instead provided as a reference for the user.

CHARACTER 50:
blank - Character 50 is a field separator. It is always blank.

CHARACTERS 51-54:
TYPE - This field is used to indicate the storage type of the data column, using FORTRAN-like references. There are a limited number of legal entries in this field:

T - Time, a real*8 value that is the number of seconds since Jan 1, 1966 at 00:00:00.000
R - Real*4 floating point number

"AVERAGE INTERVAL =" - If the data is averaged, this field indicates over what time interval the average was taken. The text string "HIGH RESOLUTION" indicates that no averaging was performed, the data in this flat file is the same resolution as the source data. The text string "UNKNOWN" is used when no AVERAGE INTERVAL was available or if the status of the source data is unknown.
The FORTRAN formats used with this keyword are:

```
  WRITE:('AVERAGE INTERVAL   = ',i6.2,':',i2.2,':',i2.2,'.',i3.3)
   READ:(a18,3x,i6.2,a1,i2.2,a1,i2.2,a1,i3.3)
        i.e. 'AVERAGE INTERVAL   =   hour:mn:sc.msec'
DEFAULT:-1.0d0
--OR--
  WRITE:('AVERAGE INTERVAL   = HIGH RESOLUTION')
   READ:(a18,3x,a)
DEFAULT:-1.0d0
--OR--
  WRITE:('AVERAGE INTERVAL   = UNKNOWN')
   READ:(a18,3x,a)
DEFAULT:-1.0d0
```

"ORBIT NUMBER(S) =" - This field provides the orbit number or numbers for data in the data object. A value of zero indicates that there is no orbit number. A range may be specified to indicate that multiple contiguous orbits are in the same flat file. There is no supported way to indicate that there are multiple non-contiguous orbits in the same flat file.
The FORTRAN formats used with this keyword are:

```
  WRITE:('ORBIT NUMBERS(S)   = ',i6)
   READ:(a18,3x,i6)
DEFAULT:0
--OR--
  WRITE:('ORBIT NUMBERS(S)   = ',i6,1x,'-',1x,i6)
   READ:(a18,3x,i6,3x,i6)
DEFAULT:0,0
```

ABSTRACT: Record of data manipulations

Many high level flat file system programs append additional information to the flat file system header object indicating changes, additions or manipulations of the values contained in the flat file system data object. The preferred format for these lines is as follows:

```
PROGRAM_NAME:  DATE_OF_ACTIVITY
  COMMENTS_CONCERNING_ACTIVITY
  COMMENTS_CONCERNING_ACTIVITY
    .
    .
    .
  COMMENTS_CONCERNING_ACTIVITY
```

The following example is from the sample flat file system header object listed above:

```
PVOFF: 86 003 JAN  3 14:21:49
  Data request for Dr. Russell
FFROT: 86 336 DEC  2 14:21:05
  BX ROT           .9630   .2660   .0014     BX VSO
  BY ROT      =   -.2656   .9625   .0544  X  BY VSO
  BZ ROT           .0132  -.0528   .9985     BZ VSO
```

In this example there are records from two different programs that operated on the data. The first entry is from the program "PVOFF" which created the on-line disk flat file by reading a magnetic tape containing the data. The only additional information added by "'pvoff" was to indicate who the flat file was created for. The second entry is from the program "FFROT", which rotated the data into a different coordinate system. In this case, the rotation matrix that was applied to the original data has been included for reference.

"END" line

The "END" line is required and is used by the UCLA/IGPP software to indicate that the end of the flat file system header object has been reached.

CCSD$$MARKERmarkerddCCSD3SS00002markeree

FLAT FILE UTILITY PROGRAMS

FF2ASCII Write flat files to ASCII tape or disk file.

Reads a flat file and writes it out as ASCII text. The ASCII text may be directed to a disk file or to magnetic tape.

FFAVG Average flat file data.

Reads one or more flat files, computes averages of specified data columns and writes these to another file. Can also compute maxima, minima, root-mean-square of the deviation, and quartiles (2nd quartile=median).

FFCALC Perform math operations on flat file data.

This program will create a new flat file whose columns are the results of operations on another file. You can do most mathematical and trigonometric operations on flat file data.

FFCLEAN Removes 'glitches' in the data.

Reads a flat file and writes a new flat file with spikes in the data converted to flags.

FFCONVERT Converts a flat file from Vax to Sun or Sun to Vax.

Program on the Vax converts Sun flat files to Vax flat files, the program on the Sun converts Vax flat files to Sun flat files.

FFHCAT Convert flat file header file to or from ascii text.

Reads a header object and writes an ascii file to standard output, or Reads an ascii file from standard input and writes a header file.

FFHEDIT Edit header file.

Copies a header file into a temporary standard ASCII file, runs vi on it for you, and then when you've exited vi, allows you to overwrite the original header file.

FFMERGE Merge flat files.

Merges, concatenates, and extracts flat file data. Files can be merged by linear or quadratic interpolation, or by nearest point.

FFSORT Sort flat file data.

Sorts the data by time, allows you to remove or keep duplicate times.

FFSR Flat File Save and Restore.

FFSR copies flat files to and from magnetic tape. Currently FFSR will read tapes written by FFSR on an HP/UNIX computer, a VAX/VMS computer or on an HP1000/A900.

FL Flat file Lister and Plotter.

Interactively displays flat files.
Within FL you can:

a. Do fast and sequential searches for a given time,
b. Compute averages, minima, maxima and standard deviations.
c. Apply a mask to the data columns - listing data fields which fall in a certain range.
d. Create an ASCII file from your flat file.
e. Plot selected columns versus time on a variety of graphics devices using the "FPLOT" program described below.
f. Plot one column versus another.
g. Flag selected data columns of selected rows.
h. Interactively select data points to flag from a time series plot.

FPLOT Flat file plotting program.

Reads a parameter file and plots selected columns versus time or versus another column on a variety of graphics devices.

PVROT Rotates PVO magnetic field data files

This program can rotate PVO magnetic field data from spacecraft coordinates to VSO coordinates. The Ephemeris data is also needed to perform this operation.

FFTRANS	Rotates Geophysical data into various coordinates.
ISEE_ROT	Rotates Isee data into various coordinates.

FLAT FILE SUBROUTINES AND FUNCTIONS

The flat file routines are callable by user written programs. There are versions of the routines in C and in FORTRAN. The quick reference guides for these two libraries are included below. Also included below is a help file for the FORTRAN callable versions of the UCLA/IGPP time manipulation routines that are typically used when accessing flat files. C callable versions of these routines are also available.

C quick reference guide

```
#include <ff_igpp.h>
  char fname[];
  FF_ID *id;
  FF_O_PARAM o_param;
  FF_COL_DESC col_desc;
  FF_H_INFO info;
  FILE *fp;
  int recl,ncols,nbufs,len;
  long nrows,row;
  char hrec[76];
  struct flat {
    double time;
    float data[];
  } drec;

/* Choose from following status options */
  o_param.status = FF_EXIST | FF_CREATE | FF_READ | FF_WRITE;
  o_param.recl = recl;
  o_param.ncols = ncols;
  o_param.nrows = nrows;
  o_param.nbufs = nbufs;
  if ((id=ff_open (fname,&o_param))==NULL) exit(1);

/* Write column descriptor record */
  col_desc.ncol = 2;
  strcpy(col_desc.name,"Bx");
  strcpy(col_desc.units,"nT");
  strcpy(col_desc.source,"ISEE1");
  strcpy(col_desc.type,"R");
  if (ff_hput(id,&col_desc) < 0) goto ff_error;

/* Read column descriptor record */
  col_desc.ncol = 7;
  if ( (n=ff_hget(id,&col_desc)) < 0) goto ff_error;
  if ( n==0 ) break;     7* end of file */

/* List header file on standard output */
  if (ff_hlist(id) < 0) goto ff_error;

/* Write header file record */
  if (ff_cput(id,"header line") < 1) goto ff_error;

/* Get info records from header file */
  if (ff_hgetinfo(id,&info) < 0) goto ff_error;

/* Put info records to header file */
  if (ff_hputinfo(id,&info) < 0) goto ff_error;

/* Read header file record */
  if ( (n=ff_cget(id,hrec)) < 0) goto ff_error;
  if ( n==0 ) break;     /* end of file */

/* Efficient write of record(s) to data file */
  fp = id->ffd->fp;
  if (fwrite(&drec,sizeof(drec),1,fp) == 0) goto ff_error;
```

```
/* Efficient read of data file record(s) */
  fp = id->ffd->fp;
  if (fread(&drec,sizeof(drec),1,fp) == 0) {
    if (ferror(fp)) goto ff_error;   /* error */
    break;       /* end of file */
  }
/* Efficient way to position file at row */
  if (fseek(fp,row*id->ffd->recl,0) != 0) goto ff_error;

/* Position data file to before record 99, numbered from 0*/
  if (ff_setrow(id->ffd,99) < 0) goto ff_error;

/* Return next row number, numbered from 0 */
  if ( (row=ff_getrow(id->ffd)) < 0) goto ff_error;

/* Binary search for time, set row1 and row2 = 0 for whole file */
  if ( (row = ff_bsearch(id,time,row1,row2)) < 0) go to ff_error;

  ff_close(id);
  exit(1);
ff_error:
  ff_reporterror(id);


Flat file structure members:

FF_ID *id;
  FILE *(id->ffh->fp);
  char *(id->ffh->name);
  FILE *(id->ffd->fp);
  char *(id->ffd->name);
  int  id->ffd->nrows;
  int  id->ffd->recl;
  int  id->ffd->ncols;

FF_O_PARAM o_param;
  int o_param.status;
  int o_param.recl;
  int o_param.ncols;
  int o_param.nrows;
  int o_param.nbufs;

FF_COL_DESC col_desc;
  int  col_desc.ncol;
  char col_desc.name[FF_COL_NAMELEN];
  char col_desc.units[FF_COL_NAMELEN];
  char col_desc.source[FF_COL_SOURCELEN];
  char col_desc.type[FF_COL_TYPELEN];
  int  col_desc.loc;

FF_H_INFO info;
  double info.first_time;
  double info.last_time;
  double info.resolution;
  double info.flag;
  char   info.owner[L_cuserid];
  int    info.first_orbit;
  int    info.last_orbit;
  double info.first_time;

----------------------------
FORTRAN quick reference guide
----------------------------

    All integers are default integers (INTEGER*4).  FNAME is character.
 Other needed declarations are shown.  The flat file system uses Fortran
 file unit numbers 23-34.  Do not use these numbers for other files.

       New create/open/close routines. IRECL is in BYTES!!

 call FFCREATE  ( FNAME, IRECL, NCOLS, NROWS, ID1, ID2, IERR, NBUF)
 call FFOPEN ( FNAME, IRECL, NCOLS, NROWS, ID1, ID2, IERR ,NBUF)
 call FFUPDATEOPEN ( same arguments as FFOPEN )
 call FFCLOSE ( ID1, ID2, IERR)

       Data read/write.  Note LEN is in BYTES!!!

 call FPUT ( ID, RECORD, LEN, IERR)     ! write record (array of LEN bytes)
 call FGET ( ID, RECORD, LEN, IERR)     ! read  record (  "   "   "   "   )
```

Header read/write.

```
character NAME*10,UNITS*10,SOURCE*24,TYPE*4,OWNER*16,STRING*72
real*8 T1,T2,DTAVG
call FHPUT (ID1,IERR,NCOL,NAME,UNITS,SOURCE,TYPE,LOC)
call FHGET (ID1,IERR,NCOL,NAME,UNITS,SOURCE,TYPE,LOC)
call FHGETINFO (ID1,IERR,T1,T2,OWNER,FLAG,DTAVG,IORBIT1,IORBIT2)
call FHPUTINFO (ID1,IERR,T1,T2,OWNER,FLAG,DTAVG,IORBIT1,IORBIT2)
call FHUPDINFO (ID1,IERR,T1,T2,OWNER,FLAG,DTAVG,IORBIT1,IORBIT2)
call FCPUT ( ID1, STRING, IERR)        ! write character header record
call FCGET ( ID1, STRING, IERR)        !  read character header record
call FHCOPYABSTRACT (IDIN,IDOUT,IERRIN,IERROUT)
```

Positioning. Note that IERR is required with FFPOS.

```
call FFPOS ( ID, IREC, IERR)           ! set file position to IREC.
IREC = JFPOS (ID)                      ! return current file position.
NROWS = JNROWS (ID2)                   ! return length of data file.
```

Fast time search.

```
real*8 TIME
call FBSEARCH ( ID, TIME, JREC, IERR , JREC1 , JREC2)
                                       ! search for first record whose
                                       ! first 8 bytes are >= TIME
```

Miscellaneous routines.

```
call FFPURGE (FNAME, IERR)             ! purge flat file pair
call FLATFILENAME (ID, IERR, FNAME)    ! return full name.
call FLATREPORTERROR (ID,IERR)         ! Report error to output device.
```

Old create/open/close routines kept for backward compatibility.

```
call FCREA  ( FNAME, IRECL, NCOLS, NROWS, ID1, ID2, IERR) ! IRECL=bytes
call FOPEN ( FNAME, ID1, ID2, IERR)
call FCLOS ( ID1, ID2)
```

Old FPOS (note no error return - does nothing if ID passed incorrectly)

```
call FPOS ( ID, IREC)                  ! set file position to IREC.
```

Specify number of buffers to use. FFBUFFS is unneeded on the SUN/UNIX or VAX/VMS unless you want to change LUOUT.

```
call FFBUFFS (NFILES, NBUFS, LUOUT)
```

All the above routines are located in a default library which is searched automatically by the linker.

"CTIME" quick reference guide

Cline time

"Cline time" (sometimes referred to as "ctime") is an 8-byte floating point number that is is the number of seconds since Jan 1, 1966 at 00:00:00.000. It is named for it's original designer, Neal Cline, of UCLA/IGPP.

Cline time routines are used to manipulate and display time values in many programs. With them you can compare, compute and display time values. Since most UCLA/IGPP programs rely on data which is time dependent, these routines are handy for many applications. Additionally, they are quite easy to use.

Cline time values can be stored in four formats:

DOUBLE PRECISION (REAL*8)	('T' format)	8 bytes per value
INTEGER(8)	('IT' format)	32 bytes per value
CHARACTER	('CT' format)	Up to 28 bytes per value
INTEGER*2(14) or INTEGER*4(7)	('AT' format)	Up to 28 bytes per value

The Cline time routines can handle most any time thrown at them - currently, dates from 1600 MAR 01 to year 9999 seem to work OK.

In the T format, a time value is stored in a double precision number, also known as REAL*8, representating the number of seconds since Jan 1, 1966 at 00:00:00.000. This format has three main advantages: it is very easy to compare several values to each other, it is the best format to manipulate

time mathematically, and it takes up very little internal program space. Its major disadvantage is that it must be converted for display in human readable form. Two conversion types are available, to integer form (referred to as "IT format") and to character form (referred to as "CT format" or "AT format").

In the IT format, a time value is broken up into eight parts and stored in an eight element integer array. The values are stored as follows:

```
IT(1) - Year                      IT(5) - Hours
IT(2) - Day of year (1-366)       IT(6) - Minutes
IT(3) - Month (1-12)              IT(7) - Seconds
IT(4) - Day of month (1-31)       IT(8) - Thousanths of seconds
```

Years 0-99 designate 1900 to 1999, otherwise use four digits.

The advantage of this format is that individual components of a time can be compared or viewed. It is also relatively easy to look at a time in IT format on the screen. The major disadvantage of IT format is that it is very difficult to compare IT times.

In the CT format, a time value is stored as ASCII data in a character string, that is, in a fortran CHARACTER data element. The purpose of the CT format is for ASCII input or output, it must be converted to a Cline time (seconds since Jan. 1, 1966) before it can be manipulated mathematically.

The standard CT output (from routines ICONC and TCONC) is 28 characters and comes in 1 of 2 formats:

```
                columns
          1   5   10   15   20   25
          ....+....+....+....+....+...
format 1:  79 031 JAN 31  12:32:07.110   two digit year for 1900's
 - or -
format 2: 1879 031 JAN 31 12:32:07.110   four digit years
```

As input, the time string can be in several more or less standard formats:

```
  79 031 123207
1979 31 123207
  79 jan 31 123207.110
  79 031 12:32:07.11
```

NOTES: 1. Four digit years are OK, two digit years represent the 1900's.
2. Month abbreviations are the first three letters of the month. Lower case is OK.

The AT format is identical to the CT format except that the ASCII characters are stored in arrays of non-character type: INTEGER, REAL, LOGICAL - anything except CHARACTER (as in the days before FORTRAN 77). In these arrays each ASCII alpha-numeric character occupies one byte. Thus, an INTEGER*2 array of 14 elements contains 14*2=28 characters. An INTEGER*4 array of 7 elements also contains 28 characters.

There are ten Cline time routines which convert times from one format to another. All these routines require that you specify both the input and output values as formal parameters.

TCONI	Usage:	CALL TCONI(T,IT)	Converts a DOUBLE PRECISION time, T, into an 8 element INTEGER array, IT. Year will be 0-99 for 1900's.
ICONT	Usage:	CALL ICONT(IT,T)	Converts an 8 element INTEGER array, IT, into a DOUBLE PRECISION T.
ICONC	Usage:	CALL ICONC(IT,CT)	Converts an 8 element array IT into a 28 character string, CT. The year, IT(1), is converted to ASCII as specified (1900 is not subtracted).
CCONI	Usage:	CALL CCONI(CT,IT)	Converts a character string, CT, into an 8 element INTEGER array, IT.
TCONC	Usage:	CALL TCONC(T,CT)	Converts the DOUBLE PRECISION time T into a 28 character string. Year will be 2 digits for 1900's.

CCONT	Usage:	CALL CCONT(CT,T)	Converts string CT, to the DOUBLE PRECISION T.
ICONA	Usage:	CALL ICONA(IT,AT)	Converts the 8 element array IT into a 28 character string in the array AT, which should be either INTEGER*4 AT(7) or INTEGER*2 AT(14).
ACONI	Usage:	CALL ACONI(N,AT,IT)	Converts N characters in array AT into an 8 element INTEGER array IT.
TCONA	Usage:	CALL TCONA(T,AT)	Converts the DOUBLE PRECISION time T into a 28 character string in the array AT.
ACONT	Usage:	CALL ACONT(N,AT,T)	Converts N characters in array AT into a DOUBLE PRECISION T.
TNOW	Usage:	T = TNOW()	Function which returns current time. Both T and TNOW must be declared DOUBLE PRECISION.

The following is a sample program which uses the three time formats:

```
      PROGRAM TEST
C
C  Program to round off two times to the nearest hour and then say
C  which is larger.
C
      INTEGER ITA(8),ITB(8)
      DOUBLE PRECISION TA,TB
      CHARACTER CT*28
C
C  Get two times from user and store in TA and TB
C
      WRITE(*,'(A)') 'Enter first time'
      READ(*,'(A)') CT                ! Read character time into CT
      CALL CCONT(CT,TA)               ! Convert to T format
C
      WRITE(*,'(A)') 'Enter second time'
      READ(*,'(A)') CT                ! Use same CT array for second time
      CALL CCONT(CT,TB)               ! Convert second time to TB
C
C  Now add 1800 seconds (half hour) to each time so that the
C  rounding off process will go to the nearest hour.
C
      TA=TA+1800.0D0  !  Add to first time
      TB=TB+1800.0D0  !  Add to second time
C
C  Now round off both times by converting to IT format and setting
C  the minutes, seconds, and milliseconds to zero.
C
      CALL TCONI(TA,ITA)  !  Convert first time
      CALL TCONI(TB,ITB)  !  Convert second time
C
      DO I= 6,8  ! Element 6 is minutes, 7 is seconds, and 8 is ms.
        ITA(I)=0
        ITB(I)=0
      ENDDO
C
C  Now convert rounded off numbers back to T format and compare.
C
      CALL ICONT(ITA,TA)
      CALL ICONT(ITB,TB)
C
      IF(TA.GT.TB) THEN                          !  If first time is larger
        CALL TCONC(TA,CT)
        WRITE(*,'(A,A)') CT,' is the larger time'
      ELSE IF(TB.GT.TA) THEN                     !  If second time is larger
        CALL TCONC(TB,CT)
        WRITE(*,'(A,A)') CT,' is the larger time'
      ELSE                                       !  Times are the same
        WRITE(*,'(A)') 'The times are the same'
      ENDIF
C
      STOP 'Thank you'
      END
```

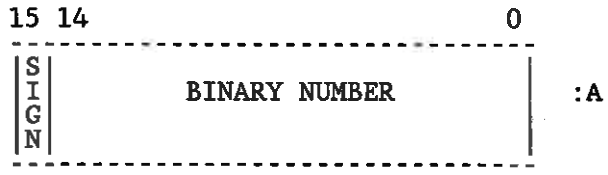
DEC VAX/VMS Data Representation

The following is from the "Programming in VAX FORTRAN" manual from Digital Equipment Corporation, AA-D034D-TE, September 1984, Pages C-1 through C-3.

Appendix C - FORTRAN Data Representation

(NOTE: Section C.1, which describes LOGICAL*1 representation, is not included because this data type is not used by UCLA/IGPP flat files.)

C.2 INTEGER*2 Representation

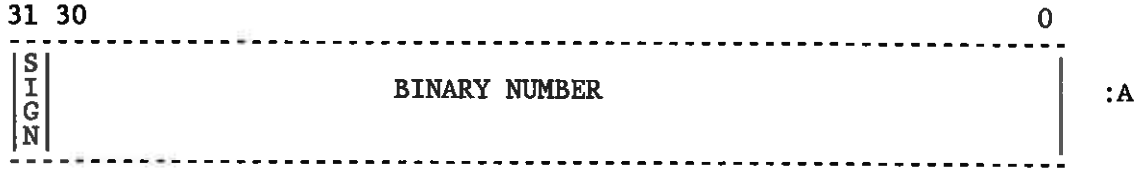


SIGN = 0(+), 1(-)

Integers are stored in a twos complement representation. INTEGER*2 values are in the range -32768 to 32767, and are stored in two contiguous bytes aligned on an arbitrary byte boundry. For example:

+22 = 0016(hex)
-7 = FFF9(hex)

C.3 INTEGER*4 Representation



SIGN = 0(+), 1(-)

INTEGER*4 values are stored in twos complement representation and lie in the range -2147483648 to 2147483647. Each value is stored in four contiguous bytes, aligned on an arbitrary byte boundry. Note that if the value is in the range of an INTEGER*2 value, that is, -32768 to 32767, then the first word can be referenced as an INTEGER*2 value.

C.4 Floating-Point Representations

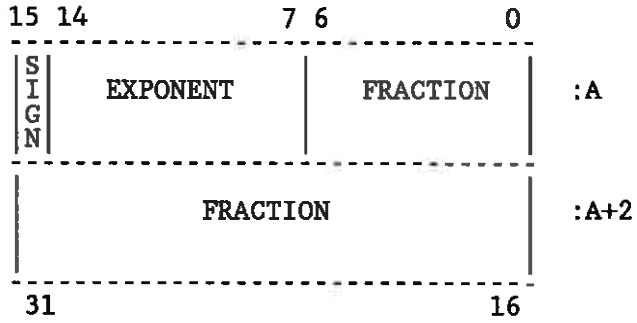
The exponent for the REAL*4 and REAL*8 (D_floating) formats is stored in binary excess 128 notation. Binary exponents from -127 to 128 are represented by the binary equivalents of 1 through 255.

(NOTE: Text describing REAL*8 (G_floating) and REAL*16 are not included because these data types are not used by UCLA/IGPP flat files.)

For each floating-point format, fractions are represented in sign-magnitude notation, with the binary radix point to the left of the most significant bit. Fractions are assumed to be normalized, and therefore the most significant bit is not stored (this is called "hidden bit normalization"). This bit is assumed to be 1 unless the exponent is 0. If the exponent equals 0, then the value represented is either zero (refer to the section entitled "Representation of 0.0" in VAX FORTRAN User's Guide) or is a reserved operand (refer to the section entitled "Reserved Operand Faults" in VAX FORTRAN User's Guide).

C.4.1 REAL*4 (F_floating)

REAL*4 (F_floating) data is four contiguous bytes starting on an arbitrary byte boundry. Bits are labeled from the right, 0 through 31.

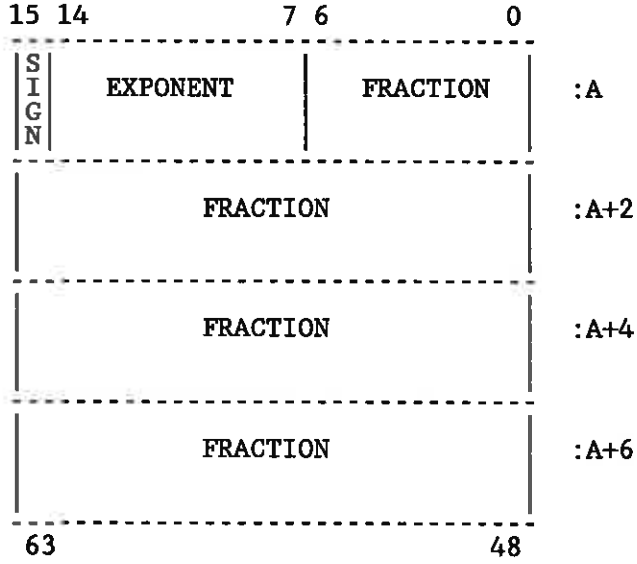


SIGN = 0(+), 1(-)

The form of REAL*4 (F__floating) data is sign magnitude, with bit 15 the sign bit, bits 14:7 an excess binary exponent, and bits 6:0 and 31:16 a normalized 24-bit fraction with the redundant most significant bit not represented. The value of F__floating data is in the approximate range: 0.29*10**-38 through 1.7*10**38. The precision is approximately one part in 2**23, that is, typically seven decimal digits.

C.4.2 REAL*8 (D__floating)

REAL*8 (D__floating) data is eight contiguous bytes starting on an arbitrary byte boundry. Bits are labeled from the right, 0 through 63.



SIGN = 0(+), 1(-)

The form of REAL*8 (D__floating) data is identical to an F__floating real number, except for an additional 32 low-significance fraction bits. The exponent conventions and approximate range of values are the same as those for F__floating. The precision is approximately one part in 2**55, that is, typically 16 decimal digits.

SUN/UNIX Data Representation

The following is from the "SPARCompiler FORTRAN 2.0.1 Reference Manual" from SunPro, a Sun Microsystems, Inc. Business, Part No: 800-6554-11, Revision A, October 1992, Pages 421 through 427.

Appendix C - Data Representations

This appendix is a brief introduction to data representation. For some detail and explanation, read the "FORTRAN User's Guide"; for even more, read the "Numerical Computation Guide".

Whatever the size of the data element in question, the most significant bit of the data element is always stored in the lowest-numbered byte of the byte sequence required to represent that object.

C.1 Real, Double, and Quadruple Precision

Real, double precision, and quadruple precision number data elements are represented according to the IEEE standard by the following form, where "f" is the bits in the fraction.

(-1)**sign * 2**exponent-bias * 1.f

Table C-1 Floating-Point Representation

	Single	Double	Quadruple
Sign	Bit 31	Bit 63	Bit 127
Exponent	Bits 30-23 Bias 127	Bits 62-52 Bias 1023	Bits 126-112 Bias 16583
Fraction	Bits 22-0	Bits 51-0	Bits 111-0
Range approx.	3.402823e+38 1.175494e-38	1.797693e+308 2.225074e-308	3.362e-4932 1.20e+4932

(NOTE: Sections C.2 through C.4, which discuss "Extreme Exponents", "IEEE Representation of Selected Numbers", and "Arithmetic Operations on Extreme Values", are not included because they are beyond the scope of a document describing UCLA/IGPP flat files. For a complete description of Sun/UNIX floating point arithmetic please refer to the "IEEE Standard 754 for Binary Floating-Point Arithmetic" or the compiler manuals for any computer vendor that implements this standard.)

C.5 Bits and Bytes by Architecture

(NOTE: While the following information does not directly define Sun/UNIX INTEGER*2 and INTEGER*4 representations, it does explain how these representations differ from those of DEC VAX/VMS, which are described above. By reviewing the DEC discussion and then implementing the changes below, one will be able to understand Sun/UNIX integer representations since the meaning of the bits are the same, the only difference being that the bytes are in a different order. The information in this section is also required to understand how to convert bot integer and floating-point values from one data representation system to the other.)

The order in which the data--the bits and bytes--are arranged differs between VAX computers on the one hand and SPARC computers on the other.

The bytes in a 32-bit integer, when read from address "n", end up in the register as shown below.

Table C-8 Bits and Bytes for Intel and VAX computers

Byte n+3	Byte n+2	Byte n+1	Byte n
3 3 2 2 2 2 2 2 1 0 9 8 7 6 5 4	2 2 2 2 1 1 1 1 3 2 1 0 9 8 7 6	1 1 1 1 1 1 0 0 5 4 3 2 1 0 9 8	0 0 0 0 0 0 0 0 7 6 5 4 3 2 1 0
Most Significant			Least Significant

Table C-9 Bits and Bytes for 680x0 and SPARC computers

Byte n	Byte n+1	Byte n+2	Byte n+3
3 3 2 2 2 2 2 2 1 0 9 8 7 6 5 4	2 2 2 2 1 1 1 1 3 2 1 0 9 8 7 6	1 1 1 1 1 1 0 0 5 4 3 2 1 0 9 8	0 0 0 0 0 0 0 0 7 6 5 4 3 2 1 0
Most Significant			Least Significant

The bits are numbered the same on these systems, even though the bytes are numbered differently.

(NOTE: Text describing the use of the Extended Data Representation (XDR) format is not included because this data type is not used by UCLA/IGPP flat files.)

CCSD$$MARKERmarkeree

[000000] FFDATA.SFD

```
CCSD3ZF0000100000001CCSD3FF0000500000001CCSD3CS00004markeraa
ADIDNAME = NSSD0211;
CCSD$$MARKERmarkeraaNSSD3KS00020markerbb

ADIDNAME = "NSSD0211";
REVISION_NUMBER = 0;
SUBMISSION_DATE = 1994-09-22;
REGISTRATION_DATE = 1995-03-17;
REVISABLE = Y;
RELEASABLE = Y;
EXPECTED_RELEASE_DATE = 1995-03-17;

BRIEF_TITLE = "UCLA IGPP Flat File - Data Object Format";

BRIEF_DESCRIPTION = "A flat file system is a two-dimensional data base
system developed at UCLA/IGPP. Flat files are used to store data
composed of multiple records consisting of one or more data fields.
This describes the data portion.";

REVISION_COMMENT =  "Original";

GROUP = REGISTRANT;
  TITLE =  Mr.;
  FIRST_NAME =  Bryan;
  MIDDLE_NAME = "";
  LAST_NAME =  Littlefield;
  AFFILIATION =  "UCLA";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::BRYAN";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "bryan@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-206-9955";
    FAX   = "+1-310-206-3051";
END_GROUP;


GROUP = REVISOR;
  TITLE =  Mr.;
  FIRST_NAME =  Bryan;
  MIDDLE_NAME = "";
  LAST_NAME =  Littlefield;
  AFFILIATION =  "UCLA";
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::BRYAN";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "bryan@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-206-9955";
    FAX   = "+1-310-206-3051";
END_GROUP;

GROUP = REVISOR;
  TITLE = Mr.;
  FIRST_NAME = Harry;
  MIDDLE_NAME =  "";
  LAST_NAME = Herbert;
  AFFILIATION = "Univ. of California";
```

```
  GROUP = ADDRESS;
     ADDRESS_LINE = "University of California at Los Angeles";
     ADDRESS_LINE = "Institute of Geophysics and Planetary Physics";
     ADDRESS_LINE = "5833 Slichter Hall";
     ADDRESS_LINE = "Los Angeles, CA  90024-1567 USA";
  END_GROUP;

  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI/DECnet;
      NET_ADDRESS = "BRUNET::HARRY";
  END_GROUP;
  GROUP = EMAIL_ADDRESS;
      NETWORK = NSI;
      NET_ADDRESS = "hherbert@igpp.ucla.edu";
  END_GROUP;

    PHONE = "+1-310-825-9030";
    FAX   = "+1-310-206-3051";
END_GROUP;

REFERENCED_ADID = 0;

PROJECT_NAME = "";
MISSION_NAME =  "";
INSTRUMENT_NAME = "";

CCSD$$MARKERmarkerbbCCSD3SS00002markercc
```

UCLA IGPP FLAT FILE SYSTEM OVERVIEW

The flat file system is a two-dimensional data base system developed at UCLA/IGPP. Flat files are useful for storing data which exists as multiple records, called rows, each consisting of one or more data fields, called columns. Here it is most often used for time series lists of real numbers, but because the data fields can contain most common computer data types - floating point, integer, character, logical - the system is quite flexible.

A flat file consists of two data objects, each typically in a separate file:

1. An ASCII character header object containing meta data, i.e., information that describes the values in the binary data object. This header object contains such information as: record length, number of rows, creation date, description of each data field or column, and room for a user-written abstract about the data. Please refer to the CCSDS registered description whose ADID=NSSD0210 for a complete description of the format and information in a header object. On the Sun/UNIX and VAX/VMS systems this object is typically found in a file with a type extension of '.ffh' or '.FFH'. Future mentions of this file will use the lower case style.

2. A binary data object containing the actual data values. The data object is handled as a fixed record length binary file. This structure provides for the following features: it allows the data to be access either randomly or sequentially, there is no need to interpret character strings before numerically manipulating the data, and the storage requirements are much lower than they would be for data stored as character strings. On the Sun/UNIX and VAX/VMS systems this object is typically found in a file with a type extension of '.ffd' or '.FFD'. Future mentions of this file will use the lower case style.

UCLA has developed a number of software packages to manipulate flat files. Descriptions of those packages available at the time of registration of this description are found in the CCSDS registered description whose ADID=NSSD0210. This software matches the header object (file) and data object (file) by matching the file names whose type extensions are ".ffh" and ".ffd" respectively.

CCSD$$MARKERmarkerccCCSD3DS00002markerdd

BINARY DATA OBJECT: DETAILED DESCRIPTION

The binary data object consists of a variable number of fixed length records. Complete details of the format of a particular instance of this data object

type can be obtained from the associated header object. The format of this header object is given in the CCSDS registered description whose ADID = NSSD0210. The associated header object is often found in a separate file with the same file name as the data object. In such cases, the file extensions will be ".ffh" for the header object and ".ffd" for the data object.

CCSD$$MARKERmarkerdd

ISEE s/c # ↓ Platter Side

[000000] VOLDESC.SFD

There is a VOLDESC.SFD file for each logical volume, i.e., for each side of each platter for each spacecraft.

CCSD3ZF0000100000001CCSD3VS00002markeraa

LOG_VOL_IDENT:	USA_NASA_NSSD_IC1D_0010A
LOG_VOL_NSSDC_EXPT_ID:	77-102A-04
LOG_VOL_INITIATION_DATE:	1994-08-11
LOG_VOL_CLOSING_DATE:	1995-03-16
LOG_VOL_CAPACITY:	1GB/Logical volume
LOG_VOL_FILE_STRUCTURE:	Files-11
VOLUME_DIAMETER:	12 inches
VOLUME_DRIVE_MFGR_AND_MODEL:	Optimem 1000
COMPUTER_MFGR:	Digital Equipment Corporation
OPERATING_SYSTEM:	MicroVMS 4.7
COMPUTER_SYSTEM:	MicroVAX II
TRANSFER_SOFTWARE:	SOAR Version 4.2

TECHNICAL_CONTACT:

Harry Herbert
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
5833 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-9030
NSI-hherbert@igpp.ucla.edu
NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS: NONE

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME:	Averaged Fluxgate Magnetometer Data
DATA_SOURCES:	International Sun-Earth Explorer 1 (ISEE-1) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:

Dr. Christopher Russell
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
6871 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-3188
NSI-ctrussel@igpp.ucla.edu
NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:
A. DESCRIPTION_OF_INSTRUMENT:
In this triaxial fluxgate magnetometer, three ring-core sensors in an

orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE OF THE INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA SET QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA PROCESSING OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA PROCESSING OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included 64-second averages of the 4-second data plus spacecraft spin rate, the zero levels that were applied to the data during processing, spacecraft position

and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds

since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1977-10-22T14:49:00 TO 1980-04-17T21:02:00

TYPE_OF_FILE_TIME_COVERAGE:
4-SECOND DATA 1977-10-22T14:49:00 TO 1980-04-17T21:02:00
60-SECOND DATA 1977-10-22T14:49:00 TO 1980-04-17T21:02:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG_VOL_FILE_TIME_COVERAGE:

4SI000I.FFD &	60S10001.FFD	1977-10-22T14:49:00	TO	1977-10-25T00:13:00
4S10002.FFD &	60S10002.FFD	1977-10-25T00:13:00	TO	1977-10-27T09:36:00
4S10003.FFD &	60S10003.FFD	1977-10-27T09:36:00	TO	1977-10-29T18:59:00
4S10004.FFD &	60S10004.FFD	1977-10-29T18:59:00	TO	1977-11-01T04:20:00
4S10005.FFD &	60S10005.FFD	1977-11-01T04:20:00	TO	1977-11-03T13:41:00
4S10006.FFD &	60S10006.FFD	1977-11-03T13:41:00	TO	1977-11-05T23:02:00
4S10007.FFD &	60S10007.FFD	1977-11-05T23:02:00	TO	1977-11-08T08:26:00
4S10008.FFD &	60S10008.FFD	1977-11-08T08:26:00	TO	1977-11-10T17:51:00
4S10009.FFD &	60S10009.FFD	1977-11-10T17:51:00	TO	1977-11-13T03:11:00
4S10010.FFD &	60S10010.FFD	1977-11-13T03:11:00	TO	1977-11-15T12:31:00
4S10011.FFD &	60S10011.FFD	1977-11-15T12:31:00	TO	1977-11-17T21:53:00
4S10012.FFD &	60S10012.FFD	1977-11-17T21:53:00	TO	1977-11-20T07:16:00
4S10013.FFD &	60S10013.FFD	1977-11-20T07:16:00	TO	1977-11-22T16:39:00
4S10014.FFD &	60S10014.FFD	1977-11-22T16:39:00	TO	1977-11-25T02:01:00
4S10015.FFD &	60S10015.FFD	1977-11-25T02:01:00	TO	1977-11-27T11:23:00
4S10016.FFD &	60S10016.FFD	1977-11-27T11:23:00	TO	1977-11-29T20:43:00
4S10017.FFD &	60S10017.FFD	1977-11-29T20:43:00	TO	1977-12-02T06:03:00
4S10018.FFD &	60S10018.FFD	1977-12-02T06:03:00	TO	1977-12-04T15:25:00
4S10019.FFD &	60S10019.FFD	1977-12-04T15:25:00	TO	1977-12-07T00:50:00
4S10020.FFD &	60S10020.FFD	1977-12-07T00:50:00	TO	1977-12-09T10:11:00
4S10021.FFD &	60S10021.FFD	1977-12-09T10:11:00	TO	1977-12-11T19:30:00
4S10022.FFD &	60S10022.FFD	1977-12-11T19:30:00	TO	1977-12-14T04:51:00
4S10023.FFD &	60S10023.FFD	1977-12-14T04:51:00	TO	1977-12-16T14:13:00
4S10024.FFD &	60S10024.FFD	1977-12-16T14:13:00	TO	1977-12-18T23:35:00
4S10025.FFD &	60S10025.FFD	1977-12-18T23:35:00	TO	1977-12-21T08:58:00
4S10026.FFD &	60S10026.FFD	1977-12-21T08:58:00	TO	1977-12-23T18:19:00
4S10027.FFD &	60S10027.FFD	1977-12-23T18:19:00	TO	1977-12-26T03:39:00
4S10028.FFD &	60S10028.FFD	1977-12-26T03:39:00	TO	1977-12-28T12:58:00

4S10029.FFD & 60S10029.FFD 1977-12-28T12:58:00 TO 1977-12-30T22:19:00
4S10030.FFD & 60S10030.FFD 1977-12-30T22:19:00 TO 1978-01-02T07:43:00
4S10031.FFD & 60S10031.FFD 1978-01-02T07:43:00 TO 1978-01-04T17:07:00
4S10032.FFD & 60S10032.FFD 1978-01-04T17:07:00 TO 1978-01-07T02:27:00
4S10033.FFD & 60S10033.FFD 1978-01-07T02:27:00 TO 1978-01-09T11:46:00
4S10034.FFD & 60S10034.FFD 1978-01-09T11:46:00 TO 1978-01-11T21:07:00
4S10035.FFD & 60S10035.FFD 1978-01-11T21:07:00 TO 1978-01-14T06:30:00
4S10036.FFD & 60S10036.FFD 1978-01-14T06:30:00 TO 1978-01-16T15:53:00
4S10037.FFD & 60S10037.FFD 1978-01-16T15:53:00 TO 1978-01-19T01:15:00
4S10038.FFD & 60S10038.FFD 1978-01-19T01:15:00 TO 1978-01-21T10:36:00
4S10039.FFD & 60S10039.FFD 1978-01-21T10:36:00 TO 1978-01-23T19:56:00
4S10040.FFD & 60S10040.FFD 1978-01-23T19:56:00 TO 1978-01-26T05:16:00
4S10041.FFD & 60S10041.FFD 1978-01-26T05:16:00 TO 1978-01-28T14:39:00
4S10042.FFD & 60S10042.FFD 1978-01-28T14:39:00 TO 1978-01-31T00:05:00
4S10043.FFD & 60S10043.FFD 1978-01-31T00:05:00 TO 1978-02-02T09:27:00
4S10044.FFD & 60S10044.FFD 1978-02-02T09:27:00 TO 1978-02-04T18:46:00
4S10045.FFD & 60S10045.FFD 1978-02-04T18:46:00 TO 1978-02-07T04:07:00
4S10046.FFD & 60S10046.FFD 1978-02-07T04:07:00 TO 1978-02-09T13:30:00
4S10047.FFD & 60S10047.FFD 1978-02-09T13:30:00 TO 1978-02-11T22:54:00
4S10048.FFD & 60S10048.FFD 1978-02-11T22:54:00 TO 1978-02-14T08:17:00
4S10049.FFD & 60S10049.FFD 1978-02-14T08:17:00 TO 1978-02-16T17:39:00
4S10050.FFD & 60S10050.FFD 1978-02-16T17:39:00 TO 1978-02-19T03:00:00
4S10051.FFD & 60S10051.FFD 1978-02-19T03:00:00 TO 1978-02-21T12:21:00
4S10052.FFD & 60S10052.FFD 1978-02-21T12:21:00 TO 1978-02-23T21:43:00
4S10053.FFD & 60S10053.FFD 1978-02-23T21:43:00 TO 1978-02-26T07:09:00
4S10054.FFD & 60S10054.FFD 1978-02-26T07:09:00 TO 1978-02-28T16:34:00
4S10055.FFD & 60S10055.FFD 1978-02-28T16:34:00 TO 1978-03-03T01:54:00
4S10056.FFD & 60S10056.FFD 1978-03-03T01:54:00 TO 1978-03-05T11:15:00
4S10057.FFD & 60S10057.FFD 1978-03-05T11:15:00 TO 1978-03-07T20:37:00
4S10058.FFD & 60S10058.FFD 1978-03-07T20:37:00 TO 1978-03-10T06:01:00
4S10059.FFD & 60S10059.FFD 1978-03-10T06:01:00 TO 1978-03-12T15:25:00
4S10060.FFD & 60S10060.FFD 1978-03-12T15:25:00 TO 1978-03-15T00:48:00
4S10061.FFD & 60S10061.FFD 1978-03-15T00:48:00 TO 1978-03-17T10:10:00
4S10062.FFD & 60S10062.FFD 1978-03-17T10:10:00 TO 1978-03-19T19:30:00
4S10063.FFD & 60S10063.FFD 1978-03-19T19:30:00 TO 1978-03-22T04:52:00
4S10064.FFD & 60S10064.FFD 1978-03-22T04:52:00 TO 1978-03-24T14:16:00
4S10065.FFD & 60S10065.FFD 1978-03-24T14:16:00 TO 1978-03-26T23:42:00
4S10066.FFD & 60S10066.FFD 1978-03-26T23:42:00 TO 1978-03-29T09:03:00
4S10067.FFD & 60S10067.FFD 1978-03-29T09:03:00 TO 1978-03-31T18:23:00
4S10068.FFD & 60S10068.FFD 1978-03-31T18:23:00 TO 1978-04-03T03:44:00
4S10069.FFD & 60S10069.FFD 1978-04-03T03:44:00 TO 1978-04-05T13:07:00
4S10070.FFD & 60S10070.FFD 1978-04-05T13:07:00 TO 1978-04-07T22:30:00
4S10071.FFD & 60S10071.FFD 1978-04-07T22:30:00 TO 1978-04-10T07:53:00
4S10072.FFD & 60S10072.FFD 1978-04-10T07:53:00 TO 1978-04-12T17:14:00
4S10073.FFD & 60S10073.FFD 1978-04-12T17:14:00 TO 1978-04-15T02:35:00
4S10074.FFD & 60S10074.FFD 1978-04-15T02:35:00 TO 1978-04-17T11:55:00
4S10075.FFD & 60S10075.FFD 1978-04-17T11:55:00 TO 1978-04-19T21:16:00
4S10076.FFD & 60S10076.FFD 1978-04-19T21:16:00 TO 1978-04-22T06:42:00
4S10077.FFD & 60S10077.FFD 1978-04-22T06:42:00 TO 1978-04-24T16:05:00
4S10078.FFD & 60S10078.FFD 1978-04-24T16:05:00 TO 1978-04-27T01:25:00
4S10079.FFD & 60S10079.FFD 1978-04-27T01:25:00 TO 1978-04-29T10:44:00
4S10080.FFD & 60S10080.FFD 1978-04-29T10:44:00 TO 1978-05-01T20:06:00
4S10081.FFD & 60S10081.FFD 1978-05-01T20:06:00 TO 1978-05-04T05:28:00
4S10082.FFD & 60S10082.FFD 1978-05-04T05:28:00 TO 1978-05-06T14:51:00
4S10083.FFD & 60S10083.FFD 1978-05-06T14:51:00 TO 1978-05-09T00:13:00
4S10084.FFD & 60S10084.FFD 1978-05-09T00:13:00 TO 1978-05-11T09:33:00
4S10085.FFD & 60S10085.FFD 1978-05-11T09:33:00 TO 1978-05-13T18:52:00
4S10086.FFD & 60S10086.FFD 1978-05-13T18:52:00 TO 1978-05-16T04:12:00
4S10087.FFD & 60S10087.FFD 1978-05-16T04:12:00 TO 1978-05-18T13:35:00
4S10088.FFD & 60S10088.FFD 1978-05-18T13:35:00 TO 1978-05-20T23:00:00
4S10089.FFD & 60S10089.FFD 1978-05-20T23:00:00 TO 1978-05-23T08:21:00
4S10090.FFD & 60S10090.FFD 1978-05-23T08:21:00 TO 1978-05-25T17:39:00
4S10091.FFD & 60S10091.FFD 1978-05-25T17:39:00 TO 1978-05-28T02:59:00
4S10092.FFD & 60S10092.FFD 1978-05-28T02:59:00 TO 1978-05-30T12:21:00
4S10093.FFD & 60S10093.FFD 1978-05-30T12:21:00 TO 1978-06-01T21:43:00
4S10094.FFD & 60S10094.FFD 1978-06-01T21:43:00 TO 1978-06-04T07:05:00
4S10095.FFD & 60S10095.FFD 1978-06-04T07:05:00 TO 1978-06-06T16:25:00
4S10096.FFD & 60S10096.FFD 1978-06-06T16:25:00 TO 1978-06-09T01:44:00
4S10097.FFD & 60S10097.FFD 1978-06-09T01:44:00 TO 1978-06-11T11:03:00
4S10098.FFD & 60S10098.FFD 1978-06-11T11:03:00 TO 1978-06-13T20:24:00
4S10099.FFD & 60S10099.FFD 1978-06-13T20:24:00 TO 1978-06-16T05:48:00
4S10100.FFD & 60S10100.FFD 1978-06-16T05:48:00 TO 1978-06-18T15:10:00
4S10101.FFD & 60S10101.FFD 1978-06-18T15:10:00 TO 1978-06-21T00:28:00
4S10102.FFD & 60S10102.FFD 1978-06-21T00:28:00 TO 1978-06-23T09:47:00
4S10103.FFD & 60S10103.FFD 1978-06-23T09:47:00 TO 1978-06-25T19:08:00
4S10104.FFD & 60S10104.FFD 1978-06-25T19:08:00 TO 1978-06-28T04:30:00
4S10105.FFD & 60S10105.FFD 1978-06-28T04:30:00 TO 1978-06-30T13:51:00
4S10106.FFD & 60S10106.FFD 1978-06-30T13:51:00 TO 1978-07-02T23:12:00
4S10107.FFD & 60S10107.FFD 1978-07-02T23:12:00 TO 1978-07-05T08:31:00
4S10108.FFD & 60S10108.FFD 1978-07-05T08:31:00 TO 1978-07-07T17:50:00

4S10109.FFD & 60S10109.FFD 1978-07-07T17:50:00 TO 1978-07-10T03:09:00
4S10110.FFD & 60S10110.FFD 1978-07-10T03:09:00 TO 1978-07-12T12:32:00
4S10111.FFD & 60S10111.FFD 1978-07-12T12:32:00 TO 1978-07-14T21:56:00
4S10112.FFD & 60S10112.FFD 1978-07-14T21:56:00 TO 1978-07-17T07:16:00
4S10113.FFD & 60S10113.FFD 1978-07-17T07:16:00 TO 1978-07-19T16:34:00
4S10114.FFD & 60S10114.FFD 1978-07-19T16:34:00 TO 1978-07-22T01:54:00
4S10115.FFD & 60S10115.FFD 1978-07-22T01:54:00 TO 1978-07-24T11:16:00
4S10116.FFD & 60S10116.FFD 1978-07-24T11:16:00 TO 1978-07-26T20:38:00
4S10117.FFD & 60S10117.FFD 1978-07-26T20:38:00 TO 1978-07-29T05:59:00
4S10118.FFD & 60S10118.FFD 1978-07-29T05:59:00 TO 1978-07-31T15:19:00
4S10119.FFD & 60S10119.FFD 1978-07-31T15:19:00 TO 1978-08-03T00:38:00
4S10120.FFD & 60S10120.FFD 1978-08-03T00:38:00 TO 1978-08-05T09:58:00
4S10121.FFD & 60S10121.FFD 1978-08-05T09:58:00 TO 1978-08-07T19:20:00
4S10122.FFD & 60S10122.FFD 1978-08-07T19:20:00 TO 1978-08-10T04:45:00
4S10123.FFD & 60S10123.FFD 1978-08-10T04:45:00 TO 1978-08-12T14:07:00
4S10124.FFD & 60S10124.FFD 1978-08-12T14:07:00 TO 1978-08-14T23:26:00
4S10125.FFD & 60S10125.FFD 1978-08-14T23:26:00 TO 1978-08-17T08:45:00
4S10126.FFD & 60S10126.FFD 1978-08-17T08:45:00 TO 1978-08-19T18:07:00
4S10127.FFD & 60S10127.FFD 1978-08-19T18:07:00 TO 1978-08-22T03:30:00
4S10128.FFD & 60S10128.FFD 1978-08-22T03:30:00 TO 1978-08-24T12:53:00
4S10129.FFD & 60S10129.FFD 1978-08-24T12:53:00 TO 1978-08-26T22:14:00
4S10130.FFD & 60S10130.FFD 1978-08-26T22:14:00 TO 1978-08-29T07:34:00
4S10131.FFD & 60S10131.FFD 1978-08-29T07:34:00 TO 1978-08-31T16:54:00
4S10132.FFD & 60S10132.FFD 1978-08-31T16:54:00 TO 1978-09-03T02:15:00
4S10133.FFD & 60S10133.FFD 1978-09-03T02:15:00 TO 1978-09-05T11:41:00
4S10134.FFD & 60S10134.FFD 1978-09-05T11:41:00 TO 1978-09-07T21:05:00
4S10135.FFD & 60S10135.FFD 1978-09-07T21:05:00 TO 1978-09-10T06:26:00
4S10136.FFD & 60S10136.FFD 1978-09-10T06:26:00 TO 1978-09-12T15:46:00
4S10137.FFD & 60S10137.FFD 1978-09-12T15:46:00 TO 1978-09-15T01:07:00
4S10138.FFD & 60S10138.FFD 1978-09-15T01:07:00 TO 1978-09-17T10:31:00
4S10139.FFD & 60S10139.FFD 1978-09-17T10:31:00 TO 1978-09-19T19:54:00
4S10140.FFD & 60S10140.FFD 1978-09-19T19:54:00 TO 1978-09-22T05:17:00
4S10141.FFD & 60S10141.FFD 1978-09-22T05:17:00 TO 1978-09-24T14:38:00
4S10142.FFD & 60S10142.FFD 1978-09-24T14:38:00 TO 1978-09-26T23:59:00
4S10143.FFD & 60S10143.FFD 1978-09-26T23:59:00 TO 1978-09-29T09:19:00
4S10144.FFD & 60S10144.FFD 1978-09-29T09:19:00 TO 1978-10-01T18:44:00
4S10145.FFD & 60S10145.FFD 1978-10-01T18:44:00 TO 1978-10-04T04:10:00
4S10146.FFD & 60S10146.FFD 1978-10-04T04:10:00 TO 1978-10-06T13:33:00
4S10147.FFD & 60S10147.FFD 1978-10-06T13:33:00 TO 1978-10-08T22:53:00
4S10148.FFD & 60S10148.FFD 1978-10-08T22:53:00 TO 1978-10-11T08:14:00
4S10149.FFD & 60S10149.FFD 1978-10-11T08:14:00 TO 1978-10-13T17:37:00
4S10150.FFD & 60S10150.FFD 1978-10-13T17:37:00 TO 1978-10-16T03:01:00
4S10151.FFD & 60S10151.FFD 1978-10-16T03:01:00 TO 1978-10-18T12:24:00
4S10152.FFD & 60S10152.FFD 1978-10-18T12:24:00 TO 1978-10-20T21:46:00
4S10153.FFD & 60S10153.FFD 1978-10-20T21:46:00 TO 1978-10-23T07:07:00
4S10154.FFD & 60S10154.FFD 1978-10-23T07:07:00 TO 1978-10-25T16:27:00
4S10155.FFD & 60S10155.FFD 1978-10-25T16:27:00 TO 1978-10-28T01:50:00
4S10156.FFD & 60S10156.FFD 1978-10-28T01:50:00 TO 1978-10-30T11:16:00
4S10157.FFD & 60S10157.FFD 1978-10-30T11:16:00 TO 1978-11-01T20:41:00
4S10158.FFD & 60S10158.FFD 1978-11-01T20:41:00 TO 1978-11-04T06:01:00
4S10159.FFD & 60S10159.FFD 1978-11-04T06:01:00 TO 1978-11-06T15:20:00
4S10160.FFD & 60S10160.FFD 1978-11-06T15:20:00 TO 1978-11-09T00:42:00
4S10161.FFD & 60S10161.FFD 1978-11-09T00:42:00 TO 1978-11-11T10:05:00
4S10162.FFD & 60S10162.FFD 1978-11-11T10:05:00 TO 1978-11-13T19:29:00
4S10163.FFD & 60S10163.FFD 1978-11-13T19:29:00 TO 1978-11-16T04:51:00
4S10164.FFD & 60S10164.FFD 1978-11-16T04:51:00 TO 1978-11-18T14:11:00
4S10165.FFD & 60S10165.FFD 1978-11-18T14:11:00 TO 1978-11-20T23:31:00
4S10166.FFD & 60S10166.FFD 1978-11-20T23:31:00 TO 1978-11-23T08:51:00
4S10167.FFD & 60S10167.FFD 1978-11-23T08:51:00 TO 1978-11-25T18:15:00
4S10168.FFD & 60S10168.FFD 1978-11-25T18:15:00 TO 1978-11-28T03:41:00
4S10169.FFD & 60S10169.FFD 1978-11-28T03:41:00 TO 1978-11-30T13:02:00
4S10170.FFD & 60S10170.FFD 1978-11-30T13:02:00 TO 1978-12-02T22:20:00
4S10171.FFD & 60S10171.FFD 1978-12-02T22:20:00 TO 1978-12-05T07:40:00
4S10172.FFD & 60S10172.FFD 1978-12-05T07:40:00 TO 1978-12-07T17:02:00
4S10173.FFD & 60S10173.FFD 1978-12-07T17:02:00 TO 1978-12-10T02:25:00
4S10174.FFD & 60S10174.FFD 1978-12-10T02:25:00 TO 1978-12-12T11:46:00
4S10175.FFD & 60S10175.FFD 1978-12-12T11:46:00 TO 1978-12-14T21:07:00
4S10176.FFD & 60S10176.FFD 1978-12-14T21:07:00 TO 1978-12-17T06:26:00
4S10177.FFD & 60S10177.FFD 1978-12-17T06:26:00 TO 1978-12-19T15:45:00
4S10178.FFD & 60S10178.FFD 1978-12-19T15:45:00 TO 1978-12-22T01:06:00
4S10179.FFD & 60S10179.FFD 1978-12-22T01:06:00 TO 1978-12-24T10:31:00
4S10180.FFD & 60S10180.FFD 1978-12-24T10:31:00 TO 1978-12-26T19:54:00
4S10181.FFD & 60S10181.FFD 1978-12-26T19:54:00 TO 1978-12-29T05:12:00
4S10182.FFD & 60S10182.FFD 1978-12-29T05:12:00 TO 1978-12-31T14:30:00
4S10183.FFD & 60S10183.FFD 1978-12-31T14:30:00 TO 1979-01-02T23:51:00
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4S10185.FFD & 60S10185.FFD 1979-01-05T09:13:00 TO 1979-01-07T18:35:00
4S10186.FFD & 60S10186.FFD 1979-01-07T18:35:00 TO 1979-01-10T03:56:00
4S10187.FFD & 60S10187.FFD 1979-01-10T03:56:00 TO 1979-01-12T13:15:00
4S10188.FFD & 60S10188.FFD 1979-01-12T13:15:00 TO 1979-01-14T22:34:00

4S10189.FFD & 60S10189.FFD 1979-01-14T22:34:00 TO 1979-01-17T07:54:00
4S10190.FFD & 60S10190.FFD 1979-01-17T07:54:00 TO 1979-01-19T17:17:00
4S10191.FFD & 60S10191.FFD 1979-01-19T17:17:00 TO 1979-01-22T02:42:00
4S10192.FFD & 60S10192.FFD 1979-01-22T02:42:00 TO 1979-01-24T12:02:00
4S10193.FFD & 60S10193.FFD 1979-01-24T12:02:00 TO 1979-01-26T21:21:00
4S10194.FFD & 60S10194.FFD 1979-01-26T21:21:00 TO 1979-01-29T06:41:00
4S10195.FFD & 60S10195.FFD 1979-01-29T06:41:00 TO 1979-01-31T16:03:00
4S10196.FFD & 60S10196.FFD 1979-01-31T16:03:00 TO 1979-02-03T01:26:00
4S10197.FFD & 60S10197.FFD 1979-02-03T01:26:00 TO 1979-02-05T10:47:00
4S10198.FFD & 60S10198.FFD 1979-02-05T10:47:00 TO 1979-02-07T20:08:00
4S10199.FFD & 60S10199.FFD 1979-02-07T20:08:00 TO 1979-02-10T05:27:00
4S10200.FFD & 60S10200.FFD 1979-02-10T05:27:00 TO 1979-02-12T14:47:00
4S10201.FFD & 60S10201.FFD 1979-02-12T14:47:00 TO 1979-02-15T00:10:00
4S10202.FFD & 60S10202.FFD 1979-02-15T00:10:00 TO 1979-02-17T09:36:00
4S10203.FFD & 60S10203.FFD 1979-02-17T09:36:00 TO 1979-02-19T18:59:00
4S10204.FFD & 60S10204.FFD 1979-02-19T18:59:00 TO 1979-02-22T04:19:00
4S10205.FFD & 60S10205.FFD 1979-02-22T04:19:00 TO 1979-02-24T13:39:00
4S10206.FFD & 60S10206.FFD 1979-02-24T13:39:00 TO 1979-02-26T23:01:00
4S10207.FFD & 60S10207.FFD 1979-02-26T23:01:00 TO 1979-03-01T08:25:00
4S10208.FFD & 60S10208.FFD 1979-03-01T08:25:00 TO 1979-03-03T17:48:00
4S10209.FFD & 60S10209.FFD 1979-03-03T17:48:00 TO 1979-03-06T03:10:00
4S10210.FFD & 60S10210.FFD 1979-03-06T03:10:00 TO 1979-03-08T12:31:00
4S10211.FFD & 60S10211.FFD 1979-03-08T12:31:00 TO 1979-03-10T21:51:00
4S10212.FFD & 60S10212.FFD 1979-03-10T21:51:00 TO 1979-03-13T07:13:00
4S10213.FFD & 60S10213.FFD 1979-03-13T07:13:00 TO 1979-03-15T16:39:00
4S10214.FFD & 60S10214.FFD 1979-03-15T16:39:00 TO 1979-03-18T02:05:00
4S10215.FFD & 60S10215.FFD 1979-03-18T02:05:00 TO 1979-03-20T11:27:00
4S10216.FFD & 60S10216.FFD 1979-03-20T11:27:00 TO 1979-03-22T20:47:00
4S10217.FFD & 60S10217.FFD 1979-03-22T20:47:00 TO 1979-03-25T06:08:00
4S10218.FFD & 60S10218.FFD 1979-03-25T06:08:00 TO 1979-03-27T15:32:00
4S10219.FFD & 60S10219.FFD 1979-03-27T15:32:00 TO 1979-03-30T00:57:00
4S10220.FFD & 60S10220.FFD 1979-03-30T00:57:00 TO 1979-04-01T10:20:00
4S10221.FFD & 60S10221.FFD 1979-04-01T10:20:00 TO 1979-04-03T19:42:00
4S10222.FFD & 60S10222.FFD 1979-04-03T19:42:00 TO 1979-04-06T05:02:00
4S10223.FFD & 60S10223.FFD 1979-04-06T05:02:00 TO 1979-04-08T14:24:00
4S10224.FFD & 60S10224.FFD 1979-04-08T14:24:00 TO 1979-04-10T23:48:00
4S10225.FFD & 60S10225.FFD 1979-04-10T23:48:00 TO 1979-04-13T09:15:00
4S10226.FFD & 60S10226.FFD 1979-04-13T09:15:00 TO 1979-04-15T18:39:00
4S10227.FFD & 60S10227.FFD 1979-04-15T18:39:00 TO 1979-04-18T03:59:00
4S10228.FFD & 60S10228.FFD 1979-04-18T03:59:00 TO 1979-04-20T13:20:00
4S10229.FFD & 60S10229.FFD 1979-04-20T13:20:00 TO 1979-04-22T22:43:00
4S10230.FFD & 60S10230.FFD 1979-04-22T22:43:00 TO 1979-04-25T08:07:00
4S10231.FFD & 60S10231.FFD 1979-04-25T08:07:00 TO 1979-04-27T17:30:00
4S10232.FFD & 60S10232.FFD 1979-04-27T17:30:00 TO 1979-04-30T02:52:00
4S10233.FFD & 60S10233.FFD 1979-04-30T02:52:00 TO 1979-05-02T12:13:00
4S10234.FFD & 60S10234.FFD 1979-05-02T12:13:00 TO 1979-05-04T21:33:00
4S10235.FFD & 60S10235.FFD 1979-05-04T21:33:00 TO 1979-05-07T06:56:00
4S10236.FFD & 60S10236.FFD 1979-05-07T06:56:00 TO 1979-05-09T16:22:00
4S10237.FFD & 60S10237.FFD 1979-05-09T16:22:00 TO 1979-05-12T01:47:00
4S10238.FFD & 60S10238.FFD 1979-05-12T01:47:00 TO 1979-05-14T11:07:00
4S10239.FFD & 60S10239.FFD 1979-05-14T11:07:00 TO 1979-05-16T20:26:00
4S10240.FFD & 60S10240.FFD 1979-05-16T20:26:00 TO 1979-05-19T05:48:00
4S10241.FFD & 60S10241.FFD 1979-05-19T05:48:00 TO 1979-05-21T15:11:00
4S10242.FFD & 60S10242.FFD 1979-05-21T15:11:00 TO 1979-05-24T00:34:00
4S10243.FFD & 60S10243.FFD 1979-05-24T00:34:00 TO 1979-05-26T09:56:00
4S10244.FFD & 60S10244.FFD 1979-05-26T09:56:00 TO 1979-05-28T19:16:00
4S10245.FFD & 60S10245.FFD 1979-05-28T19:16:00 TO 1979-05-31T04:35:00
4S10246.FFD & 60S10246.FFD 1979-05-31T04:35:00 TO 1979-06-02T13:56:00
4S10247.FFD & 60S10247.FFD 1979-06-02T13:56:00 TO 1979-06-04T23:20:00
4S10248.FFD & 60S10248.FFD 1979-06-04T23:20:00 TO 1979-06-07T08:45:00
4S10249.FFD & 60S10249.FFD 1979-06-07T08:45:00 TO 1979-06-09T18:06:00
4S10250.FFD & 60S10250.FFD 1979-06-09T18:06:00 TO 1979-06-12T03:25:00
4S10251.FFD & 60S10251.FFD 1979-06-12T03:25:00 TO 1979-06-14T12:44:00
4S10252.FFD & 60S10252.FFD 1979-06-14T12:44:00 TO 1979-06-16T22:06:00
4S10253.FFD & 60S10253.FFD 1979-06-16T22:06:00 TO 1979-06-19T07:29:00
4S10254.FFD & 60S10254.FFD 1979-06-19T07:29:00 TO 1979-06-21T16:51:00
4S10255.FFD & 60S10255.FFD 1979-06-21T16:51:00 TO 1979-06-24T02:11:00
4S10256.FFD & 60S10256.FFD 1979-06-24T02:11:00 TO 1979-06-26T11:30:00
4S10257.FFD & 60S10257.FFD 1979-06-26T11:30:00 TO 1979-06-28T20:49:00
4S10258.FFD & 60S10258.FFD 1979-06-28T20:49:00 TO 1979-07-01T06:11:00
4S10259.FFD & 60S10259.FFD 1979-07-01T06:11:00 TO 1979-07-03T15:36:00
4S10260.FFD & 60S10260.FFD 1979-07-03T15:36:00 TO 1979-07-06T00:59:00
4S10261.FFD & 60S10261.FFD 1979-07-06T00:59:00 TO 1979-07-08T10:18:00
4S10262.FFD & 60S10262.FFD 1979-07-08T10:18:00 TO 1979-07-10T19:36:00
4S10263.FFD & 60S10263.FFD 1979-07-10T19:36:00 TO 1979-07-13T04:57:00
4S10264.FFD & 60S10264.FFD 1979-07-13T04:57:00 TO 1979-07-15T14:19:00
4S10265.FFD & 60S10265.FFD 1979-07-15T14:19:00 TO 1979-07-17T23:41:00
4S10266.FFD & 60S10266.FFD 1979-07-17T23:41:00 TO 1979-07-20T09:02:00
4S10267.FFD & 60S10267.FFD 1979-07-20T09:02:00 TO 1979-07-22T18:22:00
4S10268.FFD & 60S10268.FFD 1979-07-22T18:22:00 TO 1979-07-25T03:41:00

4S10269.FFD & 60S10269.FFD 1979-07-25T03:41:00 TO 1979-07-27T13:01:00
4S10270.FFD & 60S10270.FFD 1979-07-27T13:01:00 TO 1979-07-29T22:25:00
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4S10273.FFD & 60S10273.FFD 1979-08-03T17:11:00 TO 1979-08-06T02:30:00
4S10274.FFD & 60S10274.FFD 1979-08-06T02:30:00 TO 1979-08-08T11:50:00
4S10275.FFD & 60S10275.FFD 1979-08-08T11:50:00 TO 1979-08-10T21:13:00
4S10276.FFD & 60S10276.FFD 1979-08-10T21:13:00 TO 1979-08-13T06:36:00
4S10277.FFD & 60S10277.FFD 1979-08-13T06:36:00 TO 1979-08-15T15:58:00
4S10278.FFD & 60S10278.FFD 1979-08-15T15:58:00 TO 1979-08-18T01:19:00
4S10279.FFD & 60S10279.FFD 1979-08-18T01:19:00 TO 1979-08-20T10:39:00
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4S10281.FFD & 60S10281.FFD 1979-08-22T19:59:00 TO 1979-08-25T05:22:00
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4S10283.FFD & 60S10283.FFD 1979-08-27T14:49:00 TO 1979-08-30T00:12:00
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4S10287.FFD & 60S10287.FFD 1979-09-06T04:15:00 TO 1979-09-08T13:39:00
4S10288.FFD & 60S10288.FFD 1979-09-08T13:39:00 TO 1979-09-10T23:03:00
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4S10290.FFD & 60S10290.FFD 1979-09-13T08:25:00 TO 1979-09-15T17:46:00
4S10291.FFD & 60S10291.FFD 1979-09-15T17:46:00 TO 1979-09-18T03:06:00
4S10292.FFD & 60S10292.FFD 1979-09-18T03:06:00 TO 1979-09-20T12:29:00
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4S10294.FFD & 60S10294.FFD 1979-09-22T21:55:00 TO 1979-09-25T07:21:00
4S10295.FFD & 60S10295.FFD 1979-09-25T07:21:00 TO 1979-09-27T16:43:00
4S10296.FFD & 60S10296.FFD 1979-09-27T16:43:00 TO 1979-09-30T02:03:00
4S10297.FFD & 60S10297.FFD 1979-09-30T02:03:00 TO 1979-10-02T11:25:00
4S10298.FFD & 60S10298.FFD 1979-10-02T11:25:00 TO 1979-10-04T20:49:00
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4S10302.FFD & 60S10302.FFD 1979-10-12T00:59:00 TO 1979-10-14T10:20:00
4S10303.FFD & 60S10303.FFD 1979-10-14T10:20:00 TO 1979-10-16T19:41:00
4S10304.FFD & 60S10304.FFD 1979-10-16T19:41:00 TO 1979-10-19T05:06:00
4S10305.FFD & 60S10305.FFD 1979-10-19T05:06:00 TO 1979-10-21T14:33:00
4S10306.FFD & 60S10306.FFD 1979-10-21T14:33:00 TO 1979-10-23T23:56:00
4S10307.FFD & 60S10307.FFD 1979-10-23T23:56:00 TO 1979-10-26T09:17:00
4S10308.FFD & 60S10308.FFD 1979-10-26T09:17:00 TO 1979-10-28T18:38:00
4S10309.FFD & 60S10309.FFD 1979-10-28T18:38:00 TO 1979-10-31T04:00:00
4S10310.FFD & 60S10310.FFD 1979-10-31T04:00:00 TO 1979-11-02T13:24:00
4S10311.FFD & 60S10311.FFD 1979-11-02T13:24:00 TO 1979-11-04T22:48:00
4S10312.FFD & 60S10312.FFD 1979-11-04T22:48:00 TO 1979-11-07T08:10:00
4S10313.FFD & 60S10313.FFD 1979-11-07T08:10:00 TO 1979-11-09T17:31:00
4S10314.FFD & 60S10314.FFD 1979-11-09T17:31:00 TO 1979-11-12T02:51:00
4S10315.FFD & 60S10315.FFD 1979-11-12T02:51:00 TO 1979-11-14T12:14:00
4S10316.FFD & 60S10316.FFD 1979-11-14T12:14:00 TO 1979-11-16T21:40:00
4S10317.FFD & 60S10317.FFD 1979-11-16T21:40:00 TO 1979-11-19T07:04:00
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4S10319.FFD & 60S10319.FFD 1979-11-21T16:24:00 TO 1979-11-24T01:44:00
4S10320.FFD & 60S10320.FFD 1979-11-24T01:44:00 TO 1979-11-26T11:05:00
4S10321.FFD & 60S10321.FFD 1979-11-26T11:05:00 TO 1979-11-28T20:27:00
4S10322.FFD & 60S10322.FFD 1979-11-28T20:27:00 TO 1979-12-01T05:51:00
4S10323.FFD & 60S10323.FFD 1979-12-01T05:51:00 TO 1979-12-03T15:13:00
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4S10326.FFD & 60S10326.FFD 1979-12-08T09:51:00 TO 1979-12-10T19:12:00
4S10327.FFD & 60S10327.FFD 1979-12-10T19:12:00 TO 1979-12-13T04:36:00
4S10328.FFD & 60S10328.FFD 1979-12-13T04:36:00 TO 1979-12-15T14:01:00
4S10329.FFD & 60S10329.FFD 1979-12-15T14:01:00 TO 1979-12-17T23:22:00
4S10330.FFD & 60S10330.FFD 1979-12-17T23:22:00 TO 1979-12-20T08:40:00
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4S10345.FFD & 60S10345.FFD 1980-01-22T19:34:00 TO 1980-01-25T04:56:00
4S10346.FFD & 60S10346.FFD 1980-01-25T04:56:00 TO 1980-01-27T14:18:00
4S10347.FFD & 60S10347.FFD 1980-01-27T14:18:00 TO 1980-01-29T23:37:00
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```
 4S10349.FFD & 60S10349.FFD  1980-02-01T08:56:00 TO 1980-02-03T18:17:00
 4S10350.FFD & 60S10350.FFD  1980-02-03T18:17:00 TO 1980-02-06T03:42:00
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 4S10370.FFD & 60S10370.FFD  1980-03-22T13:49:00 TO 1980-03-24T23:10:00
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 4S10372.FFD & 60S10372.FFD  1980-03-27T08:31:00 TO 1980-03-29T17:54:00
 4S10373.FFD & 60S10373.FFD  1980-03-29T17:54:00 TO 1980-04-01T03:20:00
 4S10374.FFD & 60S10374.FFD  1980-04-01T03:20:00 TO 1980-04-03T12:46:00
 4S10375.FFD & 60S10375.FFD  1980-04-03T12:46:00 TO 1980-04-05T22:08:00
 4S10376.FFD & 60S10376.FFD  1980-04-05T22:08:00 TO 1980-04-08T07:28:00
 4S10377.FFD & 60S10377.FFD  1980-04-08T07:28:00 TO 1980-04-10T16:50:00
 4S10378.FFD & 60S10378.FFD  1980-04-10T16:50:00 TO 1980-04-13T02:13:00
 4S10379.FFD & 60S10379.FFD  1980-04-13T02:13:00 TO 1980-04-15T11:38:00
 4S10380.FFD & 60S10380.FFD  1980-04-15T11:38:00 TO 1980-04-17T21:02:00

PREV_LOG_VOL_COVERAGE: None

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REFERENCETYPE=$CCSDS1;

LABEL=CCSD3SF0000200000001;
REFERENCE="ERRATA.TXT";

LABEL=ATTACHED;
REFERENCE="FFHEADER.SFD";
REFERENCE="FFDATA.SFD";
REFERENCE="4SECOND.SFD";
REFERENCE="60SECOND.SFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/4S1/4S1*.FFH;
LABEL=NSSD3IF0006100000001;
REFERENCE="/4S1/4S1*.FFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/60S1/60S1*.FFH";
LABEL=NSSD3IF0006200000001;
REFERENCE="/60S1/60S1*.FFD";

LABEL=CCSD3SF0000200000001;
REFERENCE="/SOURCE/00README.TXT";
REFERENCE="/SOURCE/4S2ASC.COM";
REFERENCE="/SOURCE/4S2ASC.F";
REFERENCE="/SOURCE/4S2ASC.FOR";
REFERENCE="/SOURCE/60S2ASC.COM";
REFERENCE="/SOURCE/60S2ASC.F";
REFERENCE="/SOURCE/60S2ASC.FOR";
REFERENCE="/SOURCE/CONVERT.C";
REFERENCE="/SOURCE/CTIME.C";
REFERENCE="/SOURCE/CTIME.FOR";
REFERENCE="/SOURCE/MAKEFILE.";

/* EOF */
```

VOLDESC.SFD

CCSD3ZF0000100000001CCSD3VS00002markeraa

LOG_VOL_IDENT: USA_NASA_NSSD_IC1D_0010B
LOG_VOL_NSSDC_EXPT_ID: 77-I02A-04
LOG_VOL_INITIATION_DATE: 1994-08-11
LOG_VOL_CLOSING_DATE: 1995-03-16
LOG_VOL_CAPACITY: 1GB/Logical volume
LOG_VOL_FILE_STRUCTURE: Files-11

VOLUME_DIAMETER: 12 inches
VOLUME_DRIVE_MFGR_AND_MODEL: Optimem 1000
COMPUTER_MFGR: Digital Equipment Corporation
OPERATING_SYSTEM: MicroVMS 4.7
COMPUTER_SYSTEM: MicroVAX II
TRANSFER_SOFTWARE: SOAR Version 4.2

TECHNICAL_CONTACT: Harry Herbert
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
5833 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-9030
NSI=hherbert@igpp.ucla.edu
NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS: USA_NASA_NSSD_IC1D_0010A

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME: Averaged Fluxgate Magnetometer Data
DATA_SOURCES: International Sun-Earth Explorer 1 (ISEE-1)
and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT: Dr. Christopher Russell
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
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Los Angeles, CA 90025-1567
(310) 825-3188
NSI=ctrussel@igpp.ucla.edu
NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:
A. DESCRIPTION_OF_INSTRUMENT:
In this triaxial fluxgate magnetometer, three ring-core sensors in an

orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE OF THE INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA SET QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA PROCESSING OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA PROCESSING OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included 64-second averages of the 4-second data plus spacecraft spin rate, the zero levels that were applied to the data during processing, spacecraft position

and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds

since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1980-04-17T21:02:00 TO 1982-10-13T01:45:00

TYPE_OF_FILE_TIME_COVERAGE:
4-SECOND DATA 1980-04-17T21:02:00 TO 1982-10-13T01:45:00
60-SECOND DATA 1980-04-17T21:02:00 TO 1982-10-13T01:45:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG_VOL_FILE_TIME_COVERAGE:

4SI038I.FFD	&	60S10381.FFD	1980-04-17T21:02:00	TO	1980-04-20T06:23:00
4S10382.FFD	&	60S10382.FFD	1980-04-20T06:23:00	TO	1980-04-22T15:43:00
4S10383.FFD	&	60S10383.FFD	1980-04-22T15:43:00	TO	1980-04-25T01:05:00
4S10384.FFD	&	60S10384.FFD	1980-04-25T01:05:00	TO	1980-04-27T10:30:00
4S10385.FFD	&	60S10385.FFD	1980-04-27T10:30:00	TO	1980-04-29T19:56:00
4S10386.FFD	&	60S10386.FFD	1980-04-29T19:56:00	TO	1980-05-02T05:19:00
4S10387.FFD	&	60S10387.FFD	1980-05-02T05:19:00	TO	1980-05-04T14:39:00
4S10388.FFD	&	60S10388.FFD	1980-05-04T14:39:00	TO	1980-05-06T23:59:00
4S10389.FFD	&	60S10389.FFD	1980-05-06T23:59:00	TO	1980-05-09T09:21:00
4S10390.FFD	&	60S10390.FFD	1980-05-09T09:21:00	TO	1980-05-11T18:45:00
4S10391.FFD	&	60S10391.FFD	1980-05-11T18:45:00	TO	1980-05-14T04:08:00
4S10392.FFD	&	60S10392.FFD	1980-05-14T04:08:00	TO	1980-05-16T13:30:00
4S10393.FFD	&	60S10393.FFD	1980-05-16T13:30:00	TO	1980-05-18T22:49:00
4S10394.FFD	&	60S10394.FFD	1980-05-18T22:49:00	TO	1980-05-21T08:09:00
4S10395.FFD	&	60S10395.FFD	1980-05-21T08:09:00	TO	1980-05-23T17:32:00
4S10396.FFD	&	60S10396.FFD	1980-05-23T17:32:00	TO	1980-05-26T02:57:00
4S10397.FFD	&	60S10397.FFD	1980-05-26T02:57:00	TO	1980-05-28T12:21:00
4S10398.FFD	&	60S10398.FFD	1980-05-28T12:21:00	TO	1980-05-30T21:41:00
4S10399.FFD	&	60S10399.FFD	1980-05-30T21:41:00	TO	1980-06-02T07:00:00
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4S10401.FFD	&	60S10401.FFD	1980-06-04T16:20:00	TO	1980-06-07T01:42:00
4S10402.FFD	&	60S10402.FFD	1980-06-07T01:42:00	TO	1980-06-09T11:05:00
4S10403.FFD	&	60S10403.FFD	1980-06-09T11:05:00	TO	1980-06-11T20:27:00
4S10404.FFD	&	60S10404.FFD	1980-06-11T20:27:00	TO	1980-06-14T05:47:00
4S10405.FFD	&	60S10405.FFD	1980-06-14T05:47:00	TO	1980-06-16T15:05:00
4S10406.FFD	&	60S10406.FFD	1980-06-16T15:05:00	TO	1980-06-19T00:25:00
4S10407.FFD	&	60S10407.FFD	1980-06-19T00:25:00	TO	1980-06-21T09:49:00
4S10408.FFD	&	60S10408.FFD	1980-06-21T09:49:00	TO	1980-06-23T19:14:00

4S10409.FFD & 60S10409.FFD 1980-06-23T19:14:00 TO 1980-06-26T04:35:00
4S10410.FFD & 60S10410.FFD 1980-06-26T04:35:00 TO 1980-06-28T13:53:00
4S10411.FFD & 60S10411.FFD 1980-06-28T13:53:00 TO 1980-06-30T23:12:00
4S10412.FFD & 60S10412.FFD 1980-06-30T23:12:00 TO 1980-07-03T08:33:00
4S10413.FFD & 60S10413.FFD 1980-07-03T08:33:00 TO 1980-07-05T17:56:00
4S10414.FFD & 60S10414.FFD 1980-07-05T17:56:00 TO 1980-07-08T03:18:00
4S10415.FFD & 60S10415.FFD 1980-07-08T03:18:00 TO 1980-07-10T12:38:00
4S10416.FFD & 60S10416.FFD 1980-07-10T12:38:00 TO 1980-07-12T21:57:00
4S10417.FFD & 60S10417.FFD 1980-07-12T21:57:00 TO 1980-07-15T07:16:00
4S10418.FFD & 60S10418.FFD 1980-07-15T07:16:00 TO 1980-07-17T16:38:00
4S10419.FFD & 60S10419.FFD 1980-07-17T16:38:00 TO 1980-07-20T02:03:00
4S10420.FFD & 60S10420.FFD 1980-07-20T02:03:00 TO 1980-07-22T11:26:00
4S10421.FFD & 60S10421.FFD 1980-07-22T11:26:00 TO 1980-07-24T20:45:00
4S10422.FFD & 60S10422.FFD 1980-07-24T20:45:00 TO 1980-07-27T06:04:00
4S10423.FFD & 60S10423.FFD 1980-07-27T06:04:00 TO 1980-07-29T15:25:00
4S10424.FFD & 60S10424.FFD 1980-07-29T15:25:00 TO 1980-08-01T00:47:00
4S10425.FFD & 60S10425.FFD 1980-08-01T00:47:00 TO 1980-08-03T10:10:00
4S10426.FFD & 60S10426.FFD 1980-08-03T10:10:00 TO 1980-08-05T19:32:00
4S10427.FFD & 60S10427.FFD 1980-08-05T19:32:00 TO 1980-08-08T04:51:00
4S10428.FFD & 60S10428.FFD 1980-08-08T04:51:00 TO 1980-08-10T14:11:00
4S10429.FFD & 60S10429.FFD 1980-08-10T14:11:00 TO 1980-08-12T23:32:00
4S10430.FFD & 60S10430.FFD 1980-08-12T23:32:00 TO 1980-08-15T08:57:00
4S10431.FFD & 60S10431.FFD 1980-08-15T08:57:00 TO 1980-08-17T18:22:00
4S10432.FFD & 60S10432.FFD 1980-08-17T18:22:00 TO 1980-08-20T03:43:00
4S10433.FFD & 60S10433.FFD 1980-08-20T03:43:00 TO 1980-08-22T13:02:00
4S10434.FFD & 60S10434.FFD 1980-08-22T13:02:00 TO 1980-08-24T22:23:00
4S10435.FFD & 60S10435.FFD 1980-08-24T22:23:00 TO 1980-08-27T07:45:00
4S10436.FFD & 60S10436.FFD 1980-08-27T07:45:00 TO 1980-08-29T17:09:00
4S10437.FFD & 60S10437.FFD 1980-08-29T17:09:00 TO 1980-09-01T02:32:00
4S10438.FFD & 60S10438.FFD 1980-09-01T02:32:00 TO 1980-09-03T11:54:00
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4S10442.FFD & 60S10442.FFD 1980-09-10T15:59:00 TO 1980-09-13T01:25:00
4S10443.FFD & 60S10443.FFD 1980-09-13T01:25:00 TO 1980-09-15T10:49:00
4S10444.FFD & 60S10444.FFD 1980-09-15T10:49:00 TO 1980-09-17T20:09:00
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4S10454.FFD & 60S10454.FFD 1980-10-09T08:34:00 TO 1980-10-11T17:59:00
4S10455.FFD & 60S10455.FFD 1980-10-11T17:59:00 TO 1980-10-14T03:21:00
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4S10457.FFD & 60S10457.FFD 1980-10-16T12:41:00 TO 1980-10-18T22:03:00
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4S10463.FFD & 60S10463.FFD 1980-10-30T20:55:00 TO 1980-11-02T06:17:00
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4S10466.FFD & 60S10466.FFD 1980-11-07T01:07:00 TO 1980-11-09T10:30:00
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4S10468.FFD & 60S10468.FFD 1980-11-11T19:50:00 TO 1980-11-14T05:10:00
4S10469.FFD & 60S10469.FFD 1980-11-14T05:10:00 TO 1980-11-16T14:31:00
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4S10473.FFD & 60S10473.FFD 1980-11-23T18:40:00 TO 1980-11-26T03:59:00
4S10474.FFD & 60S10474.FFD 1980-11-26T03:59:00 TO 1980-11-28T13:18:00
4S10475.FFD & 60S10475.FFD 1980-11-28T13:18:00 TO 1980-11-30T22:41:00
4S10476.FFD & 60S10476.FFD 1980-11-30T22:41:00 TO 1980-12-03T08:06:00
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4S10478.FFD & 60S10478.FFD 1980-12-05T17:29:00 TO 1980-12-08T02:49:00
4S10479.FFD & 60S10479.FFD 1980-12-08T02:49:00 TO 1980-12-10T12:08:00
4S10480.FFD & 60S10480.FFD 1980-12-10T12:08:00 TO 1980-12-12T21:28:00
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4S10483.FFD & 60S10483.FFD 1980-12-17T16:12:00 TO 1980-12-20T01:34:00
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4S10487.FFD & 60S10487.FFD 1980-12-27T05:32:00 TO 1980-12-29T14:56:00
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4S10546.FFD & 60S10546.FFD 1981-05-17T06:11:00 TO 1981-05-19T15:33:00
4S10547.FFD & 60S10547.FFD 1981-05-19T15:33:00 TO 1981-05-22T00:53:00
4S10548.FFD & 60S10548.FFD 1981-05-22T00:53:00 TO 1981-05-24T10:13:00
4S10549.FFD & 60S10549.FFD 1981-05-24T10:13:00 TO 1981-05-26T19:34:00
4S10550.FFD & 60S10550.FFD 1981-05-26T19:34:00 TO 1981-05-29T04:56:00
4S10551.FFD & 60S10551.FFD 1981-05-29T04:56:00 TO 1981-05-31T14:19:00
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4S10556.FFD & 60S10556.FFD 1981-06-10T03:41:00 TO 1981-06-12T13:06:00
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4S10559.FFD & 60S10559.FFD 1981-06-17T07:48:00 TO 1981-06-19T17:07:00
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4S10561.FFD & 60S10561.FFD 1981-06-22T02:26:00 TO 1981-06-24T11:48:00
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4S10564.FFD & 60S10564.FFD 1981-06-29T06:32:00 TO 1981-07-01T15:52:00
4S10565.FFD & 60S10565.FFD 1981-07-01T15:52:00 TO 1981-07-04T01:10:00
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4S10567.FFD & 60S10567.FFD 1981-07-06T10:30:00 TO 1981-07-08T19:54:00
4S10568.FFD & 60S10568.FFD 1981-07-08T19:54:00 TO 1981-07-11T05:17:00

4S10569.FFD & 60S10569.FFD 1981-07-11T05:17:00 TO 1981-07-13T14:37:00
4S10570.FFD & 60S10570.FFD 1981-07-13T14:37:00 TO 1981-07-15T23:56:00
4S10571.FFD & 60S10571.FFD 1981-07-15T23:56:00 TO 1981-07-18T09:15:00
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4S10576.FFD & 60S10576.FFD 1981-07-27T22:41:00 TO 1981-07-30T08:00:00
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4S10587.FFD & 60S10587.FFD 1981-08-23T05:36:00 TO 1981-08-25T14:56:00
4S10588.FFD & 60S10588.FFD 1981-08-25T14:56:00 TO 1981-08-28T00:15:00
4S10589.FFD & 60S10589.FFD 1981-08-28T00:15:00 TO 1981-08-30T09:37:00
4S10590.FFD & 60S10590.FFD 1981-08-30T09:37:00 TO 1981-09-01T19:02:00
4S10591.FFD & 60S10591.FFD 1981-09-01T19:02:00 TO 1981-09-04T04:27:00
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4S10594.FFD & 60S10594.FFD 1981-09-08T23:08:00 TO 1981-09-11T08:29:00
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4S10597.FFD & 60S10597.FFD 1981-09-16T03:15:00 TO 1981-09-18T12:39:00
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4S10602.FFD & 60S10602.FFD 1981-09-28T02:06:00 TO 1981-09-30T11:32:00
4S10603.FFD & 60S10603.FFD 1981-09-30T11:32:00 TO 1981-10-02T20:55:00
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4S10605.FFD & 60S10605.FFD 1981-10-05T06:16:00 TO 1981-10-07T15:37:00
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4S10608.FFD & 60S10608.FFD 1981-10-12T10:23:00 TO 1981-10-14T19:47:00
4S10609.FFD & 60S10609.FFD 1981-10-14T19:47:00 TO 1981-10-17T05:10:00
4S10610.FFD & 60S10610.FFD 1981-10-17T05:10:00 TO 1981-10-19T14:31:00
4S10611.FFD & 60S10611.FFD 1981-10-19T14:31:00 TO 1981-10-21T23:51:00
4S10612.FFD & 60S10612.FFD 1981-10-21T23:51:00 TO 1981-10-24T09:14:00
4S10613.FFD & 60S10613.FFD 1981-10-24T09:14:00 TO 1981-10-26T18:40:00
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4S10615.FFD & 60S10615.FFD 1981-10-29T04:04:00 TO 1981-10-31T13:25:00
4S10616.FFD & 60S10616.FFD 1981-10-31T13:25:00 TO 1981-11-02T22:45:00
4S10617.FFD & 60S10617.FFD 1981-11-02T22:45:00 TO 1981-11-05T08:06:00
4S10618.FFD & 60S10618.FFD 1981-11-05T08:06:00 TO 1981-11-07T17:29:00
4S10619.FFD & 60S10619.FFD 1981-11-07T17:29:00 TO 1981-11-10T02:52:00
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LOG_VOL_CLOSING_DATE: 1995-03-16
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LOG_VOL_FILE_STRUCTURE: Files-11

VOLUME_DIAMETER: 12 inches
VOLUME_DRIVE_MFGR_AND_MODEL: Optimem 1000
COMPUTER_MFGR: Digital Equipment Corporation
OPERATING_SYSTEM: MicroVMS 4.7
COMPUTER_SYSTEM: MicroVAX II
TRANSFER_SOFTWARE: SOAR Version 4.2

TECHNICAL_CONTACT:
Harry Herbert
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
5833 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-9030
NSI=hherbert@igpp.ucla.edu
NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS:
USA_NASA_NSSD_IC1D_0010A
USA_NASA_NSSD_IC1D_0010B

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DATA_SET_NAME: Averaged Fluxgate Magnetometer Data
DATA_SOURCES: International Sun-Earth Explorer 1 (ISEE-1) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:
Dr. Christopher Russell
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
6871 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-3188
NSI=ctrussel@igpp.ucla.edu
NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:
A. DESCRIPTION_OF_INSTRUMENT:

In this triaxial fluxgate magnetometer, three ring-core sensors in an orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL_MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED_PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE_OF_THE_INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA_SET_QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA PROCESSING OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA_PROCESSING_OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included 64-second averages of the 4-second data plus spacecraft spin rate, the zero

levels that were applied to the data during processing, spacecraft position and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1982-10-13T01:45:00 TO 1985-04-08T06:46:00

TYPE_OF_FILE_TIME_COVERAGE:
4-SECOND DATA 1982-10-13T01:45:00 TO 1985-04-08T06:46:00
60-SECOND DATA 1982-10-13T01:45:00 TO 1985-04-08T06:46:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG_VOL_FILE_TIME_COVERAGE:

4S10761.FFD & 60S10761.FFD	1982-10-13T01:45:00 TO 1982-10-15T11:08:00
4S10762.FFD & 60S10762.FFD	1982-10-15T11:08:00 TO 1982-10-17T20:33:00
4S10763.FFD & 60S10763.FFD	1982-10-17T20:33:00 TO 1982-10-20T05:56:00
4S10764.FFD & 60S10764.FFD	1982-10-20T05:56:00 TO 1982-10-22T15:17:00
4S10765.FFD & 60S10765.FFD	1982-10-22T15:17:00 TO 1982-10-25T00:37:00
4S10766.FFD & 60S10766.FFD	1982-10-25T00:37:00 TO 1982-10-27T09:59:00
4S10767.FFD & 60S10767.FFD	1982-10-27T09:59:00 TO 1982-10-29T19:21:00
4S10768.FFD & 60S10768.FFD	1982-10-29T19:21:00 TO 1982-11-01T04:45:00
4S10769.FFD & 60S10769.FFD	1982-11-01T04:45:00 TO 1982-11-03T14:08:00
4S10770.FFD & 60S10770.FFD	1982-11-03T14:08:00 TO 1982-11-05T23:30:00
4S10771.FFD & 60S10771.FFD	1982-11-05T23:30:00 TO 1982-11-08T08:49:00
4S10772.FFD & 60S10772.FFD	1982-11-08T08:49:00 TO 1982-11-10T18:10:00
4S10773.FFD & 60S10773.FFD	1982-11-10T18:10:00 TO 1982-11-13T03:34:00
4S10774.FFD & 60S10774.FFD	1982-11-13T03:34:00 TO 1982-11-15T12:58:00
4S10775.FFD & 60S10775.FFD	1982-11-15T12:58:00 TO 1982-11-17T22:20:00
4S10776.FFD & 60S10776.FFD	1982-11-17T22:20:00 TO 1982-11-20T07:40:00
4S10777.FFD & 60S10777.FFD	1982-11-20T07:40:00 TO 1982-11-22T17:00:00
4S10778.FFD & 60S10778.FFD	1982-11-22T17:00:00 TO 1982-11-25T02:21:00
4S10779.FFD & 60S10779.FFD	1982-11-25T02:21:00 TO 1982-11-27T11:44:00
4S10780.FFD & 60S10780.FFD	1982-11-27T11:44:00 TO 1982-11-29T21:07:00
4S10781.FFD & 60S10781.FFD	1982-11-29T21:07:00 TO 1982-12-02T06:29:00
4S10782.FFD & 60S10782.FFD	1982-12-02T06:29:00 TO 1982-12-04T15:48:00
4S10783.FFD & 60S10783.FFD	1982-12-04T15:48:00 TO 1982-12-07T01:07:00
4S10784.FFD & 60S10784.FFD	1982-12-07T01:07:00 TO 1982-12-09T10:29:00
4S10785.FFD & 60S10785.FFD	1982-12-09T10:29:00 TO 1982-12-11T19:53:00
4S10786.FFD & 60S10786.FFD	1982-12-11T19:53:00 TO 1982-12-14T05:15:00
4S10787.FFD & 60S10787.FFD	1982-12-14T05:15:00 TO 1982-12-16T14:34:00

4S10788.FFD & 60S10788.FFD 1982-12-16T14:34:00 TO 1982-12-18T23:53:00
4S10789.FFD & 60S10789.FFD 1982-12-18T23:53:00 TO 1982-12-21T09:13:00
4S10790.FFD & 60S10790.FFD 1982-12-21T09:13:00 TO 1982-12-23T18:35:00
4S10791.FFD & 60S10791.FFD 1982-12-23T18:35:00 TO 1982-12-26T03:57:00
4S10792.FFD & 60S10792.FFD 1982-12-26T03:57:00 TO 1982-12-28T13:19:00
4S10793.FFD & 60S10793.FFD 1982-12-28T13:19:00 TO 1982-12-30T22:39:00
4S10794.FFD & 60S10794.FFD 1982-12-30T22:39:00 TO 1983-01-02T07:57:00
4S10795.FFD & 60S10795.FFD 1983-01-02T07:57:00 TO 1983-01-04T17:16:00
4S10796.FFD & 60S10796.FFD 1983-01-04T17:16:00 TO 1983-01-07T02:39:00
4S10797.FFD & 60S10797.FFD 1983-01-07T02:39:00 TO 1983-01-09T12:02:00
4S10798.FFD & 60S10798.FFD 1983-01-09T12:02:00 TO 1983-01-11T21:21:00
4S10799.FFD & 60S10799.FFD 1983-01-11T21:21:00 TO 1983-01-14T06:40:00
4S10800.FFD & 60S10800.FFD 1983-01-14T06:40:00 TO 1983-01-16T15:59:00
4S10801.FFD & 60S10801.FFD 1983-01-16T15:59:00 TO 1983-01-19T01:19:00
4S10802.FFD & 60S10802.FFD 1983-01-19T01:19:00 TO 1983-01-21T10:41:00
4S10803.FFD & 60S10803.FFD 1983-01-21T10:41:00 TO 1983-01-23T20:02:00
4S10804.FFD & 60S10804.FFD 1983-01-23T20:02:00 TO 1983-01-26T05:23:00
4S10805.FFD & 60S10805.FFD 1983-01-26T05:23:00 TO 1983-01-28T14:42:00
4S10806.FFD & 60S10806.FFD 1983-01-28T14:42:00 TO 1983-01-31T00:00:00
4S10807.FFD & 60S10807.FFD 1983-01-31T00:00:00 TO 1983-02-02T09:22:00
4S10808.FFD & 60S10808.FFD 1983-02-02T09:22:00 TO 1983-02-04T18:45:00
4S10809.FFD & 60S10809.FFD 1983-02-04T18:45:00 TO 1983-02-07T04:06:00
4S10810.FFD & 60S10810.FFD 1983-02-07T04:06:00 TO 1983-02-09T13:25:00
4S10811.FFD & 60S10811.FFD 1983-02-09T13:25:00 TO 1983-02-11T22:44:00
4S10812.FFD & 60S10812.FFD 1983-02-11T22:44:00 TO 1983-02-14T08:05:00
4S10813.FFD & 60S10813.FFD 1983-02-14T08:05:00 TO 1983-02-16T17:26:00
4S10814.FFD & 60S10814.FFD 1983-02-16T17:26:00 TO 1983-02-19T02:48:00
4S10815.FFD & 60S10815.FFD 1983-02-19T02:48:00 TO 1983-02-21T12:10:00
4S10816.FFD & 60S10816.FFD 1983-02-21T12:10:00 TO 1983-02-23T21:31:00
4S10817.FFD & 60S10817.FFD 1983-02-23T21:31:00 TO 1983-02-26T06:49:00
4S10818.FFD & 60S10818.FFD 1983-02-26T06:49:00 TO 1983-02-28T16:09:00
4S10819.FFD & 60S10819.FFD 1983-02-28T16:09:00 TO 1983-03-03T01:33:00
4S10820.FFD & 60S10820.FFD 1983-03-03T01:33:00 TO 1983-03-05T10:57:00
4S10821.FFD & 60S10821.FFD 1983-03-05T10:57:00 TO 1983-03-07T20:17:00
4S10822.FFD & 60S10822.FFD 1983-03-07T20:17:00 TO 1983-03-10T05:37:00
4S10823.FFD & 60S10823.FFD 1983-03-10T05:37:00 TO 1983-03-12T14:57:00
4S10824.FFD & 60S10824.FFD 1983-03-12T14:57:00 TO 1983-03-15T00:19:00
4S10825.FFD & 60S10825.FFD 1983-03-15T00:19:00 TO 1983-03-17T09:42:00
4S10826.FFD & 60S10826.FFD 1983-03-17T09:42:00 TO 1983-03-19T19:05:00
4S10827.FFD & 60S10827.FFD 1983-03-19T19:05:00 TO 1983-03-22T04:27:00
4S10828.FFD & 60S10828.FFD 1983-03-22T04:27:00 TO 1983-03-24T13:47:00
4S10829.FFD & 60S10829.FFD 1983-03-24T13:47:00 TO 1983-03-26T23:07:00
4S10830.FFD & 60S10830.FFD 1983-03-26T23:07:00 TO 1983-03-29T08:30:00
4S10831.FFD & 60S10831.FFD 1983-03-29T08:30:00 TO 1983-03-31T17:55:00
4S10832.FFD & 60S10832.FFD 1983-03-31T17:55:00 TO 1983-04-03T03:18:00
4S10833.FFD & 60S10833.FFD 1983-04-03T03:18:00 TO 1983-04-05T12:38:00
4S10834.FFD & 60S10834.FFD 1983-04-05T12:38:00 TO 1983-04-07T21:59:00
4S10835.FFD & 60S10835.FFD 1983-04-07T21:59:00 TO 1983-04-10T07:20:00
4S10836.FFD & 60S10836.FFD 1983-04-10T07:20:00 TO 1983-04-12T16:43:00
4S10837.FFD & 60S10837.FFD 1983-04-12T16:43:00 TO 1983-04-15T02:07:00
4S10838.FFD & 60S10838.FFD 1983-04-15T02:07:00 TO 1983-04-17T11:30:00
4S10839.FFD & 60S10839.FFD 1983-04-17T11:30:00 TO 1983-04-19T20:51:00
4S10840.FFD & 60S10840.FFD 1983-04-19T20:51:00 TO 1983-04-22T06:11:00
4S10841.FFD & 60S10841.FFD 1983-04-22T06:11:00 TO 1983-04-24T15:32:00
4S10842.FFD & 60S10842.FFD 1983-04-24T15:32:00 TO 1983-04-27T00:58:00
4S10843.FFD & 60S10843.FFD 1983-04-27T00:58:00 TO 1983-04-29T10:22:00
4S10844.FFD & 60S10844.FFD 1983-04-29T10:22:00 TO 1983-05-01T19:43:00
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4S10846.FFD & 60S10846.FFD 1983-05-04T05:04:00 TO 1983-05-06T14:25:00
4S10847.FFD & 60S10847.FFD 1983-05-06T14:25:00 TO 1983-05-08T23:47:00
4S10848.FFD & 60S10848.FFD 1983-05-08T23:47:00 TO 1983-05-11T09:10:00
4S10849.FFD & 60S10849.FFD 1983-05-11T09:10:00 TO 1983-05-13T18:34:00
4S10850.FFD & 60S10850.FFD 1983-05-13T18:34:00 TO 1983-05-16T03:56:00
4S10851.FFD & 60S10851.FFD 1983-05-16T03:56:00 TO 1983-05-18T13:16:00
4S10852.FFD & 60S10852.FFD 1983-05-18T13:16:00 TO 1983-05-20T22:36:00
4S10853.FFD & 60S10853.FFD 1983-05-20T22:36:00 TO 1983-05-23T07:59:00
4S10854.FFD & 60S10854.FFD 1983-05-23T07:59:00 TO 1983-05-25T17:24:00
4S10855.FFD & 60S10855.FFD 1983-05-25T17:24:00 TO 1983-05-28T02:46:00
4S10856.FFD & 60S10856.FFD 1983-05-28T02:46:00 TO 1983-05-30T12:06:00
4S10857.FFD & 60S10857.FFD 1983-05-30T12:06:00 TO 1983-06-01T21:26:00
4S10858.FFD & 60S10858.FFD 1983-06-01T21:26:00 TO 1983-06-04T06:47:00
4S10859.FFD & 60S10859.FFD 1983-06-04T06:47:00 TO 1983-06-06T16:09:00
4S10860.FFD & 60S10860.FFD 1983-06-06T16:09:00 TO 1983-06-09T01:32:00
4S10861.FFD & 60S10861.FFD 1983-06-09T01:32:00 TO 1983-06-11T10:54:00
4S10862.FFD & 60S10862.FFD 1983-06-11T10:54:00 TO 1983-06-13T20:15:00
4S10863.FFD & 60S10863.FFD 1983-06-13T20:15:00 TO 1983-06-16T05:33:00
4S10864.FFD & 60S10864.FFD 1983-06-16T05:33:00 TO 1983-06-18T14:54:00
4S10865.FFD & 60S10865.FFD 1983-06-18T14:54:00 TO 1983-06-21T00:18:00
4S10866.FFD & 60S10866.FFD 1983-06-21T00:18:00 TO 1983-06-23T09:41:00
4S10867.FFD & 60S10867.FFD 1983-06-23T09:41:00 TO 1983-06-25T19:01:00

4S10868.FFD & 60S10868.FFD 1983-06-25T19:01:00 TO 1983-06-28T04:20:00
4S10869.FFD & 60S10869.FFD 1983-06-28T04:20:00 TO 1983-06-30T13:40:00
4S10870.FFD & 60S10870.FFD 1983-06-30T13:40:00 TO 1983-07-02T23:01:00
4S10871.FFD & 60S10871.FFD 1983-07-02T23:01:00 TO 1983-07-05T08:23:00
4S10872.FFD & 60S10872.FFD 1983-07-05T08:23:00 TO 1983-07-07T17:45:00
4S10873.FFD & 60S10873.FFD 1983-07-07T17:45:00 TO 1983-07-10T03:06:00
4S10874.FFD & 60S10874.FFD 1983-07-10T03:06:00 TO 1983-07-12T12:24:00
4S10875.FFD & 60S10875.FFD 1983-07-12T12:24:00 TO 1983-07-14T21:43:00
4S10876.FFD & 60S10876.FFD 1983-07-14T21:43:00 TO 1983-07-17T07:06:00
4S10877.FFD & 60S10877.FFD 1983-07-17T07:06:00 TO 1983-07-19T16:30:00
4S10878.FFD & 60S10878.FFD 1983-07-19T16:30:00 TO 1983-07-22T01:50:00
4S10879.FFD & 60S10879.FFD 1983-07-22T01:50:00 TO 1983-07-24T11:09:00
4S10880.FFD & 60S10880.FFD 1983-07-24T11:09:00 TO 1983-07-26T20:28:00
4S10881.FFD & 60S10881.FFD 1983-07-26T20:28:00 TO 1983-07-29T05:48:00
4S10882.FFD & 60S10882.FFD 1983-07-29T05:48:00 TO 1983-07-31T15:09:00
4S10883.FFD & 60S10883.FFD 1983-07-31T15:09:00 TO 1983-08-03T00:31:00
4S10884.FFD & 60S10884.FFD 1983-08-03T00:31:00 TO 1983-08-05T09:53:00
4S10885.FFD & 60S10885.FFD 1983-08-05T09:53:00 TO 1983-08-07T19:12:00
4S10886.FFD & 60S10886.FFD 1983-08-07T19:12:00 TO 1983-08-10T04:30:00
4S10887.FFD & 60S10887.FFD 1983-08-10T04:30:00 TO 1983-08-12T13:51:00
4S10888.FFD & 60S10888.FFD 1983-08-12T13:51:00 TO 1983-08-14T23:16:00
4S10889.FFD & 60S10889.FFD 1983-08-14T23:16:00 TO 1983-08-17T08:38:00
4S10890.FFD & 60S10890.FFD 1983-08-17T08:38:00 TO 1983-08-19T17:57:00
4S10891.FFD & 60S10891.FFD 1983-08-19T17:57:00 TO 1983-08-22T03:16:00
4S10892.FFD & 60S10892.FFD 1983-08-22T03:16:00 TO 1983-08-24T12:36:00
4S10893.FFD & 60S10893.FFD 1983-08-24T12:36:00 TO 1983-08-26T21:58:00
4S10894.FFD & 60S10894.FFD 1983-08-26T21:58:00 TO 1983-08-29T07:20:00
4S10895.FFD & 60S10895.FFD 1983-08-29T07:20:00 TO 1983-08-31T16:42:00
4S10896.FFD & 60S10896.FFD 1983-08-31T16:42:00 TO 1983-09-03T02:03:00
4S10897.FFD & 60S10897.FFD 1983-09-03T02:03:00 TO 1983-09-05T11:22:00
4S10898.FFD & 60S10898.FFD 1983-09-05T11:22:00 TO 1983-09-07T20:42:00
4S10899.FFD & 60S10899.FFD 1983-09-07T20:42:00 TO 1983-09-10T06:06:00
4S10900.FFD & 60S10900.FFD 1983-09-10T06:06:00 TO 1983-09-12T15:31:00
4S10901.FFD & 60S10901.FFD 1983-09-12T15:31:00 TO 1983-09-15T00:52:00
4S10902.FFD & 60S10902.FFD 1983-09-15T00:52:00 TO 1983-09-17T10:11:00
4S10903.FFD & 60S10903.FFD 1983-09-17T10:11:00 TO 1983-09-19T19:32:00
4S10904.FFD & 60S10904.FFD 1983-09-19T19:32:00 TO 1983-09-22T04:53:00
4S10905.FFD & 60S10905.FFD 1983-09-22T04:53:00 TO 1983-09-24T14:16:00
4S10906.FFD & 60S10906.FFD 1983-09-24T14:16:00 TO 1983-09-26T23:40:00
4S10907.FFD & 60S10907.FFD 1983-09-26T23:40:00 TO 1983-09-29T09:02:00
4S10908.FFD & 60S10908.FFD 1983-09-29T09:02:00 TO 1983-10-01T18:23:00
4S10909.FFD & 60S10909.FFD 1983-10-01T18:23:00 TO 1983-10-04T03:42:00
4S10910.FFD & 60S10910.FFD 1983-10-04T03:42:00 TO 1983-10-06T13:05:00
4S10911.FFD & 60S10911.FFD 1983-10-06T13:05:00 TO 1983-10-08T22:32:00
4S10912.FFD & 60S10912.FFD 1983-10-08T22:32:00 TO 1983-10-11T07:55:00
4S10913.FFD & 60S10913.FFD 1983-10-11T07:55:00 TO 1983-10-13T17:16:00
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 4S11118.FFD & 60S11118.FFD  1985-02-12T07:24:00 TO 1985-02-14T16:46:00
 4S11119.FFD & 60S11119.FFD  1985-02-14T16:46:00 TO 1985-02-17T02:05:00
 4S11120.FFD & 60S11120.FFD  1985-02-17T02:05:00 TO 1985-02-19T11:24:00
 4S11121.FFD & 60S11121.FFD  1985-02-19T11:24:00 TO 1985-02-21T20:45:00
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 4S11123.FFD & 60S11123.FFD  1985-02-24T06:07:00 TO 1985-02-26T15:29:00
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 4S11125.FFD & 60S11125.FFD  1985-03-01T00:51:00 TO 1985-03-03T10:12:00
 4S11126.FFD & 60S11126.FFD  1985-03-03T10:12:00 TO 1985-03-05T19:31:00
 4S11127.FFD & 60S11127.FFD  1985-03-05T19:31:00 TO 1985-03-08T04:51:00
 4S11128.FFD & 60S11128.FFD  1985-03-08T04:51:00 TO 1985-03-10T14:16:00
 4S11129.FFD & 60S11129.FFD  1985-03-10T14:16:00 TO 1985-03-12T23:42:00
 4S11130.FFD & 60S11130.FFD  1985-03-12T23:42:00 TO 1985-03-15T09:03:00
 4S11131.FFD & 60S11131.FFD  1985-03-15T09:03:00 TO 1985-03-17T18:22:00
 4S11132.FFD & 60S11132.FFD  1985-03-17T18:22:00 TO 1985-03-20T03:43:00
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 4S11134.FFD & 60S11134.FFD  1985-03-22T13:05:00 TO 1985-03-24T22:28:00
 4S11135.FFD & 60S11135.FFD  1985-03-24T22:28:00 TO 1985-03-27T07:52:00
 4S11136.FFD & 60S11136.FFD  1985-03-27T07:52:00 TO 1985-03-29T17:14:00
 4S11137.FFD & 60S11137.FFD  1985-03-29T17:14:00 TO 1985-04-01T02:35:00
 4S11138.FFD & 60S11138.FFD  1985-04-01T02:35:00 TO 1985-04-03T11:54:00
 4S11139.FFD & 60S11139.FFD  1985-04-03T11:54:00 TO 1985-04-05T21:17:00
 4S11140.FFD & 60S11140.FFD  1985-04-05T21:17:00 TO 1985-04-08T06:46:00

PREV_LOG_VOL_COVERAGE: 1980-04-17T21:02:00 TO 1982-10-13T01:45:00

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LABEL=ATTACHED;
REFERENCE="FFHEADER.SFD";
REFERENCE="FFDATA.SFD";
REFERENCE="4SECOND.SFD";
REFERENCE="60SECOND.SFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/4S1/4S1*.FFH;
LABEL=NSSD3IF0006100000001;
REFERENCE="/4S1/4S1*.FFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/60S1/60S1*.FFH";
LABEL=NSSD3IF0006200000001;
REFERENCE="/60S1/60S1*.FFD";

LABEL=CCSD3SF0000200000001;
REFERENCE="/SOURCE/00README.TXT";
REFERENCE="/SOURCE/4S2ASC.COM";
REFERENCE="/SOURCE/4S2ASC.F";
REFERENCE="/SOURCE/4S2ASC.FOR";
REFERENCE="/SOURCE/60S2ASC.COM";
REFERENCE="/SOURCE/60S2ASC.F";
REFERENCE="/SOURCE/60S2ASC.FOR";
REFERENCE="/SOURCE/CONVERT.C";
REFERENCE="/SOURCE/CTIME.C";
REFERENCE="/SOURCE/CTIME.FOR";
REFERENCE="/SOURCE/MAKEFILE.";

/* EOF */
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CCSD3ZF0000100000001CCSD3VS00002markeraa

LOG_VOL_IDENT:	USA_NASA_NSSD_IC1D_0011B
LOG_VOL_NSSDC_EXPT_ID:	77-102A-04
LOG_VOL_INITIATION_DATE:	1994-09-23
LOG_VOL_CLOSING_DATE:	1995-03-16
LOG_VOL_CAPACITY:	1GB/Logical volume
LOG_VOL_FILE_STRUCTURE:	Files-11
VOLUME_DIAMETER:	12 inches
VOLUME_DRIVE_MFGR_AND_MODEL:	Optimem 1000
COMPUTER_MFGR:	Digital Equipment Corporation
OPERATING_SYSTEM:	MicroVMS 4.7
COMPUTER_SYSTEM:	MicroVAX II
TRANSFER_SOFTWARE:	SOAR Version 4.2

VOLDESC.SFD

TECHNICAL_CONTACT:

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NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS:

USA_NASA_NSSD_IC1D_0010A
USA_NASA_NSSD_IC1D_0010B
USA_NASA_NSSD_IC1D_0011A

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME:	Averaged Fluxgate Magnetometer Data
DATA_SOURCES:	International Sun-Earth Explorer 1 (ISEE-1) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:

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NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:

A. DESCRIPTION_OF_INSTRUMENT:
In this triaxial fluxgate magnetometer, three ring-core sensors in an orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL_MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED_PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE_OF_THE_INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA_SET_QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA_PROCESSING_OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA_PROCESSING_OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included

64-second averages of the 4-second data plus spacecraft spin rate, the zero levels that were applied to the data during processing, spacecraft position and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1985-04-08T06:46:00 TO 1987-09-26T06:38:00

TYPE OF FILE TIME COVERAGE:
4-SECOND DATA 1985-04-08T06:46:00 TO 1987-09-26T06:38:00
60-SECOND DATA 1985-04-08T06:46:00 TO 1987-09-26T06:38:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG VOL FILE TIME COVERAGE:

4S11141.FFD	&	60S11141.FFD	1985-04-08T06:46:00 TO 1985-04-10T16:10:00
4S11142.FFD	&	60S11142.FFD	1985-04-10T16:10:00 TO 1985-04-13T01:30:00
4S11143.FFD	&	60S11143.FFD	1985-04-13T01:30:00 TO 1985-04-15T10:51:00
4S11144.FFD	&	60S11144.FFD	1985-04-15T10:51:00 TO 1985-04-17T20:13:00
4S11145.FFD	&	60S11145.FFD	1985-04-17T20:13:00 TO 1985-04-20T05:37:00
4S11146.FFD	&	60S11146.FFD	1985-04-20T05:37:00 TO 1985-04-22T15:00:00
4S11147.FFD	&	60S11147.FFD	1985-04-22T15:00:00 TO 1985-04-25T00:24:00
4S11148.FFD	&	60S11148.FFD	1985-04-25T00:24:00 TO 1985-04-27T09:46:00
4S11149.FFD	&	60S11149.FFD	1985-04-27T09:46:00 TO 1985-04-29T19:06:00
4S11150.FFD	&	60S11150.FFD	1985-04-29T19:06:00 TO 1985-05-02T04:27:00
4S11151.FFD	&	60S11151.FFD	1985-05-02T04:27:00 TO 1985-05-04T13:54:00
4S11152.FFD	&	60S11152.FFD	1985-05-04T13:54:00 TO 1985-05-06T23:21:00
4S11153.FFD	&	60S11153.FFD	1985-05-06T23:21:00 TO 1985-05-09T08:43:00
4S11154.FFD	&	60S11154.FFD	1985-05-09T08:43:00 TO 1985-05-11T18:03:00
4S11155.FFD	&	60S11155.FFD	1985-05-11T18:03:00 TO 1985-05-14T03:25:00
4S11156.FFD	&	60S11156.FFD	1985-05-14T03:25:00 TO 1985-05-16T12:48:00
4S11157.FFD	&	60S11157.FFD	1985-05-16T12:48:00 TO 1985-05-18T22:12:00
4S11158.FFD	&	60S11158.FFD	1985-05-18T22:12:00 TO 1985-05-21T07:35:00
4S11159.FFD	&	60S11159.FFD	1985-05-21T07:35:00 TO 1985-05-23T16:57:00
4S11160.FFD	&	60S11160.FFD	1985-05-23T16:57:00 TO 1985-05-26T02:18:00
4S11161.FFD	&	60S11161.FFD	1985-05-26T02:18:00 TO 1985-05-28T11:38:00
4S11162.FFD	&	60S11162.FFD	1985-05-28T11:38:00 TO 1985-05-30T21:01:00
4S11163.FFD	&	60S11163.FFD	1985-05-30T21:01:00 TO 1985-06-02T06:30:00
4S11164.FFD	&	60S11164.FFD	1985-06-02T06:30:00 TO 1985-06-04T15:53:00
4S11165.FFD	&	60S11165.FFD	1985-06-04T15:53:00 TO 1985-06-07T01:12:00
4S11166.FFD	&	60S11166.FFD	1985-06-07T01:12:00 TO 1985-06-09T10:33:00

4S11167.FFD & 60S11167.FFD 1985-06-09T10:33:00 TO 1985-06-11T19:55:00
4S11168.FFD & 60S11168.FFD 1985-06-11T19:55:00 TO 1985-06-14T05:18:00
4S11169.FFD & 60S11169.FFD 1985-06-14T05:18:00 TO 1985-06-16T14:41:00
4S11170.FFD & 60S11170.FFD 1985-06-16T14:41:00 TO 1985-06-19T00:03:00
4S11171.FFD & 60S11171.FFD 1985-06-19T00:03:00 TO 1985-06-21T09:23:00
4S11172.FFD & 60S11172.FFD 1985-06-21T09:23:00 TO 1985-06-23T18:43:00
4S11173.FFD & 60S11173.FFD 1985-06-23T18:43:00 TO 1985-06-26T04:03:00
4S11174.FFD & 60S11174.FFD 1985-06-26T04:03:00 TO 1985-06-28T13:29:00
4S11175.FFD & 60S11175.FFD 1985-06-28T13:29:00 TO 1985-06-30T22:54:00
4S11176.FFD & 60S11176.FFD 1985-06-30T22:54:00 TO 1985-07-03T08:14:00
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4S11178.FFD & 60S11178.FFD 1985-07-05T17:33:00 TO 1985-07-08T02:53:00
4S11179.FFD & 60S11179.FFD 1985-07-08T02:53:00 TO 1985-07-10T12:15:00
4S11180.FFD & 60S11180.FFD 1985-07-10T12:15:00 TO 1985-07-12T21:37:00
4S11181.FFD & 60S11181.FFD 1985-07-12T21:37:00 TO 1985-07-15T06:59:00
4S11182.FFD & 60S11182.FFD 1985-07-15T06:59:00 TO 1985-07-17T16:20:00
4S11183.FFD & 60S11183.FFD 1985-07-17T16:20:00 TO 1985-07-20T01:39:00
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4S11186.FFD & 60S11186.FFD 1985-07-24T20:21:00 TO 1985-07-27T05:47:00
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4S11189.FFD & 60S11189.FFD 1985-08-01T00:26:00 TO 1985-08-03T09:46:00
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4S11195.FFD & 60S11195.FFD 1985-08-15T08:31:00 TO 1985-08-17T17:50:00
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4S11197.FFD & 60S11197.FFD 1985-08-20T03:10:00 TO 1985-08-22T12:37:00
4S11198.FFD & 60S11198.FFD 1985-08-22T12:37:00 TO 1985-08-24T22:00:00
4S11199.FFD & 60S11199.FFD 1985-08-24T22:00:00 TO 1985-08-27T07:19:00
4S11200.FFD & 60S11200.FFD 1985-08-27T07:19:00 TO 1985-08-29T16:38:00
4S11201.FFD & 60S11201.FFD 1985-08-29T16:38:00 TO 1985-09-01T01:59:00
4S11202.FFD & 60S11202.FFD 1985-09-01T01:59:00 TO 1985-09-03T11:21:00
4S11203.FFD & 60S11203.FFD 1985-09-03T11:21:00 TO 1985-09-05T20:43:00
4S11204.FFD & 60S11204.FFD 1985-09-05T20:43:00 TO 1985-09-08T06:05:00
4S11205.FFD & 60S11205.FFD 1985-09-08T06:05:00 TO 1985-09-10T15:26:00
4S11206.FFD & 60S11206.FFD 1985-09-10T15:26:00 TO 1985-09-13T00:46:00
4S11207.FFD & 60S11207.FFD 1985-09-13T00:46:00 TO 1985-09-15T10:05:00
4S11208.FFD & 60S11208.FFD 1985-09-15T10:05:00 TO 1985-09-17T19:30:00
4S11209.FFD & 60S11209.FFD 1985-09-17T19:30:00 TO 1985-09-20T04:57:00
4S11210.FFD & 60S11210.FFD 1985-09-20T04:57:00 TO 1985-09-22T14:18:00
4S11211.FFD & 60S11211.FFD 1985-09-22T14:18:00 TO 1985-09-24T23:37:00
4S11212.FFD & 60S11212.FFD 1985-09-24T23:37:00 TO 1985-09-27T08:58:00
4S11213.FFD & 60S11213.FFD 1985-09-27T08:58:00 TO 1985-09-29T18:21:00
4S11214.FFD & 60S11214.FFD 1985-09-29T18:21:00 TO 1985-10-02T03:44:00
4S11215.FFD & 60S11215.FFD 1985-10-02T03:44:00 TO 1985-10-04T13:07:00
4S11216.FFD & 60S11216.FFD 1985-10-04T13:07:00 TO 1985-10-06T22:29:00
4S11217.FFD & 60S11217.FFD 1985-10-06T22:29:00 TO 1985-10-09T07:50:00
4S11218.FFD & 60S11218.FFD 1985-10-09T07:50:00 TO 1985-10-11T17:10:00
4S11219.FFD & 60S11219.FFD 1985-10-11T17:10:00 TO 1985-10-14T02:33:00
4S11220.FFD & 60S11220.FFD 1985-10-14T02:33:00 TO 1985-10-16T12:01:00
4S11221.FFD & 60S11221.FFD 1985-10-16T12:01:00 TO 1985-10-18T21:25:00
4S11222.FFD & 60S11222.FFD 1985-10-18T21:25:00 TO 1985-10-21T06:46:00
4S11223.FFD & 60S11223.FFD 1985-10-21T06:46:00 TO 1985-10-23T16:07:00
4S11224.FFD & 60S11224.FFD 1985-10-23T16:07:00 TO 1985-10-26T01:29:00
4S11225.FFD & 60S11225.FFD 1985-10-26T01:29:00 TO 1985-10-28T10:52:00
4S11226.FFD & 60S11226.FFD 1985-10-28T10:52:00 TO 1985-10-30T20:16:00
4S11227.FFD & 60S11227.FFD 1985-10-30T20:16:00 TO 1985-11-02T05:40:00
4S11228.FFD & 60S11228.FFD 1985-11-02T05:40:00 TO 1985-11-04T15:02:00
4S11229.FFD & 60S11229.FFD 1985-11-04T15:02:00 TO 1985-11-07T00:22:00
4S11230.FFD & 60S11230.FFD 1985-11-07T00:22:00 TO 1985-11-09T09:43:00
4S11231.FFD & 60S11231.FFD 1985-11-09T09:43:00 TO 1985-11-11T19:09:00
4S11232.FFD & 60S11232.FFD 1985-11-11T19:09:00 TO 1985-11-14T04:37:00
4S11233.FFD & 60S11233.FFD 1985-11-14T04:37:00 TO 1985-11-16T13:58:00
4S11234.FFD & 60S11234.FFD 1985-11-16T13:58:00 TO 1985-11-18T23:19:00
4S11235.FFD & 60S11235.FFD 1985-11-18T23:19:00 TO 1985-11-21T08:40:00
4S11236.FFD & 60S11236.FFD 1985-11-21T08:40:00 TO 1985-11-23T18:03:00
4S11237.FFD & 60S11237.FFD 1985-11-23T18:03:00 TO 1985-11-26T03:27:00
4S11238.FFD & 60S11238.FFD 1985-11-26T03:27:00 TO 1985-11-28T12:50:00
4S11239.FFD & 60S11239.FFD 1985-11-28T12:50:00 TO 1985-11-30T22:13:00
4S11240.FFD & 60S11240.FFD 1985-11-30T22:13:00 TO 1985-12-03T07:34:00
4S11241.FFD & 60S11241.FFD 1985-12-03T07:34:00 TO 1985-12-05T16:54:00
4S11242.FFD & 60S11242.FFD 1985-12-05T16:54:00 TO 1985-12-08T02:16:00
4S11243.FFD & 60S11243.FFD 1985-12-08T02:16:00 TO 1985-12-10T11:44:00
4S11244.FFD & 60S11244.FFD 1985-12-10T11:44:00 TO 1985-12-12T21:07:00
4S11245.FFD & 60S11245.FFD 1985-12-12T21:07:00 TO 1985-12-15T06:27:00
4S11246.FFD & 60S11246.FFD 1985-12-15T06:27:00 TO 1985-12-17T15:47:00

4S11247.FFD & 60S11247.FFD 1985-12-17T15:47:00 TO 1985-12-20T01:09:00
4S11248.FFD & 60S11248.FFD 1985-12-20T01:09:00 TO 1985-12-22T10:31:00
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4S11250.FFD & 60S11250.FFD 1985-12-24T19:54:00 TO 1985-12-27T05:16:00
4S11251.FFD & 60S11251.FFD 1985-12-27T05:16:00 TO 1985-12-29T14:36:00
4S11252.FFD & 60S11252.FFD 1985-12-29T14:36:00 TO 1985-12-31T23:55:00
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4S11254.FFD & 60S11254.FFD 1986-01-03T09:15:00 TO 1986-01-05T18:40:00
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4S11256.FFD & 60S11256.FFD 1986-01-08T04:05:00 TO 1986-01-10T13:25:00
4S11257.FFD & 60S11257.FFD 1986-01-10T13:25:00 TO 1986-01-12T22:44:00
4S11258.FFD & 60S11258.FFD 1986-01-12T22:44:00 TO 1986-01-15T08:04:00
4S11259.FFD & 60S11259.FFD 1986-01-15T08:04:00 TO 1986-01-17T17:26:00
4S11260.FFD & 60S11260.FFD 1986-01-17T17:26:00 TO 1986-01-20T02:47:00
4S11261.FFD & 60S11261.FFD 1986-01-20T02:47:00 TO 1986-01-22T12:09:00
4S11262.FFD & 60S11262.FFD 1986-01-22T12:09:00 TO 1986-01-24T21:30:00
4S11263.FFD & 60S11263.FFD 1986-01-24T21:30:00 TO 1986-01-27T06:49:00
4S11264.FFD & 60S11264.FFD 1986-01-27T06:49:00 TO 1986-01-29T16:07:00
4S11265.FFD & 60S11265.FFD 1986-01-29T16:07:00 TO 1986-02-01T01:29:00
4S11266.FFD & 60S11266.FFD 1986-02-01T01:29:00 TO 1986-02-03T10:55:00
4S11267.FFD & 60S11267.FFD 1986-02-03T10:55:00 TO 1986-02-05T20:16:00
4S11268.FFD & 60S11268.FFD 1986-02-05T20:16:00 TO 1986-02-08T05:35:00
4S11269.FFD & 60S11269.FFD 1986-02-08T05:35:00 TO 1986-02-10T14:54:00
4S11270.FFD & 60S11270.FFD 1986-02-10T14:54:00 TO 1986-02-13T00:15:00
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4S11273.FFD & 60S11273.FFD 1986-02-17T18:59:00 TO 1986-02-20T04:20:00
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4S11276.FFD & 60S11276.FFD 1986-02-24T22:58:00 TO 1986-02-27T08:18:00
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4S11278.FFD & 60S11278.FFD 1986-03-01T17:44:00 TO 1986-03-04T03:08:00
4S11279.FFD & 60S11279.FFD 1986-03-04T03:08:00 TO 1986-03-06T12:28:00
4S11280.FFD & 60S11280.FFD 1986-03-06T12:28:00 TO 1986-03-08T21:47:00
4S11281.FFD & 60S11281.FFD 1986-03-08T21:47:00 TO 1986-03-11T07:08:00
4S11282.FFD & 60S11282.FFD 1986-03-11T07:08:00 TO 1986-03-13T16:30:00
4S11283.FFD & 60S11283.FFD 1986-03-13T16:30:00 TO 1986-03-16T01:53:00
4S11284.FFD & 60S11284.FFD 1986-03-16T01:53:00 TO 1986-03-18T11:15:00
4S11285.FFD & 60S11285.FFD 1986-03-18T11:15:00 TO 1986-03-20T20:36:00
4S11286.FFD & 60S11286.FFD 1986-03-20T20:36:00 TO 1986-03-23T05:56:00
4S11287.FFD & 60S11287.FFD 1986-03-23T05:56:00 TO 1986-03-25T15:16:00
4S11288.FFD & 60S11288.FFD 1986-03-25T15:16:00 TO 1986-03-28T00:40:00
4S11289.FFD & 60S11289.FFD 1986-03-28T00:40:00 TO 1986-03-30T10:07:00
4S11290.FFD & 60S11290.FFD 1986-03-30T10:07:00 TO 1986-04-01T19:29:00
4S11291.FFD & 60S11291.FFD 1986-04-01T19:29:00 TO 1986-04-04T04:49:00
4S11292.FFD & 60S11292.FFD 1986-04-04T04:49:00 TO 1986-04-06T14:09:00
4S11293.FFD & 60S11293.FFD 1986-04-06T14:09:00 TO 1986-04-08T23:32:00
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4S11297.FFD & 60S11297.FFD 1986-04-16T03:41:00 TO 1986-04-18T13:03:00
4S11298.FFD & 60S11298.FFD 1986-04-18T13:03:00 TO 1986-04-20T22:23:00
4S11299.FFD & 60S11299.FFD 1986-04-20T22:23:00 TO 1986-04-23T07:44:00
4S11300.FFD & 60S11300.FFD 1986-04-23T07:44:00 TO 1986-04-25T17:12:00
4S11301.FFD & 60S11301.FFD 1986-04-25T17:12:00 TO 1986-04-28T02:37:00
4S11302.FFD & 60S11302.FFD 1986-04-28T02:37:00 TO 1986-04-30T11:57:00
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4S11304.FFD & 60S11304.FFD 1986-05-02T21:18:00 TO 1986-05-05T06:40:00
4S11305.FFD & 60S11305.FFD 1986-05-05T06:40:00 TO 1986-05-07T16:04:00
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4S11309.FFD & 60S11309.FFD 1986-05-14T20:12:00 TO 1986-05-17T05:33:00
4S11310.FFD & 60S11310.FFD 1986-05-17T05:33:00 TO 1986-05-19T14:53:00
4S11311.FFD & 60S11311.FFD 1986-05-19T14:53:00 TO 1986-05-22T00:17:00
4S11312.FFD & 60S11312.FFD 1986-05-22T00:17:00 TO 1986-05-24T09:45:00
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4S11315.FFD & 60S11315.FFD 1986-05-29T04:26:00 TO 1986-05-31T13:48:00
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4S11320.FFD & 60S11320.FFD 1986-06-10T03:18:00 TO 1986-06-12T12:39:00
4S11321.FFD & 60S11321.FFD 1986-06-12T12:39:00 TO 1986-06-14T21:58:00
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4S11324.FFD & 60S11324.FFD 1986-06-19T16:46:00 TO 1986-06-22T02:10:00
4S11325.FFD & 60S11325.FFD 1986-06-22T02:10:00 TO 1986-06-24T11:29:00
4S11326.FFD & 60S11326.FFD 1986-06-24T11:29:00 TO 1986-06-26T20:48:00

4S11327.FFD & 60S11327.FFD 1986-06-26T20:48:00 TO 1986-06-29T06:10:00
4S11328.FFD & 60S11328.FFD 1986-06-29T06:10:00 TO 1986-07-01T15:32:00
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4S11333.FFD & 60S11333.FFD 1986-07-11T04:55:00 TO 1986-07-13T14:14:00
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4S11340.FFD & 60S11340.FFD 1986-07-27T22:22:00 TO 1986-07-30T07:44:00
4S11341.FFD & 60S11341.FFD 1986-07-30T07:44:00 TO 1986-08-01T17:06:00
4S11342.FFD & 60S11342.FFD 1986-08-01T17:06:00 TO 1986-08-04T02:26:00
4S11343.FFD & 60S11343.FFD 1986-08-04T02:26:00 TO 1986-08-06T11:45:00
4S11344.FFD & 60S11344.FFD 1986-08-06T11:45:00 TO 1986-08-08T21:04:00
4S11345.FFD & 60S11345.FFD 1986-08-08T21:04:00 TO 1986-08-11T06:25:00
4S11346.FFD & 60S11346.FFD 1986-08-11T06:25:00 TO 1986-08-13T15:50:00
4S11347.FFD & 60S11347.FFD 1986-08-13T15:50:00 TO 1986-08-16T01:12:00
4S11348.FFD & 60S11348.FFD 1986-08-16T01:12:00 TO 1986-08-18T10:30:00
4S11349.FFD & 60S11349.FFD 1986-08-18T10:30:00 TO 1986-08-20T19:49:00
4S11350.FFD & 60S11350.FFD 1986-08-20T19:49:00 TO 1986-08-23T05:10:00
4S11351.FFD & 60S11351.FFD 1986-08-23T05:10:00 TO 1986-08-25T14:32:00
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4S11355.FFD & 60S11355.FFD 1986-09-01T18:35:00 TO 1986-09-04T03:53:00
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4S11361.FFD & 60S11361.FFD 1986-09-16T02:40:00 TO 1986-09-18T12:01:00
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4S11363.FFD & 60S11363.FFD 1986-09-20T21:23:00 TO 1986-09-23T06:46:00
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4S11368.FFD & 60S11368.FFD 1986-10-02T20:09:00 TO 1986-10-05T05:31:00
4S11369.FFD & 60S11369.FFD 1986-10-05T05:31:00 TO 1986-10-07T14:58:00
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4S11374.FFD & 60S11374.FFD 1986-10-17T04:22:00 TO 1986-10-19T13:46:00
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4S11387.FFD & 60S11387.FFD 1986-11-17T06:14:00 TO 1986-11-19T15:37:00
4S11388.FFD & 60S11388.FFD 1986-11-19T15:37:00 TO 1986-11-22T00:59:00
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4S11397.FFD & 60S11397.FFD 1986-12-11T03:53:00 TO 1986-12-13T13:16:00
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4S11399.FFD & 60S11399.FFD 1986-12-15T22:39:00 TO 1986-12-18T08:00:00
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4S11406.FFD & 60S11406.FFD 1987-01-01T16:08:00 TO 1987-01-04T01:27:00

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VOLDESC.SFD

LOG_VOL_IDENT: USA_NASA_NSSD_IC2D_0010A
LOG_VOL_NSSDC_EXPT_ID: 77-I02B-04
LOG_VOL_INITIATION_DATE: 1994-10-13
LOG_VOL_CLOSING_DATE: 1995-03-16
LOG_VOL_CAPACITY: 1GB/Logical volume
LOG_VOL_FILE_STRUCTURE: Files-11

VOLUME_DIAMETER: 12 inches
VOLUME_DRIVE_MFGR_AND_MODEL: Optimem 1000
COMPUTER_MFGR: Digital Equipment Corporation
OPERATING_SYSTEM: MicroVMS 4.7
COMPUTER_SYSTEM: MicroVAX II
TRANSFER_SOFTWARE: SOAR Version 4.2

TECHNICAL_CONTACT:
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NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS: NONE

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME: Averaged Fluxgate Magnetometer Data
DATA_SOURCES: International Sun-Earth Explorer 2 (ISEE-2) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:
Dr. Christopher Russell
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NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:
A. DESCRIPTION_OF_INSTRUMENT:
In this triaxial fluxgate magnetometer, three ring-core sensors in an

orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL_MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED_PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE_OF_THE_INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA_SET_QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA_PROCESSING_OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA_PROCESSING_OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included 64-second averages of the 4-second data plus spacecraft spin rate, the zero levels that were applied to the data during processing, spacecraft position

and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds

since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

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LOG_VOL_TIME_COVERAGE: 1977-10-22T14:49:00 TO 1980-04-17T21:02:00

TYPE OF FILE TIME COVERAGE:
4-SECOND DATA 1977-10-22T14:49:00 TO 1980-04-17T21:02:00
60-SECOND DATA 1977-10-22T14:49:00 TO 1980-04-17T21:02:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG VOL FILE TIME COVERAGE:

4S20001.FFD & 60S20001.FFD	1977-10-22T14:49:00 TO 1977-10-25T00:20:00
4S20002.FFD & 60S20002.FFD	1977-10-25T00:20:00 TO 1977-10-27T09:42:00
4S20003.FFD & 60S20003.FFD	1977-10-27T09:42:00 TO 1977-10-29T19:02:00
4S20004.FFD & 60S20004.FFD	1977-10-29T19:02:00 TO 1977-11-01T04:22:00
4S20005.FFD & 60S20005.FFD	1977-11-01T04:22:00 TO 1977-11-03T13:43:00
4S20006.FFD & 60S20006.FFD	1977-11-03T13:43:00 TO 1977-11-05T23:06:00
4S20007.FFD & 60S20007.FFD	1977-11-05T23:06:00 TO 1977-11-08T08:29:00
4S20008.FFD & 60S20008.FFD	1977-11-08T08:29:00 TO 1977-11-10T17:53:00
4S20009.FFD & 60S20009.FFD	1977-11-10T17:53:00 TO 1977-11-13T03:12:00
4S20010.FFD & 60S20010.FFD	1977-11-13T03:12:00 TO 1977-11-15T12:30:00
4S20011.FFD & 60S20011.FFD	1977-11-15T12:30:00 TO 1977-11-17T21:51:00
4S20012.FFD & 60S20012.FFD	1977-11-17T21:51:00 TO 1977-11-20T07:13:00
4S20013.FFD & 60S20013.FFD	1977-11-20T07:13:00 TO 1977-11-22T16:36:00
4S20014.FFD & 60S20014.FFD	1977-11-22T16:36:00 TO 1977-11-25T01:58:00
4S20015.FFD & 60S20015.FFD	1977-11-25T01:58:00 TO 1977-11-27T11:19:00
4S20016.FFD & 60S20016.FFD	1977-11-27T11:19:00 TO 1977-11-29T20:38:00
4S20017.FFD & 60S20017.FFD	1977-11-29T20:38:00 TO 1977-12-02T05:58:00
4S20018.FFD & 60S20018.FFD	1977-12-02T05:58:00 TO 1977-12-04T15:20:00
4S20019.FFD & 60S20019.FFD	1977-12-04T15:20:00 TO 1977-12-07T00:45:00
4S20020.FFD & 60S20020.FFD	1977-12-07T00:45:00 TO 1977-12-09T10:07:00
4S20021.FFD & 60S20021.FFD	1977-12-09T10:07:00 TO 1977-12-11T19:25:00
4S20022.FFD & 60S20022.FFD	1977-12-11T19:25:00 TO 1977-12-14T04:45:00
4S20023.FFD & 60S20023.FFD	1977-12-14T04:45:00 TO 1977-12-16T14:07:00
4S20024.FFD & 60S20024.FFD	1977-12-16T14:07:00 TO 1977-12-18T23:30:00
4S20025.FFD & 60S20025.FFD	1977-12-18T23:30:00 TO 1977-12-21T08:52:00
4S20026.FFD & 60S20026.FFD	1977-12-21T08:52:00 TO 1977-12-23T18:13:00
4S20027.FFD & 60S20027.FFD	1977-12-23T18:13:00 TO 1977-12-26T03:33:00
4S20028.FFD & 60S20028.FFD	1977-12-26T03:33:00 TO 1977-12-28T12:52:00

4S20029.FFD & 60S20029.FFD 1977-12-28T12:52:00 TO 1977-12-30T22:13:00
4S20030.FFD & 60S20030.FFD 1977-12-30T22:13:00 TO 1978-01-02T07:37:00
4S20031.FFD & 60S20031.FFD 1978-01-02T07:37:00 TO 1978-01-04T17:00:00
4S20032.FFD & 60S20032.FFD 1978-01-04T17:00:00 TO 1978-01-07T02:20:00
4S20033.FFD & 60S20033.FFD 1978-01-07T02:20:00 TO 1978-01-09T11:39:00
4S20034.FFD & 60S20034.FFD 1978-01-09T11:39:00 TO 1978-01-11T21:00:00
4S20035.FFD & 60S20035.FFD 1978-01-11T21:00:00 TO 1978-01-14T06:23:00
4S20036.FFD & 60S20036.FFD 1978-01-14T06:23:00 TO 1978-01-16T15:46:00
4S20037.FFD & 60S20037.FFD 1978-01-16T15:46:00 TO 1978-01-19T01:07:00
4S20038.FFD & 60S20038.FFD 1978-01-19T01:07:00 TO 1978-01-21T10:28:00
4S20039.FFD & 60S20039.FFD 1978-01-21T10:28:00 TO 1978-01-23T19:48:00
4S20040.FFD & 60S20040.FFD 1978-01-23T19:48:00 TO 1978-01-26T05:08:00
4S20041.FFD & 60S20041.FFD 1978-01-26T05:08:00 TO 1978-01-28T14:31:00
4S20042.FFD & 60S20042.FFD 1978-01-28T14:31:00 TO 1978-01-30T23:56:00
4S20043.FFD & 60S20043.FFD 1978-01-30T23:56:00 TO 1978-02-02T09:18:00
4S20044.FFD & 60S20044.FFD 1978-02-02T09:18:00 TO 1978-02-04T18:37:00
4S20045.FFD & 60S20045.FFD 1978-02-04T18:37:00 TO 1978-02-07T03:58:00
4S20046.FFD & 60S20046.FFD 1978-02-07T03:58:00 TO 1978-02-09T13:21:00
4S20047.FFD & 60S20047.FFD 1978-02-09T13:21:00 TO 1978-02-11T22:44:00
4S20048.FFD & 60S20048.FFD 1978-02-11T22:44:00 TO 1978-02-14T08:07:00
4S20049.FFD & 60S20049.FFD 1978-02-14T08:07:00 TO 1978-02-16T17:29:00
4S20050.FFD & 60S20050.FFD 1978-02-16T17:29:00 TO 1978-02-19T02:50:00
4S20051.FFD & 60S20051.FFD 1978-02-19T02:50:00 TO 1978-02-21T12:11:00
4S20052.FFD & 60S20052.FFD 1978-02-21T12:11:00 TO 1978-02-23T21:33:00
4S20053.FFD & 60S20053.FFD 1978-02-23T21:33:00 TO 1978-02-26T06:59:00
4S20054.FFD & 60S20054.FFD 1978-02-26T06:59:00 TO 1978-02-28T16:23:00
4S20055.FFD & 60S20055.FFD 1978-02-28T16:23:00 TO 1978-03-03T01:44:00
4S20056.FFD & 60S20056.FFD 1978-03-03T01:44:00 TO 1978-03-05T11:04:00
4S20057.FFD & 60S20057.FFD 1978-03-05T11:04:00 TO 1978-03-07T20:26:00
4S20058.FFD & 60S20058.FFD 1978-03-07T20:26:00 TO 1978-03-10T05:50:00
4S20059.FFD & 60S20059.FFD 1978-03-10T05:50:00 TO 1978-03-12T15:14:00
4S20060.FFD & 60S20060.FFD 1978-03-12T15:14:00 TO 1978-03-15T00:37:00
4S20061.FFD & 60S20061.FFD 1978-03-15T00:37:00 TO 1978-03-17T09:58:00
4S20062.FFD & 60S20062.FFD 1978-03-17T09:58:00 TO 1978-03-19T19:19:00
4S20063.FFD & 60S20063.FFD 1978-03-19T19:19:00 TO 1978-03-22T04:40:00
4S20064.FFD & 60S20064.FFD 1978-03-22T04:40:00 TO 1978-03-24T14:04:00
4S20065.FFD & 60S20065.FFD 1978-03-24T14:04:00 TO 1978-03-26T23:31:00
4S20066.FFD & 60S20066.FFD 1978-03-26T23:31:00 TO 1978-03-29T08:53:00
4S20067.FFD & 60S20067.FFD 1978-03-29T08:53:00 TO 1978-03-31T18:13:00
4S20068.FFD & 60S20068.FFD 1978-03-31T18:13:00 TO 1978-04-03T03:35:00
4S20069.FFD & 60S20069.FFD 1978-04-03T03:35:00 TO 1978-04-05T12:58:00
4S20070.FFD & 60S20070.FFD 1978-04-05T12:58:00 TO 1978-04-07T22:22:00
4S20071.FFD & 60S20071.FFD 1978-04-07T22:22:00 TO 1978-04-10T07:46:00
4S20072.FFD & 60S20072.FFD 1978-04-10T07:46:00 TO 1978-04-12T17:08:00
4S20073.FFD & 60S20073.FFD 1978-04-12T17:08:00 TO 1978-04-15T02:29:00
4S20074.FFD & 60S20074.FFD 1978-04-15T02:29:00 TO 1978-04-17T11:49:00
4S20075.FFD & 60S20075.FFD 1978-04-17T11:49:00 TO 1978-04-19T21:12:00
4S20076.FFD & 60S20076.FFD 1978-04-19T21:12:00 TO 1978-04-22T06:38:00
4S20077.FFD & 60S20077.FFD 1978-04-22T06:38:00 TO 1978-04-24T16:02:00
4S20078.FFD & 60S20078.FFD 1978-04-24T16:02:00 TO 1978-04-27T01:22:00
4S20079.FFD & 60S20079.FFD 1978-04-27T01:22:00 TO 1978-04-29T10:42:00
4S20080.FFD & 60S20080.FFD 1978-04-29T10:42:00 TO 1978-05-01T20:04:00
4S20081.FFD & 60S20081.FFD 1978-05-01T20:04:00 TO 1978-05-04T05:28:00
4S20082.FFD & 60S20082.FFD 1978-05-04T05:28:00 TO 1978-05-06T14:51:00
4S20083.FFD & 60S20083.FFD 1978-05-06T14:51:00 TO 1978-05-09T00:13:00
4S20084.FFD & 60S20084.FFD 1978-05-09T00:13:00 TO 1978-05-11T09:34:00
4S20085.FFD & 60S20085.FFD 1978-05-11T09:34:00 TO 1978-05-13T18:54:00
4S20086.FFD & 60S20086.FFD 1978-05-13T18:54:00 TO 1978-05-16T04:15:00
4S20087.FFD & 60S20087.FFD 1978-05-16T04:15:00 TO 1978-05-18T13:38:00
4S20088.FFD & 60S20088.FFD 1978-05-18T13:38:00 TO 1978-05-20T23:04:00
4S20089.FFD & 60S20089.FFD 1978-05-20T23:04:00 TO 1978-05-23T08:25:00
4S20090.FFD & 60S20090.FFD 1978-05-23T08:25:00 TO 1978-05-25T17:44:00
4S20091.FFD & 60S20091.FFD 1978-05-25T17:44:00 TO 1978-05-28T03:05:00
4S20092.FFD & 60S20092.FFD 1978-05-28T03:05:00 TO 1978-05-30T12:27:00
4S20093.FFD & 60S20093.FFD 1978-05-30T12:27:00 TO 1978-06-01T21:50:00
4S20094.FFD & 60S20094.FFD 1978-06-01T21:50:00 TO 1978-06-04T07:12:00
4S20095.FFD & 60S20095.FFD 1978-06-04T07:12:00 TO 1978-06-06T16:33:00
4S20096.FFD & 60S20096.FFD 1978-06-06T16:33:00 TO 1978-06-09T01:52:00
4S20097.FFD & 60S20097.FFD 1978-06-09T01:52:00 TO 1978-06-11T11:12:00
4S20098.FFD & 60S20098.FFD 1978-06-11T11:12:00 TO 1978-06-13T20:34:00
4S20099.FFD & 60S20099.FFD 1978-06-13T20:34:00 TO 1978-06-16T05:59:00
4S20100.FFD & 60S20100.FFD 1978-06-16T05:59:00 TO 1978-06-18T15:22:00
4S20101.FFD & 60S20101.FFD 1978-06-18T15:22:00 TO 1978-06-21T00:40:00
4S20102.FFD & 60S20102.FFD 1978-06-21T00:40:00 TO 1978-06-23T10:00:00
4S20103.FFD & 60S20103.FFD 1978-06-23T10:00:00 TO 1978-06-25T19:20:00
4S20104.FFD & 60S20104.FFD 1978-06-25T19:20:00 TO 1978-06-28T04:42:00
4S20105.FFD & 60S20105.FFD 1978-06-28T04:42:00 TO 1978-06-30T14:03:00
4S20106.FFD & 60S20106.FFD 1978-06-30T14:03:00 TO 1978-07-02T23:24:00
4S20107.FFD & 60S20107.FFD 1978-07-02T23:24:00 TO 1978-07-05T08:43:00
4S20108.FFD & 60S20108.FFD 1978-07-05T08:43:00 TO 1978-07-07T18:01:00

4S20109.FFD & 60S20109.FFD 1978-07-07T18:01:00 TO 1978-07-10T03:21:00
4S20110.FFD & 60S20110.FFD 1978-07-10T03:21:00 TO 1978-07-12T12:44:00
4S20111.FFD & 60S20111.FFD 1978-07-12T12:44:00 TO 1978-07-14T22:08:00
4S20112.FFD & 60S20112.FFD 1978-07-14T22:08:00 TO 1978-07-17T07:27:00
4S20113.FFD & 60S20113.FFD 1978-07-17T07:27:00 TO 1978-07-19T16:44:00
4S20114.FFD & 60S20114.FFD 1978-07-19T16:44:00 TO 1978-07-22T02:03:00
4S20115.FFD & 60S20115.FFD 1978-07-22T02:03:00 TO 1978-07-24T11:24:00
4S20116.FFD & 60S20116.FFD 1978-07-24T11:24:00 TO 1978-07-26T20:45:00
4S20117.FFD & 60S20117.FFD 1978-07-26T20:45:00 TO 1978-07-29T06:05:00
4S20118.FFD & 60S20118.FFD 1978-07-29T06:05:00 TO 1978-07-31T15:24:00
4S20119.FFD & 60S20119.FFD 1978-07-31T15:24:00 TO 1978-08-03T00:42:00
4S20120.FFD & 60S20120.FFD 1978-08-03T00:42:00 TO 1978-08-05T10:00:00
4S20121.FFD & 60S20121.FFD 1978-08-05T10:00:00 TO 1978-08-07T19:21:00
4S20122.FFD & 60S20122.FFD 1978-08-07T19:21:00 TO 1978-08-10T04:45:00
4S20123.FFD & 60S20123.FFD 1978-08-10T04:45:00 TO 1978-08-12T14:06:00
4S20124.FFD & 60S20124.FFD 1978-08-12T14:06:00 TO 1978-08-14T23:24:00
4S20125.FFD & 60S20125.FFD 1978-08-14T23:24:00 TO 1978-08-17T08:43:00
4S20126.FFD & 60S20126.FFD 1978-08-17T08:43:00 TO 1978-08-19T18:04:00
4S20127.FFD & 60S20127.FFD 1978-08-19T18:04:00 TO 1978-08-22T03:26:00
4S20128.FFD & 60S20128.FFD 1978-08-22T03:26:00 TO 1978-08-24T12:47:00
4S20129.FFD & 60S20129.FFD 1978-08-24T12:47:00 TO 1978-08-26T22:07:00
4S20130.FFD & 60S20130.FFD 1978-08-26T22:07:00 TO 1978-08-29T07:27:00
4S20131.FFD & 60S20131.FFD 1978-08-29T07:27:00 TO 1978-08-31T16:45:00
4S20132.FFD & 60S20132.FFD 1978-08-31T16:45:00 TO 1978-09-03T02:06:00
4S20133.FFD & 60S20133.FFD 1978-09-03T02:06:00 TO 1978-09-05T11:30:00
4S20134.FFD & 60S20134.FFD 1978-09-05T11:30:00 TO 1978-09-07T20:54:00
4S20135.FFD & 60S20135.FFD 1978-09-07T20:54:00 TO 1978-09-10T06:13:00
4S20136.FFD & 60S20136.FFD 1978-09-10T06:13:00 TO 1978-09-12T15:32:00
4S20137.FFD & 60S20137.FFD 1978-09-12T15:32:00 TO 1978-09-15T00:53:00
4S20138.FFD & 60S20138.FFD 1978-09-15T00:53:00 TO 1978-09-17T10:15:00
4S20139.FFD & 60S20139.FFD 1978-09-17T10:15:00 TO 1978-09-19T19:38:00
4S20140.FFD & 60S20140.FFD 1978-09-19T19:38:00 TO 1978-09-22T05:00:00
4S20141.FFD & 60S20141.FFD 1978-09-22T05:00:00 TO 1978-09-24T14:20:00
4S20142.FFD & 60S20142.FFD 1978-09-24T14:20:00 TO 1978-09-26T23:39:00
4S20143.FFD & 60S20143.FFD 1978-09-26T23:39:00 TO 1978-09-29T08:59:00
4S20144.FFD & 60S20144.FFD 1978-09-29T08:59:00 TO 1978-10-01T18:22:00
4S20145.FFD & 60S20145.FFD 1978-10-01T18:22:00 TO 1978-10-04T03:48:00
4S20146.FFD & 60S20146.FFD 1978-10-04T03:48:00 TO 1978-10-06T13:08:00
4S20147.FFD & 60S20147.FFD 1978-10-06T13:08:00 TO 1978-10-08T22:25:00
4S20148.FFD & 60S20148.FFD 1978-10-08T22:25:00 TO 1978-10-11T07:43:00
4S20149.FFD & 60S20149.FFD 1978-10-11T07:43:00 TO 1978-10-13T17:03:00
4S20150.FFD & 60S20150.FFD 1978-10-13T17:03:00 TO 1978-10-16T02:25:00
4S20151.FFD & 60S20151.FFD 1978-10-16T02:25:00 TO 1978-10-18T11:45:00
4S20152.FFD & 60S20152.FFD 1978-10-18T11:45:00 TO 1978-10-20T21:05:00
4S20153.FFD & 60S20153.FFD 1978-10-20T21:05:00 TO 1978-10-23T06:23:00
4S20154.FFD & 60S20154.FFD 1978-10-23T06:23:00 TO 1978-10-25T15:40:00
4S20155.FFD & 60S20155.FFD 1978-10-25T15:40:00 TO 1978-10-28T01:00:00
4S20156.FFD & 60S20156.FFD 1978-10-28T01:00:00 TO 1978-10-30T10:23:00
4S20157.FFD & 60S20157.FFD 1978-10-30T10:23:00 TO 1978-11-01T19:46:00
4S20158.FFD & 60S20158.FFD 1978-11-01T19:46:00 TO 1978-11-04T05:03:00
4S20159.FFD & 60S20159.FFD 1978-11-04T05:03:00 TO 1978-11-06T14:20:00
4S20160.FFD & 60S20160.FFD 1978-11-06T14:20:00 TO 1978-11-08T23:39:00
4S20161.FFD & 60S20161.FFD 1978-11-08T23:39:00 TO 1978-11-11T09:00:00
4S20162.FFD & 60S20162.FFD 1978-11-11T09:00:00 TO 1978-11-13T18:21:00
4S20163.FFD & 60S20163.FFD 1978-11-13T18:21:00 TO 1978-11-16T03:40:00
4S20164.FFD & 60S20164.FFD 1978-11-16T03:40:00 TO 1978-11-18T12:58:00
4S20165.FFD & 60S20165.FFD 1978-11-18T12:58:00 TO 1978-11-20T22:15:00
4S20166.FFD & 60S20166.FFD 1978-11-20T22:15:00 TO 1978-11-23T07:33:00
4S20167.FFD & 60S20167.FFD 1978-11-23T07:33:00 TO 1978-11-25T16:54:00
4S20168.FFD & 60S20168.FFD 1978-11-25T16:54:00 TO 1978-11-28T02:24:00
4S20169.FFD & 60S20169.FFD 1978-11-28T02:24:00 TO 1978-11-30T11:49:00
4S20170.FFD & 60S20170.FFD 1978-11-30T11:49:00 TO 1978-12-02T21:11:00
4S20171.FFD & 60S20171.FFD 1978-12-02T21:11:00 TO 1978-12-05T06:35:00
4S20172.FFD & 60S20172.FFD 1978-12-05T06:35:00 TO 1978-12-07T16:01:00
4S20173.FFD & 60S20173.FFD 1978-12-07T16:01:00 TO 1978-12-10T01:27:00
4S20174.FFD & 60S20174.FFD 1978-12-10T01:27:00 TO 1978-12-12T10:53:00
4S20175.FFD & 60S20175.FFD 1978-12-12T10:53:00 TO 1978-12-14T20:17:00
4S20176.FFD & 60S20176.FFD 1978-12-14T20:17:00 TO 1978-12-17T05:40:00
4S20177.FFD & 60S20177.FFD 1978-12-17T05:40:00 TO 1978-12-19T15:03:00
4S20178.FFD & 60S20178.FFD 1978-12-19T15:03:00 TO 1978-12-22T00:22:00
4S20179.FFD & 60S20179.FFD 1978-12-22T00:22:00 TO 1978-12-24T09:45:00
4S20180.FFD & 60S20180.FFD 1978-12-24T09:45:00 TO 1978-12-26T19:06:00
4S20181.FFD & 60S20181.FFD 1978-12-26T19:06:00 TO 1978-12-29T04:23:00
4S20182.FFD & 60S20182.FFD 1978-12-29T04:23:00 TO 1978-12-31T13:39:00
4S20183.FFD & 60S20183.FFD 1978-12-31T13:39:00 TO 1979-01-02T22:58:00
4S20184.FFD & 60S20184.FFD 1979-01-02T22:58:00 TO 1979-01-05T08:18:00
4S20185.FFD & 60S20185.FFD 1979-01-05T08:18:00 TO 1979-01-07T17:38:00
4S20186.FFD & 60S20186.FFD 1979-01-07T17:38:00 TO 1979-01-10T02:56:00
4S20187.FFD & 60S20187.FFD 1979-01-10T02:56:00 TO 1979-01-12T12:14:00
4S20188.FFD & 60S20188.FFD 1979-01-12T12:14:00 TO 1979-01-14T21:30:00

4S20189.FFD & 60S20189.FFD 1979-01-14T21:30:00 TO 1979-01-17T06:48:00
4S20190.FFD & 60S20190.FFD 1979-01-17T06:48:00 TO 1979-01-19T16:10:00
4S20191.FFD & 60S20191.FFD 1979-01-19T16:10:00 TO 1979-01-22T01:34:00
4S20192.FFD & 60S20192.FFD 1979-01-22T01:34:00 TO 1979-01-24T10:53:00
4S20193.FFD & 60S20193.FFD 1979-01-24T10:53:00 TO 1979-01-26T20:10:00
4S20194.FFD & 60S20194.FFD 1979-01-26T20:10:00 TO 1979-01-29T05:28:00
4S20195.FFD & 60S20195.FFD 1979-01-29T05:28:00 TO 1979-01-31T14:49:00
4S20196.FFD & 60S20196.FFD 1979-01-31T14:49:00 TO 1979-02-03T00:10:00
4S20197.FFD & 60S20197.FFD 1979-02-03T00:10:00 TO 1979-02-05T09:31:00
4S20198.FFD & 60S20198.FFD 1979-02-05T09:31:00 TO 1979-02-07T18:50:00
4S20199.FFD & 60S20199.FFD 1979-02-07T18:50:00 TO 1979-02-10T04:08:00
4S20200.FFD & 60S20200.FFD 1979-02-10T04:08:00 TO 1979-02-12T13:27:00
4S20201.FFD & 60S20201.FFD 1979-02-12T13:27:00 TO 1979-02-14T22:48:00
4S20202.FFD & 60S20202.FFD 1979-02-14T22:48:00 TO 1979-02-17T08:13:00
4S20203.FFD & 60S20203.FFD 1979-02-17T08:13:00 TO 1979-02-19T17:35:00
4S20204.FFD & 60S20204.FFD 1979-02-19T17:35:00 TO 1979-02-22T02:53:00
4S20205.FFD & 60S20205.FFD 1979-02-22T02:53:00 TO 1979-02-24T12:11:00
4S20206.FFD & 60S20206.FFD 1979-02-24T12:11:00 TO 1979-02-26T21:32:00
4S20207.FFD & 60S20207.FFD 1979-02-26T21:32:00 TO 1979-03-01T06:56:00
4S20208.FFD & 60S20208.FFD 1979-03-01T06:56:00 TO 1979-03-03T16:19:00
4S20209.FFD & 60S20209.FFD 1979-03-03T16:19:00 TO 1979-03-06T01:41:00
4S20210.FFD & 60S20210.FFD 1979-03-06T01:41:00 TO 1979-03-08T11:02:00
4S20211.FFD & 60S20211.FFD 1979-03-08T11:02:00 TO 1979-03-10T20:22:00
4S20212.FFD & 60S20212.FFD 1979-03-10T20:22:00 TO 1979-03-13T05:44:00
4S20213.FFD & 60S20213.FFD 1979-03-13T05:44:00 TO 1979-03-15T15:10:00
4S20214.FFD & 60S20214.FFD 1979-03-15T15:10:00 TO 1979-03-18T00:36:00
4S20215.FFD & 60S20215.FFD 1979-03-18T00:36:00 TO 1979-03-20T09:57:00
4S20216.FFD & 60S20216.FFD 1979-03-20T09:57:00 TO 1979-03-22T19:17:00
4S20217.FFD & 60S20217.FFD 1979-03-22T19:17:00 TO 1979-03-25T04:39:00
4S20218.FFD & 60S20218.FFD 1979-03-25T04:39:00 TO 1979-03-27T14:03:00
4S20219.FFD & 60S20219.FFD 1979-03-27T14:03:00 TO 1979-03-29T23:27:00
4S20220.FFD & 60S20220.FFD 1979-03-29T23:27:00 TO 1979-04-01T08:50:00
4S20221.FFD & 60S20221.FFD 1979-04-01T08:50:00 TO 1979-04-03T18:11:00
4S20222.FFD & 60S20222.FFD 1979-04-03T18:11:00 TO 1979-04-06T03:32:00
4S20223.FFD & 60S20223.FFD 1979-04-06T03:32:00 TO 1979-04-08T12:53:00
4S20224.FFD & 60S20224.FFD 1979-04-08T12:53:00 TO 1979-04-10T22:17:00
4S20225.FFD & 60S20225.FFD 1979-04-10T22:17:00 TO 1979-04-13T07:44:00
4S20226.FFD & 60S20226.FFD 1979-04-13T07:44:00 TO 1979-04-15T17:07:00
4S20227.FFD & 60S20227.FFD 1979-04-15T17:07:00 TO 1979-04-18T02:28:00
4S20228.FFD & 60S20228.FFD 1979-04-18T02:28:00 TO 1979-04-20T11:48:00
4S20229.FFD & 60S20229.FFD 1979-04-20T11:48:00 TO 1979-04-22T21:11:00
4S20230.FFD & 60S20230.FFD 1979-04-22T21:11:00 TO 1979-04-25T06:35:00
4S20231.FFD & 60S20231.FFD 1979-04-25T06:35:00 TO 1979-04-27T15:58:00
4S20232.FFD & 60S20232.FFD 1979-04-27T15:58:00 TO 1979-04-30T01:20:00
4S20233.FFD & 60S20233.FFD 1979-04-30T01:20:00 TO 1979-05-02T10:40:00
4S20234.FFD & 60S20234.FFD 1979-05-02T10:40:00 TO 1979-05-04T20:00:00
4S20235.FFD & 60S20235.FFD 1979-05-04T20:00:00 TO 1979-05-07T05:22:00
4S20236.FFD & 60S20236.FFD 1979-05-07T05:22:00 TO 1979-05-09T14:48:00
4S20237.FFD & 60S20237.FFD 1979-05-09T14:48:00 TO 1979-05-12T00:16:00
4S20238.FFD & 60S20238.FFD 1979-05-12T00:16:00 TO 1979-05-14T09:39:00
4S20239.FFD & 60S20239.FFD 1979-05-14T09:39:00 TO 1979-05-16T19:01:00
4S20240.FFD & 60S20240.FFD 1979-05-16T19:01:00 TO 1979-05-19T04:25:00
4S20241.FFD & 60S20241.FFD 1979-05-19T04:25:00 TO 1979-05-21T13:50:00
4S20242.FFD & 60S20242.FFD 1979-05-21T13:50:00 TO 1979-05-23T23:16:00
4S20243.FFD & 60S20243.FFD 1979-05-23T23:16:00 TO 1979-05-26T08:41:00
4S20244.FFD & 60S20244.FFD 1979-05-26T08:41:00 TO 1979-05-28T18:03:00
4S20245.FFD & 60S20245.FFD 1979-05-28T18:03:00 TO 1979-05-31T03:25:00
4S20246.FFD & 60S20246.FFD 1979-05-31T03:25:00 TO 1979-06-02T12:48:00
4S20247.FFD & 60S20247.FFD 1979-06-02T12:48:00 TO 1979-06-04T22:14:00
4S20248.FFD & 60S20248.FFD 1979-06-04T22:14:00 TO 1979-06-07T07:43:00
4S20249.FFD & 60S20249.FFD 1979-06-07T07:43:00 TO 1979-06-09T17:06:00
4S20250.FFD & 60S20250.FFD 1979-06-09T17:06:00 TO 1979-06-12T02:27:00
4S20251.FFD & 60S20251.FFD 1979-06-12T02:27:00 TO 1979-06-14T11:50:00
4S20252.FFD & 60S20252.FFD 1979-06-14T11:50:00 TO 1979-06-16T21:14:00
4S20253.FFD & 60S20253.FFD 1979-06-16T21:14:00 TO 1979-06-19T06:39:00
4S20254.FFD & 60S20254.FFD 1979-06-19T06:39:00 TO 1979-06-21T16:04:00
4S20255.FFD & 60S20255.FFD 1979-06-21T16:04:00 TO 1979-06-24T01:27:00
4S20256.FFD & 60S20256.FFD 1979-06-24T01:27:00 TO 1979-06-26T10:48:00
4S20257.FFD & 60S20257.FFD 1979-06-26T10:48:00 TO 1979-06-28T20:10:00
4S20258.FFD & 60S20258.FFD 1979-06-28T20:10:00 TO 1979-07-01T05:34:00
4S20259.FFD & 60S20259.FFD 1979-07-01T05:34:00 TO 1979-07-03T15:01:00
4S20260.FFD & 60S20260.FFD 1979-07-03T15:01:00 TO 1979-07-06T00:27:00
4S20261.FFD & 60S20261.FFD 1979-07-06T00:27:00 TO 1979-07-08T09:49:00
4S20262.FFD & 60S20262.FFD 1979-07-08T09:49:00 TO 1979-07-10T19:10:00
4S20263.FFD & 60S20263.FFD 1979-07-10T19:10:00 TO 1979-07-13T04:33:00
4S20264.FFD & 60S20264.FFD 1979-07-13T04:33:00 TO 1979-07-15T13:58:00
4S20265.FFD & 60S20265.FFD 1979-07-15T13:58:00 TO 1979-07-17T23:23:00
4S20266.FFD & 60S20266.FFD 1979-07-17T23:23:00 TO 1979-07-20T08:47:00
4S20267.FFD & 60S20267.FFD 1979-07-20T08:47:00 TO 1979-07-22T18:09:00
4S20268.FFD & 60S20268.FFD 1979-07-22T18:09:00 TO 1979-07-25T03:29:00

4S20269.FFD & 60S20269.FFD 1979-07-25T03:29:00 TO 1979-07-27T12:50:00
4S20270.FFD & 60S20270.FFD 1979-07-27T12:50:00 TO 1979-07-29T22:15:00
4S20271.FFD & 60S20271.FFD 1979-07-29T22:15:00 TO 1979-08-01T07:41:00
4S20272.FFD & 60S20272.FFD 1979-08-01T07:41:00 TO 1979-08-03T17:02:00
4S20273.FFD & 60S20273.FFD 1979-08-03T17:02:00 TO 1979-08-06T02:21:00
4S20274.FFD & 60S20274.FFD 1979-08-06T02:21:00 TO 1979-08-08T11:41:00
4S20275.FFD & 60S20275.FFD 1979-08-08T11:41:00 TO 1979-08-10T21:04:00
4S20276.FFD & 60S20276.FFD 1979-08-10T21:04:00 TO 1979-08-13T06:27:00
4S20277.FFD & 60S20277.FFD 1979-08-13T06:27:00 TO 1979-08-15T15:50:00
4S20278.FFD & 60S20278.FFD 1979-08-15T15:50:00 TO 1979-08-18T01:11:00
4S20279.FFD & 60S20279.FFD 1979-08-18T01:11:00 TO 1979-08-20T10:31:00
4S20280.FFD & 60S20280.FFD 1979-08-20T10:31:00 TO 1979-08-22T19:51:00
4S20281.FFD & 60S20281.FFD 1979-08-22T19:51:00 TO 1979-08-25T05:15:00
4S20282.FFD & 60S20282.FFD 1979-08-25T05:15:00 TO 1979-08-27T14:41:00
4S20283.FFD & 60S20283.FFD 1979-08-27T14:41:00 TO 1979-08-30T00:05:00
4S20284.FFD & 60S20284.FFD 1979-08-30T00:05:00 TO 1979-09-01T09:25:00
4S20285.FFD & 60S20285.FFD 1979-09-01T09:25:00 TO 1979-09-03T18:46:00
4S20286.FFD & 60S20286.FFD 1979-09-03T18:46:00 TO 1979-09-06T04:08:00
4S20287.FFD & 60S20287.FFD 1979-09-06T04:08:00 TO 1979-09-08T13:33:00
4S20288.FFD & 60S20288.FFD 1979-09-08T13:33:00 TO 1979-09-10T22:57:00
4S20289.FFD & 60S20289.FFD 1979-09-10T22:57:00 TO 1979-09-13T08:19:00
4S20290.FFD & 60S20290.FFD 1979-09-13T08:19:00 TO 1979-09-15T17:40:00
4S20291.FFD & 60S20291.FFD 1979-09-15T17:40:00 TO 1979-09-18T03:01:00
4S20292.FFD & 60S20292.FFD 1979-09-18T03:01:00 TO 1979-09-20T12:24:00
4S20293.FFD & 60S20293.FFD 1979-09-20T12:24:00 TO 1979-09-22T21:54:00
4S20294.FFD & 60S20294.FFD 1979-09-22T21:54:00 TO 1979-09-25T07:22:00
4S20295.FFD & 60S20295.FFD 1979-09-25T07:22:00 TO 1979-09-27T16:45:00
4S20296.FFD & 60S20296.FFD 1979-09-27T16:45:00 TO 1979-09-30T02:07:00
4S20297.FFD & 60S20297.FFD 1979-09-30T02:07:00 TO 1979-10-02T11:21:00
4S20298.FFD & 60S20298.FFD 1979-10-02T11:21:00 TO 1979-10-04T20:38:00
4S20299.FFD & 60S20299.FFD 1979-10-04T20:38:00 TO 1979-10-07T05:57:00
4S20300.FFD & 60S20300.FFD 1979-10-07T05:57:00 TO 1979-10-09T15:14:00
4S20301.FFD & 60S20301.FFD 1979-10-09T15:14:00 TO 1979-10-12T00:30:00
4S20302.FFD & 60S20302.FFD 1979-10-12T00:30:00 TO 1979-10-14T09:44:00
4S20303.FFD & 60S20303.FFD 1979-10-14T09:44:00 TO 1979-10-16T19:00:00
4S20304.FFD & 60S20304.FFD 1979-10-16T19:00:00 TO 1979-10-19T04:21:00
4S20305.FFD & 60S20305.FFD 1979-10-19T04:21:00 TO 1979-10-21T13:50:00
4S20306.FFD & 60S20306.FFD 1979-10-21T13:50:00 TO 1979-10-23T23:16:00
4S20307.FFD & 60S20307.FFD 1979-10-23T23:16:00 TO 1979-10-26T08:39:00
4S20308.FFD & 60S20308.FFD 1979-10-26T08:39:00 TO 1979-10-28T18:02:00
4S20309.FFD & 60S20309.FFD 1979-10-28T18:02:00 TO 1979-10-31T03:27:00
4S20310.FFD & 60S20310.FFD 1979-10-31T03:27:00 TO 1979-11-02T12:53:00
4S20311.FFD & 60S20311.FFD 1979-11-02T12:53:00 TO 1979-11-04T22:19:00
4S20312.FFD & 60S20312.FFD 1979-11-04T22:19:00 TO 1979-11-07T07:43:00
4S20313.FFD & 60S20313.FFD 1979-11-07T07:43:00 TO 1979-11-09T17:06:00
4S20314.FFD & 60S20314.FFD 1979-11-09T17:06:00 TO 1979-11-12T02:28:00
4S20315.FFD & 60S20315.FFD 1979-11-12T02:28:00 TO 1979-11-14T11:53:00
4S20316.FFD & 60S20316.FFD 1979-11-14T11:53:00 TO 1979-11-16T21:22:00
4S20317.FFD & 60S20317.FFD 1979-11-16T21:22:00 TO 1979-11-19T06:48:00
4S20318.FFD & 60S20318.FFD 1979-11-19T06:48:00 TO 1979-11-21T16:11:00
4S20319.FFD & 60S20319.FFD 1979-11-21T16:11:00 TO 1979-11-24T01:33:00
4S20320.FFD & 60S20320.FFD 1979-11-24T01:33:00 TO 1979-11-26T10:56:00
4S20321.FFD & 60S20321.FFD 1979-11-26T10:56:00 TO 1979-11-28T20:21:00
4S20322.FFD & 60S20322.FFD 1979-11-28T20:21:00 TO 1979-12-01T05:46:00
4S20323.FFD & 60S20323.FFD 1979-12-01T05:46:00 TO 1979-12-03T15:10:00
4S20324.FFD & 60S20324.FFD 1979-12-03T15:10:00 TO 1979-12-06T00:31:00
4S20325.FFD & 60S20325.FFD 1979-12-06T00:31:00 TO 1979-12-08T09:51:00
4S20326.FFD & 60S20326.FFD 1979-12-08T09:51:00 TO 1979-12-10T19:12:00
4S20327.FFD & 60S20327.FFD 1979-12-10T19:12:00 TO 1979-12-13T04:35:00
4S20328.FFD & 60S20328.FFD 1979-12-13T04:35:00 TO 1979-12-15T14:00:00
4S20329.FFD & 60S20329.FFD 1979-12-15T14:00:00 TO 1979-12-17T23:21:00
4S20330.FFD & 60S20330.FFD 1979-12-17T23:21:00 TO 1979-12-20T08:40:00
4S20331.FFD & 60S20331.FFD 1979-12-20T08:40:00 TO 1979-12-22T17:59:00
4S20332.FFD & 60S20332.FFD 1979-12-22T17:59:00 TO 1979-12-25T03:20:00
4S20333.FFD & 60S20333.FFD 1979-12-25T03:20:00 TO 1979-12-27T12:43:00
4S20334.FFD & 60S20334.FFD 1979-12-27T12:43:00 TO 1979-12-29T22:05:00
4S20335.FFD & 60S20335.FFD 1979-12-29T22:05:00 TO 1980-01-01T07:25:00
4S20336.FFD & 60S20336.FFD 1980-01-01T07:25:00 TO 1980-01-03T16:44:00
4S20337.FFD & 60S20337.FFD 1980-01-03T16:44:00 TO 1980-01-06T02:03:00
4S20338.FFD & 60S20338.FFD 1980-01-06T02:03:00 TO 1980-01-08T11:25:00
4S20339.FFD & 60S20339.FFD 1980-01-08T11:25:00 TO 1980-01-10T20:50:00
4S20340.FFD & 60S20340.FFD 1980-01-10T20:50:00 TO 1980-01-13T06:13:00
4S20341.FFD & 60S20341.FFD 1980-01-13T06:13:00 TO 1980-01-15T15:33:00
4S20342.FFD & 60S20342.FFD 1980-01-15T15:33:00 TO 1980-01-18T00:52:00
4S20343.FFD & 60S20343.FFD 1980-01-18T00:52:00 TO 1980-01-20T10:13:00
4S20344.FFD & 60S20344.FFD 1980-01-20T10:13:00 TO 1980-01-22T19:36:00
4S20345.FFD & 60S20345.FFD 1980-01-22T19:36:00 TO 1980-01-25T04:59:00
4S20346.FFD & 60S20346.FFD 1980-01-25T04:59:00 TO 1980-01-27T14:21:00
4S20347.FFD & 60S20347.FFD 1980-01-27T14:21:00 TO 1980-01-29T23:41:00
4S20348.FFD & 60S20348.FFD 1980-01-29T23:41:00 TO 1980-02-01T09:00:00

```
 4S20349.FFD & 60S20349.FFD  1980-02-01T09:00:00 TO 1980-02-03T18:22:00
 4S20350.FFD & 60S20350.FFD  1980-02-03T18:22:00 TO 1980-02-06T03:47:00
 4S20351.FFD & 60S20351.FFD  1980-02-06T03:47:00 TO 1980-02-08T13:12:00
 4S20352.FFD & 60S20352.FFD  1980-02-08T13:12:00 TO 1980-02-10T22:33:00
 4S20353.FFD & 60S20353.FFD  1980-02-10T22:33:00 TO 1980-02-13T07:51:00
 4S20354.FFD & 60S20354.FFD  1980-02-13T07:51:00 TO 1980-02-15T17:11:00
 4S20355.FFD & 60S20355.FFD  1980-02-15T17:11:00 TO 1980-02-18T02:34:00
 4S20356.FFD & 60S20356.FFD  1980-02-18T02:34:00 TO 1980-02-20T11:57:00
 4S20357.FFD & 60S20357.FFD  1980-02-20T11:57:00 TO 1980-02-22T21:20:00
 4S20358.FFD & 60S20358.FFD  1980-02-22T21:20:00 TO 1980-02-25T06:41:00
 4S20359.FFD & 60S20359.FFD  1980-02-25T06:41:00 TO 1980-02-27T16:00:00
 4S20360.FFD & 60S20360.FFD  1980-02-27T16:00:00 TO 1980-03-01T01:21:00
 4S20361.FFD & 60S20361.FFD  1980-03-01T01:21:00 TO 1980-03-03T10:45:00
 4S20362.FFD & 60S20362.FFD  1980-03-03T10:45:00 TO 1980-03-05T20:11:00
 4S20363.FFD & 60S20363.FFD  1980-03-05T20:11:00 TO 1980-03-08T05:34:00
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 4S20365.FFD & 60S20365.FFD  1980-03-10T14:54:00 TO 1980-03-13T00:15:00
 4S20366.FFD & 60S20366.FFD  1980-03-13T00:15:00 TO 1980-03-15T09:37:00
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 4S20368.FFD & 60S20368.FFD  1980-03-17T19:01:00 TO 1980-03-20T04:25:00
 4S20369.FFD & 60S20369.FFD  1980-03-20T04:25:00 TO 1980-03-22T13:47:00
 4S20370.FFD & 60S20370.FFD  1980-03-22T13:47:00 TO 1980-03-24T23:08:00
 4S20371.FFD & 60S20371.FFD  1980-03-24T23:08:00 TO 1980-03-27T08:28:00
 4S20372.FFD & 60S20372.FFD  1980-03-27T08:28:00 TO 1980-03-29T17:51:00
 4S20373.FFD & 60S20373.FFD  1980-03-29T17:51:00 TO 1980-04-01T03:18:00
 4S20374.FFD & 60S20374.FFD  1980-04-01T03:18:00 TO 1980-04-03T12:44:00
 4S20375.FFD & 60S20375.FFD  1980-04-03T12:44:00 TO 1980-04-05T22:06:00
 4S20376.FFD & 60S20376.FFD  1980-04-05T22:06:00 TO 1980-04-08T07:27:00
 4S20377.FFD & 60S20377.FFD  1980-04-08T07:27:00 TO 1980-04-10T16:49:00
 4S20378.FFD & 60S20378.FFD  1980-04-10T16:49:00 TO 1980-04-13T02:13:00
 4S20379.FFD & 60S20379.FFD  1980-04-13T02:13:00 TO 1980-04-15T11:38:00
 4S20380.FFD & 60S20380.FFD  1980-04-15T11:38:00 TO 1980-04-17T21:02:00

PREV_LOG_VOL_COVERAGE: None

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REFERENCETYPE=$CCSDS1;

LABEL=CCSD3SF0000200000001;
REFERENCE="ERRATA.TXT";

LABEL=ATTACHED;
REFERENCE="FFHEADER.SFD";
REFERENCE="FFDATA.SFD";
EFERENCE="4SECOND.SFD";
REFERENCE="60SECOND.SFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/4S2/4S2*.FFH";
LABEL=NSSD3IF0006100000001;
REFERENCE="/4S2/4S2*.FFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/60S2/60S2*.FFH";
LABEL=NSSD3IF0006200000001;
REFERENCE="/60S2/60S2*.FFD";

LABEL=CCSD3SF0000200000001;
REFERENCE="/SOURCE/00README.TXT";
REFERENCE="/SOURCE/4S2ASC.COM";
REFERENCE="/SOURCE/4S2ASC.F";
REFERENCE="/SOURCE/4S2ASC.FOR";
REFERENCE="/SOURCE/60S2ASC.COM";
REFERENCE="/SOURCE/60S2ASC.F";
REFERENCE="/SOURCE/60S2ASC.FOR";
REFERENCE="/SOURCE/CONVERT.C";
REFERENCE="/SOURCE/CTIME.C";
REFERENCE="/SOURCE/CTIME.FOR";
REFERENCE="/SOURCE/MAKEFILE.";

/* EOF */
```

CCSD3ZF0000100000001CCSD3VS00002markeraa

VOLDESC.SFD

LOG_VOL_IDENT: USA_NASA_NSSD_IC2D_0010B
LOG_VOL_NSSDC_EXPT_ID: 77-102B-04
LOG_VOL_INITIATION_DATE: 1994-10-24
LOG_VOL_CLOSING_DATE: 1995-03-16
LOG_VOL_CAPACITY: 1GB/Logical volume
LOG_VOL_FILE_STRUCTURE: Files-11

VOLUME_DIAMETER: 12 inches
VOLUME_DRIVE_MFGR_AND_MODEL: Optimem 1000
COMPUTER_MFGR: Digital Equipment Corporation
OPERATING_SYSTEM: MicroVMS 4.7
COMPUTER_SYSTEM: MicroVAX II
TRANSFER_SOFTWARE: SOAR Version 4.2

TECHNICAL_CONTACT:
Harry Herbert
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
5833 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-9030
NSI=hherbert@igpp.ucla.edu
NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS: USA_NASA_NSSD_IC2D_0010A

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME: Averaged Fluxgate Magnetometer Data
DATA_SOURCES: International Sun-Earth Explorer 2 (ISEE-2) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:
Dr. Christopher Russell
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6871 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-3188
NSI=ctrussel@igpp.ucla.edu
NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:
A. DESCRIPTION_OF_INSTRUMENT:
In this triaxial fluxgate magnetometer, three ring-core sensors in an

orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL_MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED_PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE_OF_THE_INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA_SET_QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA_PROCESSING_OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA_PROCESSING_OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included 64-second averages of the 4-second data plus spacecraft spin rate, the zero levels that were applied to the data during processing, spacecraft position

and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds

since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1980-04-17T21:02:00 TO 1982-10-13T01:44:00

TYPE_OF_FILE_TIME_COVERAGE:
4-SECOND DATA 1980-04-17T21:02:00 TO 1982-10-13T01:44:00
60-SECOND DATA 1980-04-17T21:02:00 TO 1982-10-13T01:44:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG_VOL_FILE_TIME_COVERAGE:

4S20381.FFD & 60S20381.FFD	1980-04-17T21:02:00 TO 1980-04-20T06:24:00
4S20382.FFD & 60S20382.FFD	1980-04-20T06:24:00 TO 1980-04-22T15:45:00
4S20383.FFD & 60S20383.FFD	1980-04-22T15:45:00 TO 1980-04-25T01:07:00
4S20384.FFD & 60S20384.FFD	1980-04-25T01:07:00 TO 1980-04-27T10:33:00
4S20385.FFD & 60S20385.FFD	1980-04-27T10:33:00 TO 1980-04-29T19:59:00
4S20386.FFD & 60S20386.FFD	1980-04-29T19:59:00 TO 1980-05-02T05:23:00
4S20387.FFD & 60S20387.FFD	1980-05-02T05:23:00 TO 1980-05-04T14:43:00
4S20388.FFD & 60S20388.FFD	1980-05-04T14:43:00 TO 1980-05-07T00:04:00
4S20389.FFD & 60S20389.FFD	1980-05-07T00:04:00 TO 1980-05-09T09:27:00
4S20390.FFD & 60S20390.FFD	1980-05-09T09:27:00 TO 1980-05-11T18:50:00
4S20391.FFD & 60S20391.FFD	1980-05-11T18:50:00 TO 1980-05-14T04:13:00
4S20392.FFD & 60S20392.FFD	1980-05-14T04:13:00 TO 1980-05-16T13:35:00
4S20393.FFD & 60S20393.FFD	1980-05-16T13:35:00 TO 1980-05-18T22:54:00
4S20394.FFD & 60S20394.FFD	1980-05-18T22:54:00 TO 1980-05-21T08:14:00
4S20395.FFD & 60S20395.FFD	1980-05-21T08:14:00 TO 1980-05-23T17:36:00
4S20396.FFD & 60S20396.FFD	1980-05-23T17:36:00 TO 1980-05-26T03:01:00
4S20397.FFD & 60S20397.FFD	1980-05-26T03:01:00 TO 1980-05-28T12:24:00
4S20398.FFD & 60S20398.FFD	1980-05-28T12:24:00 TO 1980-05-30T21:44:00
4S20399.FFD & 60S20399.FFD	1980-05-30T21:44:00 TO 1980-06-02T07:03:00
4S20400.FFD & 60S20400.FFD	1980-06-02T07:03:00 TO 1980-06-04T16:23:00
4S20401.FFD & 60S20401.FFD	1980-06-04T16:23:00 TO 1980-06-07T01:45:00
4S20402.FFD & 60S20402.FFD	1980-06-07T01:45:00 TO 1980-06-09T11:08:00
4S20403.FFD & 60S20403.FFD	1980-06-09T11:08:00 TO 1980-06-11T20:29:00
4S20404.FFD & 60S20404.FFD	1980-06-11T20:29:00 TO 1980-06-14T05:48:00
4S20405.FFD & 60S20405.FFD	1980-06-14T05:48:00 TO 1980-06-16T15:07:00
4S20406.FFD & 60S20406.FFD	1980-06-16T15:07:00 TO 1980-06-19T00:27:00
4S20407.FFD & 60S20407.FFD	1980-06-19T00:27:00 TO 1980-06-21T09:50:00
4S20408.FFD & 60S20408.FFD	1980-06-21T09:50:00 TO 1980-06-23T19:15:00

4S20409.FFD & 60S20409.FFD 1980-06-23T19:15:00 TO 1980-06-26T04:35:00
4S20410.FFD & 60S20410.FFD 1980-06-26T04:35:00 TO 1980-06-28T13:53:00
4S20411.FFD & 60S20411.FFD 1980-06-28T13:53:00 TO 1980-06-30T23:12:00
4S20412.FFD & 60S20412.FFD 1980-06-30T23:12:00 TO 1980-07-03T08:33:00
4S20413.FFD & 60S20413.FFD 1980-07-03T08:33:00 TO 1980-07-05T17:55:00
4S20414.FFD & 60S20414.FFD 1980-07-05T17:55:00 TO 1980-07-08T03:17:00
4S20415.FFD & 60S20415.FFD 1980-07-08T03:17:00 TO 1980-07-10T12:37:00
4S20416.FFD & 60S20416.FFD 1980-07-10T12:37:00 TO 1980-07-12T21:56:00
4S20417.FFD & 60S20417.FFD 1980-07-12T21:56:00 TO 1980-07-15T07:14:00
4S20418.FFD & 60S20418.FFD 1980-07-15T07:14:00 TO 1980-07-17T16:37:00
4S20419.FFD & 60S20419.FFD 1980-07-17T16:37:00 TO 1980-07-20T02:01:00
4S20420.FFD & 60S20420.FFD 1980-07-20T02:01:00 TO 1980-07-22T11:24:00
4S20421.FFD & 60S20421.FFD 1980-07-22T11:24:00 TO 1980-07-24T20:43:00
4S20422.FFD & 60S20422.FFD 1980-07-24T20:43:00 TO 1980-07-27T06:01:00
4S20423.FFD & 60S20423.FFD 1980-07-27T06:01:00 TO 1980-07-29T15:22:00
4S20424.FFD & 60S20424.FFD 1980-07-29T15:22:00 TO 1980-08-01T00:44:00
4S20425.FFD & 60S20425.FFD 1980-08-01T00:44:00 TO 1980-08-03T10:06:00
4S20426.FFD & 60S20426.FFD 1980-08-03T10:06:00 TO 1980-08-05T19:28:00
4S20427.FFD & 60S20427.FFD 1980-08-05T19:28:00 TO 1980-08-08T04:48:00
4S20428.FFD & 60S20428.FFD 1980-08-08T04:48:00 TO 1980-08-10T14:07:00
4S20429.FFD & 60S20429.FFD 1980-08-10T14:07:00 TO 1980-08-12T23:29:00
4S20430.FFD & 60S20430.FFD 1980-08-12T23:29:00 TO 1980-08-15T08:54:00
4S20431.FFD & 60S20431.FFD 1980-08-15T08:54:00 TO 1980-08-17T18:19:00
4S20432.FFD & 60S20432.FFD 1980-08-17T18:19:00 TO 1980-08-20T03:41:00
4S20433.FFD & 60S20433.FFD 1980-08-20T03:41:00 TO 1980-08-22T13:01:00
4S20434.FFD & 60S20434.FFD 1980-08-22T13:01:00 TO 1980-08-24T22:21:00
4S20435.FFD & 60S20435.FFD 1980-08-24T22:21:00 TO 1980-08-27T07:44:00
4S20436.FFD & 60S20436.FFD 1980-08-27T07:44:00 TO 1980-08-29T17:09:00
4S20437.FFD & 60S20437.FFD 1980-08-29T17:09:00 TO 1980-09-01T02:32:00
4S20438.FFD & 60S20438.FFD 1980-09-01T02:32:00 TO 1980-09-03T11:54:00
4S20439.FFD & 60S20439.FFD 1980-09-03T11:54:00 TO 1980-09-05T21:14:00
4S20440.FFD & 60S20440.FFD 1980-09-05T21:14:00 TO 1980-09-08T06:36:00
4S20441.FFD & 60S20441.FFD 1980-09-08T06:36:00 TO 1980-09-10T16:01:00
4S20442.FFD & 60S20442.FFD 1980-09-10T16:01:00 TO 1980-09-13T01:27:00
4S20443.FFD & 60S20443.FFD 1980-09-13T01:27:00 TO 1980-09-15T10:51:00
4S20444.FFD & 60S20444.FFD 1980-09-15T10:51:00 TO 1980-09-17T20:12:00
4S20445.FFD & 60S20445.FFD 1980-09-17T20:12:00 TO 1980-09-20T05:33:00
4S20446.FFD & 60S20446.FFD 1980-09-20T05:33:00 TO 1980-09-22T14:56:00
4S20447.FFD & 60S20447.FFD 1980-09-22T14:56:00 TO 1980-09-25T00:21:00
4S20448.FFD & 60S20448.FFD 1980-09-25T00:21:00 TO 1980-09-27T09:45:00
4S20449.FFD & 60S20449.FFD 1980-09-27T09:45:00 TO 1980-09-29T19:09:00
4S20450.FFD & 60S20450.FFD 1980-09-29T19:09:00 TO 1980-10-02T04:30:00
4S20451.FFD & 60S20451.FFD 1980-10-02T04:30:00 TO 1980-10-04T13:51:00
4S20452.FFD & 60S20452.FFD 1980-10-04T13:51:00 TO 1980-10-06T23:14:00
4S20453.FFD & 60S20453.FFD 1980-10-06T23:14:00 TO 1980-10-09T08:40:00
4S20454.FFD & 60S20454.FFD 1980-10-09T08:40:00 TO 1980-10-11T18:06:00
4S20455.FFD & 60S20455.FFD 1980-10-11T18:06:00 TO 1980-10-14T03:27:00
4S20456.FFD & 60S20456.FFD 1980-10-14T03:27:00 TO 1980-10-16T12:48:00
4S20457.FFD & 60S20457.FFD 1980-10-16T12:48:00 TO 1980-10-18T22:09:00
4S20458.FFD & 60S20458.FFD 1980-10-18T22:09:00 TO 1980-10-21T07:31:00
4S20459.FFD & 60S20459.FFD 1980-10-21T07:31:00 TO 1980-10-23T16:55:00
4S20460.FFD & 60S20460.FFD 1980-10-23T16:55:00 TO 1980-10-26T02:18:00
4S20461.FFD & 60S20461.FFD 1980-10-26T02:18:00 TO 1980-10-28T11:39:00
4S20462.FFD & 60S20462.FFD 1980-10-28T11:39:00 TO 1980-10-30T20:58:00
4S20463.FFD & 60S20463.FFD 1980-10-30T20:58:00 TO 1980-11-02T06:19:00
4S20464.FFD & 60S20464.FFD 1980-11-02T06:19:00 TO 1980-11-04T15:43:00
4S20465.FFD & 60S20465.FFD 1980-11-04T15:43:00 TO 1980-11-07T01:08:00
4S20466.FFD & 60S20466.FFD 1980-11-07T01:08:00 TO 1980-11-09T10:30:00
4S20467.FFD & 60S20467.FFD 1980-11-09T10:30:00 TO 1980-11-11T19:50:00
4S20468.FFD & 60S20468.FFD 1980-11-11T19:50:00 TO 1980-11-14T05:09:00
4S20469.FFD & 60S20469.FFD 1980-11-14T05:09:00 TO 1980-11-16T14:30:00
4S20470.FFD & 60S20470.FFD 1980-11-16T14:30:00 TO 1980-11-18T23:53:00
4S20471.FFD & 60S20471.FFD 1980-11-18T23:53:00 TO 1980-11-21T09:15:00
4S20472.FFD & 60S20472.FFD 1980-11-21T09:15:00 TO 1980-11-23T18:36:00
4S20473.FFD & 60S20473.FFD 1980-11-23T18:36:00 TO 1980-11-26T03:55:00
4S20474.FFD & 60S20474.FFD 1980-11-26T03:55:00 TO 1980-11-28T13:14:00
4S20475.FFD & 60S20475.FFD 1980-11-28T13:14:00 TO 1980-11-30T22:36:00
4S20476.FFD & 60S20476.FFD 1980-11-30T22:36:00 TO 1980-12-03T08:01:00
4S20477.FFD & 60S20477.FFD 1980-12-03T08:01:00 TO 1980-12-05T17:24:00
4S20478.FFD & 60S20478.FFD 1980-12-05T17:24:00 TO 1980-12-08T02:44:00
4S20479.FFD & 60S20479.FFD 1980-12-08T02:44:00 TO 1980-12-10T12:03:00
4S20480.FFD & 60S20480.FFD 1980-12-10T12:03:00 TO 1980-12-12T21:24:00
4S20481.FFD & 60S20481.FFD 1980-12-12T21:24:00 TO 1980-12-15T06:46:00
4S20482.FFD & 60S20482.FFD 1980-12-15T06:46:00 TO 1980-12-17T16:09:00
4S20483.FFD & 60S20483.FFD 1980-12-17T16:09:00 TO 1980-12-20T01:31:00
4S20484.FFD & 60S20484.FFD 1980-12-20T01:31:00 TO 1980-12-22T10:51:00
4S20485.FFD & 60S20485.FFD 1980-12-22T10:51:00 TO 1980-12-24T20:10:00
4S20486.FFD & 60S20486.FFD 1980-12-24T20:10:00 TO 1980-12-27T05:30:00
4S20487.FFD & 60S20487.FFD 1980-12-27T05:30:00 TO 1980-12-29T14:54:00
4S20488.FFD & 60S20488.FFD 1980-12-29T14:54:00 TO 1981-01-01T00:19:00

4S20489.FFD & 60S20489.FFD 1981-01-01T00:19:00 TO 1981-01-03T09:39:00
4S20490.FFD & 60S20490.FFD 1981-01-03T09:39:00 TO 1981-01-05T18:58:00
4S20491.FFD & 60S20491.FFD 1981-01-05T18:58:00 TO 1981-01-08T04:18:00
4S20492.FFD & 60S20492.FFD 1981-01-08T04:18:00 TO 1981-01-10T13:39:00
4S20493.FFD & 60S20493.FFD 1981-01-10T13:39:00 TO 1981-01-12T23:02:00
4S20494.FFD & 60S20494.FFD 1981-01-12T23:02:00 TO 1981-01-15T08:25:00
4S20495.FFD & 60S20495.FFD 1981-01-15T08:25:00 TO 1981-01-17T17:46:00
4S20496.FFD & 60S20496.FFD 1981-01-17T17:46:00 TO 1981-01-20T03:05:00
4S20497.FFD & 60S20497.FFD 1981-01-20T03:05:00 TO 1981-01-22T12:25:00
4S20498.FFD & 60S20498.FFD 1981-01-22T12:25:00 TO 1981-01-24T21:48:00
4S20499.FFD & 60S20499.FFD 1981-01-24T21:48:00 TO 1981-01-27T07:13:00
4S20500.FFD & 60S20500.FFD 1981-01-27T07:13:00 TO 1981-01-29T16:36:00
4S20501.FFD & 60S20501.FFD 1981-01-29T16:36:00 TO 1981-02-01T01:59:00
4S20502.FFD & 60S20502.FFD 1981-02-01T01:59:00 TO 1981-02-03T11:22:00
4S20503.FFD & 60S20503.FFD 1981-02-03T11:22:00 TO 1981-02-05T20:47:00
4S20504.FFD & 60S20504.FFD 1981-02-05T20:47:00 TO 1981-02-08T06:13:00
4S20505.FFD & 60S20505.FFD 1981-02-08T06:13:00 TO 1981-02-10T15:40:00
4S20506.FFD & 60S20506.FFD 1981-02-10T15:40:00 TO 1981-02-13T01:05:00
4S20507.FFD & 60S20507.FFD 1981-02-13T01:05:00 TO 1981-02-15T10:29:00
4S20508.FFD & 60S20508.FFD 1981-02-15T10:29:00 TO 1981-02-17T19:52:00
4S20509.FFD & 60S20509.FFD 1981-02-17T19:52:00 TO 1981-02-20T05:17:00
4S20510.FFD & 60S20510.FFD 1981-02-20T05:17:00 TO 1981-02-22T14:47:00
4S20511.FFD & 60S20511.FFD 1981-02-22T14:47:00 TO 1981-02-25T00:15:00
4S20512.FFD & 60S20512.FFD 1981-02-25T00:15:00 TO 1981-02-27T09:40:00
4S20513.FFD & 60S20513.FFD 1981-02-27T09:40:00 TO 1981-03-01T19:04:00
4S20514.FFD & 60S20514.FFD 1981-03-01T19:04:00 TO 1981-03-04T04:24:00
4S20515.FFD & 60S20515.FFD 1981-03-04T04:24:00 TO 1981-03-06T13:46:00
4S20516.FFD & 60S20516.FFD 1981-03-06T13:46:00 TO 1981-03-08T23:10:00
4S20517.FFD & 60S20517.FFD 1981-03-08T23:10:00 TO 1981-03-11T08:33:00
4S20518.FFD & 60S20518.FFD 1981-03-11T08:33:00 TO 1981-03-13T17:55:00
4S20519.FFD & 60S20519.FFD 1981-03-13T17:55:00 TO 1981-03-16T03:15:00
4S20520.FFD & 60S20520.FFD 1981-03-16T03:15:00 TO 1981-03-18T12:36:00
4S20521.FFD & 60S20521.FFD 1981-03-18T12:36:00 TO 1981-03-20T22:01:00
4S20522.FFD & 60S20522.FFD 1981-03-20T22:01:00 TO 1981-03-23T07:27:00
4S20523.FFD & 60S20523.FFD 1981-03-23T07:27:00 TO 1981-03-25T16:50:00
4S20524.FFD & 60S20524.FFD 1981-03-25T16:50:00 TO 1981-03-28T02:11:00
4S20525.FFD & 60S20525.FFD 1981-03-28T02:11:00 TO 1981-03-30T11:31:00
4S20526.FFD & 60S20526.FFD 1981-03-30T11:31:00 TO 1981-04-01T20:49:00
4S20527.FFD & 60S20527.FFD 1981-04-01T20:49:00 TO 1981-04-04T06:09:00
4S20528.FFD & 60S20528.FFD 1981-04-04T06:09:00 TO 1981-04-06T15:29:00
4S20529.FFD & 60S20529.FFD 1981-04-06T15:29:00 TO 1981-04-09T00:48:00
4S20530.FFD & 60S20530.FFD 1981-04-09T00:48:00 TO 1981-04-11T10:05:00
4S20531.FFD & 60S20531.FFD 1981-04-11T10:05:00 TO 1981-04-13T19:21:00
4S20532.FFD & 60S20532.FFD 1981-04-13T19:21:00 TO 1981-04-16T04:40:00
4S20533.FFD & 60S20533.FFD 1981-04-16T04:40:00 TO 1981-04-18T14:02:00
4S20534.FFD & 60S20534.FFD 1981-04-18T14:02:00 TO 1981-04-20T23:23:00
4S20535.FFD & 60S20535.FFD 1981-04-20T23:23:00 TO 1981-04-23T08:40:00
4S20536.FFD & 60S20536.FFD 1981-04-23T08:40:00 TO 1981-04-25T17:56:00
4S20537.FFD & 60S20537.FFD 1981-04-25T17:56:00 TO 1981-04-28T03:13:00
4S20538.FFD & 60S20538.FFD 1981-04-28T03:13:00 TO 1981-04-30T12:32:00
4S20539.FFD & 60S20539.FFD 1981-04-30T12:32:00 TO 1981-05-02T21:56:00
4S20540.FFD & 60S20540.FFD 1981-05-02T21:56:00 TO 1981-05-05T07:19:00
4S20541.FFD & 60S20541.FFD 1981-05-05T07:19:00 TO 1981-05-07T16:40:00
4S20542.FFD & 60S20542.FFD 1981-05-07T16:40:00 TO 1981-05-10T01:59:00
4S20543.FFD & 60S20543.FFD 1981-05-10T01:59:00 TO 1981-05-12T11:19:00
4S20544.FFD & 60S20544.FFD 1981-05-12T11:19:00 TO 1981-05-14T20:44:00
4S20545.FFD & 60S20545.FFD 1981-05-14T20:44:00 TO 1981-05-17T06:08:00
4S20546.FFD & 60S20546.FFD 1981-05-17T06:08:00 TO 1981-05-19T15:30:00
4S20547.FFD & 60S20547.FFD 1981-05-19T15:30:00 TO 1981-05-22T00:49:00
4S20548.FFD & 60S20548.FFD 1981-05-22T00:49:00 TO 1981-05-24T10:09:00
4S20549.FFD & 60S20549.FFD 1981-05-24T10:09:00 TO 1981-05-26T19:29:00
4S20550.FFD & 60S20550.FFD 1981-05-26T19:29:00 TO 1981-05-29T04:52:00
4S20551.FFD & 60S20551.FFD 1981-05-29T04:52:00 TO 1981-05-31T14:14:00
4S20552.FFD & 60S20552.FFD 1981-05-31T14:14:00 TO 1981-06-02T23:36:00
4S20553.FFD & 60S20553.FFD 1981-06-02T23:36:00 TO 1981-06-05T08:56:00
4S20554.FFD & 60S20554.FFD 1981-06-05T08:56:00 TO 1981-06-07T18:15:00
4S20555.FFD & 60S20555.FFD 1981-06-07T18:15:00 TO 1981-06-10T03:38:00
4S20556.FFD & 60S20556.FFD 1981-06-10T03:38:00 TO 1981-06-12T13:03:00
4S20557.FFD & 60S20557.FFD 1981-06-12T13:03:00 TO 1981-06-14T22:26:00
4S20558.FFD & 60S20558.FFD 1981-06-14T22:26:00 TO 1981-06-17T07:45:00
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4S20560.FFD & 60S20560.FFD 1981-06-19T17:05:00 TO 1981-06-22T02:25:00
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4S20562.FFD & 60S20562.FFD 1981-06-24T11:47:00 TO 1981-06-26T21:09:00
4S20563.FFD & 60S20563.FFD 1981-06-26T21:09:00 TO 1981-06-29T06:31:00
4S20564.FFD & 60S20564.FFD 1981-06-29T06:31:00 TO 1981-07-01T15:52:00
4S20565.FFD & 60S20565.FFD 1981-07-01T15:52:00 TO 1981-07-04T01:10:00
4S20566.FFD & 60S20566.FFD 1981-07-04T01:10:00 TO 1981-07-06T10:30:00
4S20567.FFD & 60S20567.FFD 1981-07-06T10:30:00 TO 1981-07-08T19:55:00
4S20568.FFD & 60S20568.FFD 1981-07-08T19:55:00 TO 1981-07-11T05:19:00

4S20569.FFD & 60S20569.FFD 1981-07-11T05:19:00 TO 1981-07-13T14:39:00
4S20570.FFD & 60S20570.FFD 1981-07-13T14:39:00 TO 1981-07-15T23:58:00
4S20571.FFD & 60S20571.FFD 1981-07-15T23:58:00 TO 1981-07-18T09:17:00
4S20572.FFD & 60S20572.FFD 1981-07-18T09:17:00 TO 1981-07-20T18:38:00
4S20573.FFD & 60S20573.FFD 1981-07-20T18:38:00 TO 1981-07-23T04:00:00
4S20574.FFD & 60S20574.FFD 1981-07-23T04:00:00 TO 1981-07-25T13:22:00
4S20575.FFD & 60S20575.FFD 1981-07-25T13:22:00 TO 1981-07-27T22:42:00
4S20576.FFD & 60S20576.FFD 1981-07-27T22:42:00 TO 1981-07-30T08:01:00
4S20577.FFD & 60S20577.FFD 1981-07-30T08:01:00 TO 1981-08-01T17:20:00
4S20578.FFD & 60S20578.FFD 1981-08-01T17:20:00 TO 1981-08-04T02:42:00
4S20579.FFD & 60S20579.FFD 1981-08-04T02:42:00 TO 1981-08-06T12:07:00
4S20580.FFD & 60S20580.FFD 1981-08-06T12:07:00 TO 1981-08-08T21:28:00
4S20581.FFD & 60S20581.FFD 1981-08-08T21:28:00 TO 1981-08-11T06:48:00
4S20582.FFD & 60S20582.FFD 1981-08-11T06:48:00 TO 1981-08-13T16:07:00
4S20583.FFD & 60S20583.FFD 1981-08-13T16:07:00 TO 1981-08-16T01:27:00
4S20584.FFD & 60S20584.FFD 1981-08-16T01:27:00 TO 1981-08-18T10:49:00
4S20585.FFD & 60S20585.FFD 1981-08-18T10:49:00 TO 1981-08-20T20:12:00
4S20586.FFD & 60S20586.FFD 1981-08-20T20:12:00 TO 1981-08-23T05:34:00
4S20587.FFD & 60S20587.FFD 1981-08-23T05:34:00 TO 1981-08-25T14:55:00
4S20588.FFD & 60S20588.FFD 1981-08-25T14:55:00 TO 1981-08-28T00:14:00
4S20589.FFD & 60S20589.FFD 1981-08-28T00:14:00 TO 1981-08-30T09:35:00
4S20590.FFD & 60S20590.FFD 1981-08-30T09:35:00 TO 1981-09-01T19:00:00
4S20591.FFD & 60S20591.FFD 1981-09-01T19:00:00 TO 1981-09-04T04:25:00
4S20592.FFD & 60S20592.FFD 1981-09-04T04:25:00 TO 1981-09-06T13:46:00
4S20593.FFD & 60S20593.FFD 1981-09-06T13:46:00 TO 1981-09-08T23:06:00
4S20594.FFD & 60S20594.FFD 1981-09-08T23:06:00 TO 1981-09-11T08:26:00
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4S20596.FFD & 60S20596.FFD 1981-09-13T17:49:00 TO 1981-09-16T03:12:00
4S20597.FFD & 60S20597.FFD 1981-09-16T03:12:00 TO 1981-09-18T12:36:00
4S20598.FFD & 60S20598.FFD 1981-09-18T12:36:00 TO 1981-09-20T21:58:00
4S20599.FFD & 60S20599.FFD 1981-09-20T21:58:00 TO 1981-09-23T07:18:00
4S20600.FFD & 60S20600.FFD 1981-09-23T07:18:00 TO 1981-09-25T16:38:00
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VOLDESC.SFD

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LOG_VOL_NSSDC_EXPT_ID: 77-I02B-04
LOG_VOL_INITIATION_DATE: 1994-10-24
LOG_VOL_CLOSING_DATE: 1995-03-16
LOG_VOL_CAPACITY: 1GB/Logical volume
LOG_VOL_FILE_STRUCTURE: Files-11

VOLUME_DIAMETER: 12 inches
VOLUME_DRIVE_MFGR_AND_MODEL: Optimem 1000
COMPUTER_MFGR: Digital Equipment Corporation
OPERATING_SYSTEM: MicroVMS 4.7
COMPUTER_SYSTEM: MicroVAX II
TRANSFER_SOFTWARE: SOAR Version 4.2

TECHNICAL_CONTACT:
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(310) 825-9030
NSI-hherbert@igpp.ucla.edu
NSI-DECnet-BRUNET::HARRY

PREV_LOG_VOLS: USA_NASA_NSSD_IC2D_0010A
USA_NASA_NSSD_IC2D_0010B

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME: Averaged Fluxgate Magnetometer Data
DATA_SOURCES: International Sun-Earth Explorer 2 (ISEE-2) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:
Dr. Christopher Russell
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
6871 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-3188
NSI=ctrussel@igpp.ucla.edu
NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:
A. DESCRIPTION_OF_INSTRUMENT:

In this triaxial fluxgate magnetometer, three ring-core sensors in an orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE OF THE INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA SET QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA PROCESSING OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA PROCESSING OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included 64-second averages of the 4-second data plus spacecraft spin rate, the zero

levels that were applied to the data during processing, spacecraft position and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1982-10-13T01:44:00 TO 1985-04-08T06:42:00

TYPE OF FILE TIME COVERAGE:
4-SECOND DATA 1982-10-13T01:44:00 TO 1985-04-08T06:42:00
60-SECOND DATA 1982-10-13T01:44:00 TO 1985-04-08T06:42:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG_VOL_FILE_TIME_COVERAGE:

4S20761.FFD & 60S20761.FFD	1982-10-13T01:44:00 TO 1982-10-15T11:06:00
4S20762.FFD & 60S20762.FFD	1982-10-15T11:06:00 TO 1982-10-17T20:32:00
4S20763.FFD & 60S20763.FFD	1982-10-17T20:32:00 TO 1982-10-20T05:55:00
4S20764.FFD & 60S20764.FFD	1982-10-20T05:55:00 TO 1982-10-22T15:16:00
4S20765.FFD & 60S20765.FFD	1982-10-22T15:16:00 TO 1982-10-25T00:37:00
4S20766.FFD & 60S20766.FFD	1982-10-25T00:37:00 TO 1982-10-27T09:58:00
4S20767.FFD & 60S20767.FFD	1982-10-27T09:58:00 TO 1982-10-29T19:21:00
4S20768.FFD & 60S20768.FFD	1982-10-29T19:21:00 TO 1982-11-01T04:45:00
4S20769.FFD & 60S20769.FFD	1982-11-01T04:45:00 TO 1982-11-03T14:08:00
4S20770.FFD & 60S20770.FFD	1982-11-03T14:08:00 TO 1982-11-05T23:30:00
4S20771.FFD & 60S20771.FFD	1982-11-05T23:30:00 TO 1982-11-08T08:50:00
4S20772.FFD & 60S20772.FFD	1982-11-08T08:50:00 TO 1982-11-10T18:11:00
4S20773.FFD & 60S20773.FFD	1982-11-10T18:11:00 TO 1982-11-13T03:35:00
4S20774.FFD & 60S20774.FFD	1982-11-13T03:35:00 TO 1982-11-15T13:00:00
4S20775.FFD & 60S20775.FFD	1982-11-15T13:00:00 TO 1982-11-17T22:21:00
4S20776.FFD & 60S20776.FFD	1982-11-17T22:21:00 TO 1982-11-20T07:41:00
4S20777.FFD & 60S20777.FFD	1982-11-20T07:41:00 TO 1982-11-22T17:02:00
4S20778.FFD & 60S20778.FFD	1982-11-22T17:02:00 TO 1982-11-25T02:23:00
4S20779.FFD & 60S20779.FFD	1982-11-25T02:23:00 TO 1982-11-27T11:46:00
4S20780.FFD & 60S20780.FFD	1982-11-27T11:46:00 TO 1982-11-29T21:09:00
4S20781.FFD & 60S20781.FFD	1982-11-29T21:09:00 TO 1982-12-02T06:31:00
4S20782.FFD & 60S20782.FFD	1982-12-02T06:31:00 TO 1982-12-04T15:51:00
4S20783.FFD & 60S20783.FFD	1982-12-04T15:51:00 TO 1982-12-07T01:10:00
4S20784.FFD & 60S20784.FFD	1982-12-07T01:10:00 TO 1982-12-09T10:32:00
4S20785.FFD & 60S20785.FFD	1982-12-09T10:32:00 TO 1982-12-11T19:56:00
4S20786.FFD & 60S20786.FFD	1982-12-11T19:56:00 TO 1982-12-14T05:19:00
4S20787.FFD & 60S20787.FFD	1982-12-14T05:19:00 TO 1982-12-16T14:38:00

4S20788.FFD & 60S20788.FFD 1982-12-16T14:38:00 TO 1982-12-18T23:58:00
4S20789.FFD & 60S20789.FFD 1982-12-18T23:58:00 TO 1982-12-21T09:18:00
4S20790.FFD & 60S20790.FFD 1982-12-21T09:18:00 TO 1982-12-23T18:39:00
4S20791.FFD & 60S20791.FFD 1982-12-23T18:39:00 TO 1982-12-26T04:01:00
4S20792.FFD & 60S20792.FFD 1982-12-26T04:01:00 TO 1982-12-28T13:24:00
4S20793.FFD & 60S20793.FFD 1982-12-28T13:24:00 TO 1982-12-30T22:44:00
4S20794.FFD & 60S20794.FFD 1982-12-30T22:44:00 TO 1983-01-02T08:02:00
4S20795.FFD & 60S20795.FFD 1983-01-02T08:02:00 TO 1983-01-04T17:22:00
4S20796.FFD & 60S20796.FFD 1983-01-04T17:22:00 TO 1983-01-07T02:45:00
4S20797.FFD & 60S20797.FFD 1983-01-07T02:45:00 TO 1983-01-09T12:08:00
4S20798.FFD & 60S20798.FFD 1983-01-09T12:08:00 TO 1983-01-11T21:28:00
4S20799.FFD & 60S20799.FFD 1983-01-11T21:28:00 TO 1983-01-14T06:46:00
4S20800.FFD & 60S20800.FFD 1983-01-14T06:46:00 TO 1983-01-16T16:06:00
4S20801.FFD & 60S20801.FFD 1983-01-16T16:06:00 TO 1983-01-19T01:26:00
4S20802.FFD & 60S20802.FFD 1983-01-19T01:26:00 TO 1983-01-21T10:48:00
4S20803.FFD & 60S20803.FFD 1983-01-21T10:48:00 TO 1983-01-23T20:10:00
4S20804.FFD & 60S20804.FFD 1983-01-23T20:10:00 TO 1983-01-26T05:31:00
4S20805.FFD & 60S20805.FFD 1983-01-26T05:31:00 TO 1983-01-28T14:50:00
4S20806.FFD & 60S20806.FFD 1983-01-28T14:50:00 TO 1983-01-31T00:08:00
4S20807.FFD & 60S20807.FFD 1983-01-31T00:08:00 TO 1983-02-02T09:30:00
4S20808.FFD & 60S20808.FFD 1983-02-02T09:30:00 TO 1983-02-04T18:54:00
4S20809.FFD & 60S20809.FFD 1983-02-04T18:54:00 TO 1983-02-07T04:15:00
4S20810.FFD & 60S20810.FFD 1983-02-07T04:15:00 TO 1983-02-09T13:34:00
4S20811.FFD & 60S20811.FFD 1983-02-09T13:34:00 TO 1983-02-11T22:53:00
4S20812.FFD & 60S20812.FFD 1983-02-11T22:53:00 TO 1983-02-14T08:14:00
4S20813.FFD & 60S20813.FFD 1983-02-14T08:14:00 TO 1983-02-16T17:35:00
4S20814.FFD & 60S20814.FFD 1983-02-16T17:35:00 TO 1983-02-19T02:58:00
4S20815.FFD & 60S20815.FFD 1983-02-19T02:58:00 TO 1983-02-21T12:20:00
4S20816.FFD & 60S20816.FFD 1983-02-21T12:20:00 TO 1983-02-23T21:41:00
4S20817.FFD & 60S20817.FFD 1983-02-23T21:41:00 TO 1983-02-26T07:00:00
4S20818.FFD & 60S20818.FFD 1983-02-26T07:00:00 TO 1983-02-28T16:20:00
4S20819.FFD & 60S20819.FFD 1983-02-28T16:20:00 TO 1983-03-03T01:44:00
4S20820.FFD & 60S20820.FFD 1983-03-03T01:44:00 TO 1983-03-05T11:08:00
4S20821.FFD & 60S20821.FFD 1983-03-05T11:08:00 TO 1983-03-07T20:28:00
4S20822.FFD & 60S20822.FFD 1983-03-07T20:28:00 TO 1983-03-10T05:48:00
4S20823.FFD & 60S20823.FFD 1983-03-10T05:48:00 TO 1983-03-12T15:09:00
4S20824.FFD & 60S20824.FFD 1983-03-12T15:09:00 TO 1983-03-15T00:31:00
4S20825.FFD & 60S20825.FFD 1983-03-15T00:31:00 TO 1983-03-17T09:54:00
4S20826.FFD & 60S20826.FFD 1983-03-17T09:54:00 TO 1983-03-19T19:17:00
4S20827.FFD & 60S20827.FFD 1983-03-19T19:17:00 TO 1983-03-22T04:39:00
4S20828.FFD & 60S20828.FFD 1983-03-22T04:39:00 TO 1983-03-24T14:00:00
4S20829.FFD & 60S20829.FFD 1983-03-24T14:00:00 TO 1983-03-26T23:19:00
4S20830.FFD & 60S20830.FFD 1983-03-26T23:19:00 TO 1983-03-29T08:43:00
4S20831.FFD & 60S20831.FFD 1983-03-29T08:43:00 TO 1983-03-31T18:08:00
4S20832.FFD & 60S20832.FFD 1983-03-31T18:08:00 TO 1983-04-03T03:31:00
4S20833.FFD & 60S20833.FFD 1983-04-03T03:31:00 TO 1983-04-05T12:52:00
4S20834.FFD & 60S20834.FFD 1983-04-05T12:52:00 TO 1983-04-07T22:12:00
4S20835.FFD & 60S20835.FFD 1983-04-07T22:12:00 TO 1983-04-10T07:34:00
4S20836.FFD & 60S20836.FFD 1983-04-10T07:34:00 TO 1983-04-12T16:57:00
4S20837.FFD & 60S20837.FFD 1983-04-12T16:57:00 TO 1983-04-15T02:21:00
4S20838.FFD & 60S20838.FFD 1983-04-15T02:21:00 TO 1983-04-17T11:45:00
4S20839.FFD & 60S20839.FFD 1983-04-17T11:45:00 TO 1983-04-19T21:06:00
4S20840.FFD & 60S20840.FFD 1983-04-19T21:06:00 TO 1983-04-22T06:26:00
4S20841.FFD & 60S20841.FFD 1983-04-22T06:26:00 TO 1983-04-24T15:48:00
4S20842.FFD & 60S20842.FFD 1983-04-24T15:48:00 TO 1983-04-27T01:13:00
4S20843.FFD & 60S20843.FFD 1983-04-27T01:13:00 TO 1983-04-29T10:39:00
4S20844.FFD & 60S20844.FFD 1983-04-29T10:39:00 TO 1983-05-01T20:00:00
4S20845.FFD & 60S20845.FFD 1983-05-01T20:00:00 TO 1983-05-04T05:20:00
4S20846.FFD & 60S20846.FFD 1983-05-04T05:20:00 TO 1983-05-06T14:41:00
4S20847.FFD & 60S20847.FFD 1983-05-06T14:41:00 TO 1983-05-09T00:04:00
4S20848.FFD & 60S20848.FFD 1983-05-09T00:04:00 TO 1983-05-11T09:27:00
4S20849.FFD & 60S20849.FFD 1983-05-11T09:27:00 TO 1983-05-13T18:50:00
4S20850.FFD & 60S20850.FFD 1983-05-13T18:50:00 TO 1983-05-16T04:12:00
4S20851.FFD & 60S20851.FFD 1983-05-16T04:12:00 TO 1983-05-18T13:31:00
4S20852.FFD & 60S20852.FFD 1983-05-18T13:31:00 TO 1983-05-20T22:51:00
4S20853.FFD & 60S20853.FFD 1983-05-20T22:51:00 TO 1983-05-23T08:13:00
4S20854.FFD & 60S20854.FFD 1983-05-23T08:13:00 TO 1983-05-25T17:38:00
4S20855.FFD & 60S20855.FFD 1983-05-25T17:38:00 TO 1983-05-28T03:00:00
4S20856.FFD & 60S20856.FFD 1983-05-28T03:00:00 TO 1983-05-30T12:19:00
4S20857.FFD & 60S20857.FFD 1983-05-30T12:19:00 TO 1983-06-01T21:39:00
4S20858.FFD & 60S20858.FFD 1983-06-01T21:39:00 TO 1983-06-04T07:00:00
4S20859.FFD & 60S20859.FFD 1983-06-04T07:00:00 TO 1983-06-06T16:21:00
4S20860.FFD & 60S20860.FFD 1983-06-06T16:21:00 TO 1983-06-09T01:44:00
4S20861.FFD & 60S20861.FFD 1983-06-09T01:44:00 TO 1983-06-11T11:06:00
4S20862.FFD & 60S20862.FFD 1983-06-11T11:06:00 TO 1983-06-13T20:26:00
4S20863.FFD & 60S20863.FFD 1983-06-13T20:26:00 TO 1983-06-16T05:44:00
4S20864.FFD & 60S20864.FFD 1983-06-16T05:44:00 TO 1983-06-18T15:04:00
4S20865.FFD & 60S20865.FFD 1983-06-18T15:04:00 TO 1983-06-21T00:28:00
4S20866.FFD & 60S20866.FFD 1983-06-21T00:28:00 TO 1983-06-23T09:51:00
4S20867.FFD & 60S20867.FFD 1983-06-23T09:51:00 TO 1983-06-25T19:10:00

4S20868.FFD & 60S20868.FFD 1983-06-25T19:10:00 TO 1983-06-28T04:29:00
4S20869.FFD & 60S20869.FFD 1983-06-28T04:29:00 TO 1983-06-30T13:48:00
4S20870.FFD & 60S20870.FFD 1983-06-30T13:48:00 TO 1983-07-02T23:09:00
4S20871.FFD & 60S20871.FFD 1983-07-02T23:09:00 TO 1983-07-05T08:30:00
4S20872.FFD & 60S20872.FFD 1983-07-05T08:30:00 TO 1983-07-07T17:52:00
4S20873.FFD & 60S20873.FFD 1983-07-07T17:52:00 TO 1983-07-10T03:12:00
4S20874.FFD & 60S20874.FFD 1983-07-10T03:12:00 TO 1983-07-12T12:31:00
4S20875.FFD & 60S20875.FFD 1983-07-12T12:31:00 TO 1983-07-14T21:49:00
4S20876.FFD & 60S20876.FFD 1983-07-14T21:49:00 TO 1983-07-17T07:11:00
4S20877.FFD & 60S20877.FFD 1983-07-17T07:11:00 TO 1983-07-19T16:35:00
4S20878.FFD & 60S20878.FFD 1983-07-19T16:35:00 TO 1983-07-22T01:55:00
4S20879.FFD & 60S20879.FFD 1983-07-22T01:55:00 TO 1983-07-24T11:13:00
4S20880.FFD & 60S20880.FFD 1983-07-24T11:13:00 TO 1983-07-26T20:32:00
4S20881.FFD & 60S20881.FFD 1983-07-26T20:32:00 TO 1983-07-29T05:52:00
4S20882.FFD & 60S20882.FFD 1983-07-29T05:52:00 TO 1983-07-31T15:13:00
4S20883.FFD & 60S20883.FFD 1983-07-31T15:13:00 TO 1983-08-03T00:34:00
4S20884.FFD & 60S20884.FFD 1983-08-03T00:34:00 TO 1983-08-05T09:55:00
4S20885.FFD & 60S20885.FFD 1983-08-05T09:55:00 TO 1983-08-07T19:14:00
4S20886.FFD & 60S20886.FFD 1983-08-07T19:14:00 TO 1983-08-10T04:32:00
4S20887.FFD & 60S20887.FFD 1983-08-10T04:32:00 TO 1983-08-12T13:52:00
4S20888.FFD & 60S20888.FFD 1983-08-12T13:52:00 TO 1983-08-14T23:16:00
4S20889.FFD & 60S20889.FFD 1983-08-14T23:16:00 TO 1983-08-17T08:38:00
4S20890.FFD & 60S20890.FFD 1983-08-17T08:38:00 TO 1983-08-19T17:57:00
4S20891.FFD & 60S20891.FFD 1983-08-19T17:57:00 TO 1983-08-22T03:16:00
4S20892.FFD & 60S20892.FFD 1983-08-22T03:16:00 TO 1983-08-24T12:35:00
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4S20895.FFD & 60S20895.FFD 1983-08-29T07:18:00 TO 1983-08-31T16:40:00
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4S20919.FFD & 60S20919.FFD 1983-10-25T15:57:00 TO 1983-10-28T01:19:00
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 4S21140.FFD & 60S21140.FFD  1985-04-05T21:12:00 TO 1985-04-08T06:42:00

PREV_LOG_VOL_COVERAGE: 1980-04-17T21:02:00 TO 1982-10-13T01:44:00

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REFERENCE="FFDATA.SFD";
EFERENCE="4SECOND.SFD";
REFERENCE="60SECOND.SFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/4S2/4S2*.FFH";
LABEL=NSSD3IF0006100000001;
REFERENCE="/4S2/4S2*.FFD";

LABEL=NSSD3IF0021000000001;
REFERENCE="/60S2/60S2*.FFH";
LABEL=NSSD3IF0006200000001;
REFERENCE="/60S2/60S2*.FFD";

LABEL=CCSD3SF0000200000001;
REFERENCE="/SOURCE/00README.TXT";
REFERENCE="/SOURCE/4S2ASC.COM";
REFERENCE="/SOURCE/4S2ASC.F";
REFERENCE="/SOURCE/4S2ASC.FOR";
REFERENCE="/SOURCE/60S2ASC.COM";
REFERENCE="/SOURCE/60S2ASC.F";
REFERENCE="/SOURCE/60S2ASC.FOR";
REFERENCE="/SOURCE/CONVERT.C";
REFERENCE="/SOURCE/CTIME.C";
REFERENCE="/SOURCE/CTIME.FOR";
REFERENCE="/SOURCE/MAKEFILE.";

/* EOF */
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CCSD3ZF0000100000001CCSD3VS00002markeraa

LOG_VOL_IDENT: USA_NASA_NSSD_IC2D_0011B VOLDESC.SFD
LOG_VOL_NSSDC_EXPT_ID: 77-102B-04
LOG_VOL_INITIATION_DATE: 1994-10-24
LOG_VOL_CLOSING_DATE: 1995-03-16
LOG_VOL_CAPACITY: 1GB/Logical volume
LOG_VOL_FILE_STRUCTURE: Files-11

VOLUME_DIAMETER: 12 inches
VOLUME_DRIVE_MFGR_AND_MODEL: Optimem 1000
COMPUTER_MFGR: Digital Equipment Corporation
OPERATING_SYSTEM: MicroVMS 4.7
COMPUTER_SYSTEM: MicroVAX II
TRANSFER_SOFTWARE: SOAR Version 4.2

TECHNICAL_CONTACT:
Harry Herbert
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
5833 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-9030
NSI=hherbert@igpp.ucla.edu
NSI-DECnet=BRUNET::HARRY

PREV_LOG_VOLS:
USA_NASA_NSSD_IC2D_0010A
USA_NASA_NSSD_IC2D_0010B
USA_NASA_NSSD_IC2D_0011A

CCSD$$MARKERmarkeraaCCSD3SS00002markerab

DATA_SET_NAME: Averaged Fluxgate Magnetometer Data
DATA_SOURCES: International Sun-Earth Explorer 2 (ISEE-2) and Fluxgate Magnetometer Instrument

SCIENTIFIC_CONTACT:
Dr. Christopher Russell
University of California at Los Angeles
Institute of Geophysics and Planetary Physics
6871 Slichter Hall
Los Angeles, CA 90025-1567
(310) 825-3188
NSI=ctrussel@igpp.ucla.edu
NSI-DECnet=BRUNET::CTRUSSELL

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:
The Explorer-class spacecraft, ISEE-1 and ISEE-2 were part of the mother/daughter/heliocentric mission which consisted of ISEE-1, ISEE-2, and ISEE-3 spacecraft. These were spin stabilized spacecraft with their spin axes usually normal to the ecliptic plane. The spin axis of ISEE-1 was within 1 degree of the ecliptic pole throughout the mission. The spin axis of ISEE-2 was usually close to the ecliptic pole but was up to 90 degrees from the ecliptic pole on a few occasions. Solar panels provided the power for the instruments.

B. ORBIT_INFORMATION:
The mother/daughter portion of the mission consisted of two spacecraft, one with station-keeping capability, in a highly eccentric earth orbit with apogee at 23 earth radii. The spacecraft maintained a small, but variable, separation distance and made simultaneous coordinated measurements to permit separation of spatial from temporal irregularities in the near-earth solar wind, the bow shock, and inside the magnetosphere. The spin rate of ISEE-1 was set at 19.75 rpm, differing slightly from that of the ISEE-2 spacecraft, whose spin rate was set at 19.8 rpm.

C. PERFORMANCE:
The ISEE-1 and ISEE-2 spacecraft operated continuously from launch on October 22, 1977 to September 27, 1987 when they both reentered the Earth's atmosphere.

INVESTIGATION_OBJECTIVES:
The purposes of the mission were (1) to investigate solar/terrestrial relationships at the outermost boundaries of the earth's magnetosphere, (2) to examine in detail the structure of the solar wind near the earth and the shock wave that forms the interface between the solar wind and earth, and (3) to continue the investigation of cosmic rays and solar flares in the interplanetary region near 1 AU.

INSTRUMENT_ATTRIBUTES:

A. DESCRIPTION_OF_INSTRUMENT:
In this triaxial fluxgate magnetometer, three ring-core sensors in an orthogonal triad were enclosed in a flipper mechanism at the end of the magnetometer boom. The electronics unit was on the main body of the spacecraft at the foot of the boom. For a complete description of the instrument see, "The ISEE 1 and 2 Fluxgate Magnetometers," by C. T. Russell, Geoscience Electronics GE-16, 239-242, 1978.

B. OPERATIONAL_MODE:
The magnetometer had two operating ranges of plus or minus 8192 nT and plus or minus 256 nT in each vector component. The data were digitized and averaged within the instrument to provide increased resolution and to provide Nyquist filtering. There were two modes for the transmission of the averaged data. In the double-precision mode of operation, 16-bit samples of data were transmitted. This provided a maximum resolution of plus or minus 1/4 nT or 1/128 nT in the low-sensitivity and high-sensitivity ranges. In the single-precision mode, any 8 consecutive bits of the above 16-bits were selected by ground command for transmission and the telemetry bandwidths of the magnetometer were doubled. This bandwidth varied from 2 Hz for the low-telemetry rate, double-precision experiment mode to 32 Hz for the high-telemetry rate, single precision mode.

C. MEASURED_PARAMETERS:
The instrument measured 3 components of the magnetic field. The data were despun to give the magnetic field along the spin axis, Bz, and the two components in the spin plane. The component along the projection of the sun-earth line onto the spin plane was called the Bx component.

D. PERFORMANCE_OF_THE_INSTRUMENT:
The instruments continued to function with undiminished accuracy until re-entry. Variation of the zero levels has been removed in processing. Occasionally latch up of a sensor occurred during range changes. Because three components of the field could be measured from the two remaining sensors due to the spin of the spacecraft this latch up does not usually affect the calculation of low temporal resolution data.

E. RESOLUTION:
The temporal resolution of the data is generally 4 or 16 samples per second. A single precision mode giving lower amplitude resolution but twice the temporal resolution was seldom used. The analog to digital converter of the magnetometer had a resolution of +/- 2 nT and +/- 1/16 nT in high range and low range. Averaging was used to increase the resolution to +/- 1/8 nT and +/- 1/256 nT. The accuracy of the analog to digital conversion was +/- 1/2 nT and +/- 1/64 nT.

PARAMETERS:
The archive includes 4-second averaged magnetic field vectors, 60-second averages of the four second data, standard deviations and attitude/orbit information.

DATA_SET_QUALITY:
The data submitted on this disk have been compared to other spacecraft in the solar wind and intercompared so that long term zero level errors and pointing errors should be small, much less than 1 nT and 1 degree respectively. (Please refer to the DATA PROCESSING OVERVIEW for a more detailed description of this process). However, telemetry errors could not be completely eliminated. Hence there may be occasional incorrect vectors.

NOTE: Since the zero levels for BZ have been adjusted for all vectors of the ISEE-1 and ISEE-2 magnetometer 4-second and 60-second datasets, the current data supercedes all previously submitted data.

Each WORM disk includes the file ERRATA.TXT in the root directory. This file will contain a description of any data and documentation inaccuracies that have been discovered in previous logical volumes of this dataset. An empty ERRATA.TXT file indicates that no problems have been identified in previous logical volumes. A non-existant ERRATA.TXT file indicates that the logical volume pre-dates the establishment of this mechanism for communcating known problems. Since inaccuracies in this dataset may be discovered after the last logical volume has been completed, a file containing the latest version of ERRATA.TXT will be available on the anonymous FTP account at "igpp.ucla.edu" in the directory "/pub/isee/archive" with the name "errata_4s60s.txt".

DATA_PROCESSING_OVERVIEW:
The ISEE magnetometer DECOM data was processed and written to 9-track magnetic tape using a series of Sun/UNIX FORTRAN programs. The output tape included un-despun normalized high resolution magnetic field values (BX, BY and BZ) in spacecraft coordinates, despun 12-second averages of the high resolution data taken every 4-seconds, and a data record every 64 seconds that included

64-second averages of the 4-second data plus spacecraft spin rate, the zero levels that were applied to the data during processing, spacecraft position and other housekeeping information.

An independent set of Sun/UNIX FORTRAN programs read the Multi-Coordinate Ephemeris (MCE) data and extracted attitude/orbit (A/O) information including various coordinate system rotation matrices, calculated theoretical magnetic field values and organized the output into spacecraft orbits (perigee-to-perigee).

NOTE: The entire datasets of unprocessed ISEE-1 and ISEE-2 magnetometer DECOM and MCE data, along with the source code for the software used at UCLA to perform the data processing described above, have been archived at the NSSDC on WORM disk (DEC/VMS format). Additionally, the MCE data have been archived on Recordable CD-ROM (Sun/UNIX format) and the DECOM data will be archived in a similar format in the near future.

To prepare the datasets in this archive, the 4-second data was first extracted from the tapes containing the processed data and written to magnetic disk on a Sun/UNIX system. Then the data was passed through a FORTRAN program that first removed many telemetry errors and then organized the data into spacecraft orbits in alignment with the A/O data files. Next, the ISEE-1 and ISEE-2 values were compared so that pointing errors in the spin plane components (BX and BY) could be detected and corrected and so that differences in the offset of the spin axis component (BZ) could be discovered and brought into agreement. Following this, the BZ values were compared with the BZ values for IMP-8 and ISEE-3 data in the Interplanetary Magnetic Field (IMF) and the ISEE-1 and ISEE-2 BZ values were adjusted to match the values observed by these spacecraft. These adjustments were as follows:

```
orbits    1- 143: (.0036*orbit#)-.154
orbits  144- 180: (.0025*orbit#)-.0025
orbits  181- 340: .611
orbits  341- 800: .44
orbits  801-1250: .26
orbits 1251-1400: .288
orbits 1401-1517: .133
```

Finally, whenever BZ values were altered the value of BT was recalculated. This 4-second dataset (UT, BX, BY, BZ, BT) in spacecraft coordinates is one of the datasets included in this archive.

The other main dataset in this archive was created by averaging the 4-second data to 60-seconds, aligned with the times of the A/O data. These 60-second averages are also scanned to remove many telemetry errors and then merged with the A/O data to create the ISEE magnetometer summary dataset.

NOTE: All time values recorded in the 4-second and 60-second ISEE datasets are for the mid-points of the averaging interval.

After the data files were generated, they were moved to a MicroVAX II using FTP software from The Wollongong Group. The floating point values in the data file were then converted from IEEE to VMS format and it was verified that the data had been successfully copied and converted. The data files were then written to this WORM disk using NSSDC SOAR software.

DATA_USAGE:
The data in this archive have been stored as UCLA-IGPP flat files so a computer program is required to read the data. A UCLA-IGPP flat file is made up of two data files, an ASCII file containing meta data with the file type extension ".ffh" (for flat file header) and a binary file containing DEC/VMS floating point values with the file type extension ".ffd" (for flat file data). The files [000000]FFHEADER.SFD and [000000]FFDATA.SFD on this archive contain a more complete description of UCLA-IGPP flat files. FORTRAN source code has also been included that can read the ISEE-1 and ISEE-2 4-second and 60-second flat files and write the data to an ASCII file. These programs typically have names such as "4S2ASC", where "4S" is the data resolution the program reads, "2" is a shortened form of the word "TO", and "ASC" is short for "ASCII" text, which the program writes. The file [SOURCE]00README.TXT includes an overview of the various documentation files in this archive and the file [000000]ERRATA.TXT described in the DATA_SET_QUALITY section describes any known inaccuracies.

DATA_ORGANIZATION:
The archive includes two distinct data sets. The first dataset contains universal time and 4-second averaged magnetic field vectors in spacecraft coordinates. The second dataset includes universal time, 60-second averages of the four second data in both spacecraft and GSM coordinates, standard deviations, attitude/orbit (AO) information, several coordinate system rotation matrices and the theoretical magnetic field components (GSM).

NOTE: Universal time is a real*8 value containing the number of seconds since January 1, 1966 at 00:00:00.000.

NOTE: In the 4-second data files the magnetic field vector values (BX, BY and BZ) preceed the total field value (BT) in each data record. Conversely, in the 60-second data files the total field value (BT) preceeds the magnetic field vector values (BX, BY and BZ) in each data record.

Each logical volume, one side of an optical disk, includes 380 orbits of ISEE-1 or ISEE-2 4-second and 60-second data, except the last side, which includes 377 orbits of data. Thus, the data resides on disk as follows:

disk 1 side 1:	orbits	1 - 380
disk 1 side 2:	orbits	381 - 760
disk 2 side 1:	orbits	761 - 1140
disk 2 side 2:	orbits	1141 - 1517

TYPE_OF_FILE_RELATIONSHIPS:
The 4-second data type of file is provided in spacecraft coordinates. The 60-second data type of file includes averages and standard deviations of 4-second data, along with theoretical magnetic field values, rotation matrices between coordinate systems, spin axis orientation of the spacecraft and other A/O information that may be applied to both the 60-second and 4-second data. To facilitate this, the start and stop times for the 4-second and 60-second files for the same orbit are the same.

CCSD$$MARKERmarkerabCCSD3KS00002markerac

LOG_VOL_TIME_COVERAGE: 1985-04-08T06:42:00 TO 1987-09-26T06:38:00

TYPE_OF_FILE_TIME_COVERAGE:
4-SECOND DATA 1985-04-08T06:42:00 TO 1987-09-26T06:38:00
60-SECOND DATA 1985-04-08T06:42:00 TO 1987-09-26T06:38:00

FILE_NAMING_CONVENTION:
For the 4-second type of file, file names are of the form "4S#XXXX.FFH" and "4S#XXXX.FFD" where "4S" is the type of data (4-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 4-second files are located in the directory "[4S#]" where "4S" is the type of data (4-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

For the 60-second type of file, file names are of the form "60S#XXXX.FFH" and "60S#XXXX.FFD" where "60S" is the type of data (60-second), "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data and "XXXX" is the four digit ISEE orbit number with leading zeroes as needed. An orbit number, also called a pass number, is measured from perigee to perigee. All the 60-second files are located in the directory "[60S#]" where "60S" is the type of data (60-second) and "#" is a "1" for ISEE-1 data or a "2" for ISEE-2 data.

LOG_VOL_FILE_TIME_COVERAGE:

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4S21143.FFD & 60S21143.FFD	1985-04-13T01:25:00 TO 1985-04-15T10:47:00
4S21144.FFD & 60S21144.FFD	1985-04-15T10:47:00 TO 1985-04-17T20:09:00
4S21145.FFD & 60S21145.FFD	1985-04-17T20:09:00 TO 1985-04-20T05:33:00
4S21146.FFD & 60S21146.FFD	1985-04-20T05:33:00 TO 1985-04-22T14:57:00
4S21147.FFD & 60S21147.FFD	1985-04-22T14:57:00 TO 1985-04-25T00:20:00
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4S21149.FFD & 60S21149.FFD	1985-04-27T09:42:00 TO 1985-04-29T19:03:00
4S21150.FFD & 60S21150.FFD	1985-04-29T19:03:00 TO 1985-05-02T04:24:00
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4S21152.FFD & 60S21152.FFD	1985-05-04T13:51:00 TO 1985-05-06T23:19:00
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4S21154.FFD & 60S21154.FFD	1985-05-09T08:40:00 TO 1985-05-11T18:00:00
4S21155.FFD & 60S21155.FFD	1985-05-11T18:00:00 TO 1985-05-14T03:22:00
4S21156.FFD & 60S21156.FFD	1985-05-14T03:22:00 TO 1985-05-16T12:46:00
4S21157.FFD & 60S21157.FFD	1985-05-16T12:46:00 TO 1985-05-18T22:09:00
4S21158.FFD & 60S21158.FFD	1985-05-18T22:09:00 TO 1985-05-21T07:33:00
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4S21160.FFD & 60S21160.FFD	1985-05-23T16:55:00 TO 1985-05-26T02:16:00
4S21161.FFD & 60S21161.FFD	1985-05-26T02:16:00 TO 1985-05-28T11:37:00
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4S21163.FFD & 60S21163.FFD	1985-05-30T21:00:00 TO 1985-06-02T06:29:00
4S21164.FFD & 60S21164.FFD	1985-06-02T06:29:00 TO 1985-06-04T15:52:00
4S21165.FFD & 60S21165.FFD	1985-06-04T15:52:00 TO 1985-06-07T01:11:00
4S21166.FFD & 60S21166.FFD	1985-06-07T01:11:00 TO 1985-06-09T10:32:00

4S21167.FFD & 60S21167.FFD 1985-06-09T10:32:00 TO 1985-06-11T19:54:00
4S21168.FFD & 60S21168.FFD 1985-06-11T19:54:00 TO 1985-06-14T05:17:00
4S21169.FFD & 60S21169.FFD 1985-06-14T05:17:00 TO 1985-06-16T14:40:00
4S21170.FFD & 60S21170.FFD 1985-06-16T14:40:00 TO 1985-06-19T00:03:00
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4S21183.FFD & 60S21183.FFD 1985-07-17T16:22:00 TO 1985-07-20T01:41:00
4S21184.FFD & 60S21184.FFD 1985-07-20T01:41:00 TO 1985-07-22T11:00:00
4S21185.FFD & 60S21185.FFD 1985-07-22T11:00:00 TO 1985-07-24T20:23:00
4S21186.FFD & 60S21186.FFD 1985-07-24T20:23:00 TO 1985-07-27T05:49:00
4S21187.FFD & 60S21187.FFD 1985-07-27T05:49:00 TO 1985-07-29T15:10:00
4S21188.FFD & 60S21188.FFD 1985-07-29T15:10:00 TO 1985-08-01T00:29:00
4S21189.FFD & 60S21189.FFD 1985-08-01T00:29:00 TO 1985-08-03T09:48:00
4S21190.FFD & 60S21190.FFD 1985-08-03T09:48:00 TO 1985-08-05T19:09:00
4S21191.FFD & 60S21191.FFD 1985-08-05T19:09:00 TO 1985-08-08T04:31:00
4S21192.FFD & 60S21192.FFD 1985-08-08T04:31:00 TO 1985-08-10T13:53:00
4S21193.FFD & 60S21193.FFD 1985-08-10T13:53:00 TO 1985-08-12T23:15:00
4S21194.FFD & 60S21194.FFD 1985-08-12T23:15:00 TO 1985-08-15T08:35:00
4S21195.FFD & 60S21195.FFD 1985-08-15T08:35:00 TO 1985-08-17T17:53:00
4S21196.FFD & 60S21196.FFD 1985-08-17T17:53:00 TO 1985-08-20T03:14:00
4S21197.FFD & 60S21197.FFD 1985-08-20T03:14:00 TO 1985-08-22T12:40:00
4S21198.FFD & 60S21198.FFD 1985-08-22T12:40:00 TO 1985-08-24T22:03:00
4S21199.FFD & 60S21199.FFD 1985-08-24T22:03:00 TO 1985-08-27T07:22:00
4S21200.FFD & 60S21200.FFD 1985-08-27T07:22:00 TO 1985-08-29T16:42:00
4S21201.FFD & 60S21201.FFD 1985-08-29T16:42:00 TO 1985-09-01T02:02:00
4S21202.FFD & 60S21202.FFD 1985-09-01T02:02:00 TO 1985-09-03T11:24:00
4S21203.FFD & 60S21203.FFD 1985-09-03T11:24:00 TO 1985-09-05T20:47:00
4S21204.FFD & 60S21204.FFD 1985-09-05T20:47:00 TO 1985-09-08T06:09:00
4S21205.FFD & 60S21205.FFD 1985-09-08T06:09:00 TO 1985-09-10T15:30:00
4S21206.FFD & 60S21206.FFD 1985-09-10T15:30:00 TO 1985-09-13T00:49:00
4S21207.FFD & 60S21207.FFD 1985-09-13T00:49:00 TO 1985-09-15T10:09:00
4S21208.FFD & 60S21208.FFD 1985-09-15T10:09:00 TO 1985-09-17T19:34:00
4S21209.FFD & 60S21209.FFD 1985-09-17T19:34:00 TO 1985-09-20T05:00:00
4S21210.FFD & 60S21210.FFD 1985-09-20T05:00:00 TO 1985-09-22T14:21:00
4S21211.FFD & 60S21211.FFD 1985-09-22T14:21:00 TO 1985-09-24T23:41:00
4S21212.FFD & 60S21212.FFD 1985-09-24T23:41:00 TO 1985-09-27T09:02:00
4S21213.FFD & 60S21213.FFD 1985-09-27T09:02:00 TO 1985-09-29T18:24:00
4S21214.FFD & 60S21214.FFD 1985-09-29T18:24:00 TO 1985-10-02T03:47:00
4S21215.FFD & 60S21215.FFD 1985-10-02T03:47:00 TO 1985-10-04T13:10:00
4S21216.FFD & 60S21216.FFD 1985-10-04T13:10:00 TO 1985-10-06T22:33:00
4S21217.FFD & 60S21217.FFD 1985-10-06T22:33:00 TO 1985-10-09T07:54:00
4S21218.FFD & 60S21218.FFD 1985-10-09T07:54:00 TO 1985-10-11T17:14:00
4S21219.FFD & 60S21219.FFD 1985-10-11T17:14:00 TO 1985-10-14T02:36:00
4S21220.FFD & 60S21220.FFD 1985-10-14T02:36:00 TO 1985-10-16T12:05:00
4S21221.FFD & 60S21221.FFD 1985-10-16T12:05:00 TO 1985-10-18T21:29:00
4S21222.FFD & 60S21222.FFD 1985-10-18T21:29:00 TO 1985-10-21T06:49:00
4S21223.FFD & 60S21223.FFD 1985-10-21T06:49:00 TO 1985-10-23T16:10:00
4S21224.FFD & 60S21224.FFD 1985-10-23T16:10:00 TO 1985-10-26T01:32:00
4S21225.FFD & 60S21225.FFD 1985-10-26T01:32:00 TO 1985-10-28T10:56:00
4S21226.FFD & 60S21226.FFD 1985-10-28T10:56:00 TO 1985-10-30T20:20:00
4S21227.FFD & 60S21227.FFD 1985-10-30T20:20:00 TO 1985-11-02T05:43:00
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4S21229.FFD & 60S21229.FFD 1985-11-04T15:05:00 TO 1985-11-07T00:26:00
4S21230.FFD & 60S21230.FFD 1985-11-07T00:26:00 TO 1985-11-09T09:46:00
4S21231.FFD & 60S21231.FFD 1985-11-09T09:46:00 TO 1985-11-11T19:13:00
4S21232.FFD & 60S21232.FFD 1985-11-11T19:13:00 TO 1985-11-14T04:40:00
4S21233.FFD & 60S21233.FFD 1985-11-14T04:40:00 TO 1985-11-16T14:02:00
4S21234.FFD & 60S21234.FFD 1985-11-16T14:02:00 TO 1985-11-18T23:22:00
4S21235.FFD & 60S21235.FFD 1985-11-18T23:22:00 TO 1985-11-21T08:44:00
4S21236.FFD & 60S21236.FFD 1985-11-21T08:44:00 TO 1985-11-23T18:07:00
4S21237.FFD & 60S21237.FFD 1985-11-23T18:07:00 TO 1985-11-26T03:30:00
4S21238.FFD & 60S21238.FFD 1985-11-26T03:30:00 TO 1985-11-28T12:54:00
4S21239.FFD & 60S21239.FFD 1985-11-28T12:54:00 TO 1985-11-30T22:16:00
4S21240.FFD & 60S21240.FFD 1985-11-30T22:16:00 TO 1985-12-03T07:37:00
4S21241.FFD & 60S21241.FFD 1985-12-03T07:37:00 TO 1985-12-05T16:57:00
4S21242.FFD & 60S21242.FFD 1985-12-05T16:57:00 TO 1985-12-08T02:19:00
4S21243.FFD & 60S21243.FFD 1985-12-08T02:19:00 TO 1985-12-10T11:47:00
4S21244.FFD & 60S21244.FFD 1985-12-10T11:47:00 TO 1985-12-12T21:11:00
4S21245.FFD & 60S21245.FFD 1985-12-12T21:11:00 TO 1985-12-15T06:30:00
4S21246.FFD & 60S21246.FFD 1985-12-15T06:30:00 TO 1985-12-17T15:50:00

ERRATA.TXT file included on LOG_VOL_IDENT: USA_NASA_NSSD_IC2D_0011B

LOG_VOL_NSSDC_EXPT_ID:	77-102B-04
DATA_SET_NAME:	Averaged Fluxgate Magnetometer Data
DATA_SOURCES:	International Sun-Earth Explorer 2 (ISEE-2) and Fluxgate Magnetometer Instrument
SCIENTIFIC_CONTACT:	Dr. Christopher Russell University of California at Los Angeles Institute of Geophysics and Planetary Physics 6871 Slichter Hall Los Angeles, CA 90024-1567 (310) 825-3188 NSI=ctrussel@igpp.ucla.edu NSI-DECnet=BRUNET::CTRUSSELL
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1 ERENCE_FILES:	[000000]VOLDESC.SFD [000000]4SECOND.SFD [000000]60SECOND.SFD [000000]FFHEADER.SFD [000000]FFDATA.SFD [000000]ERRATA.TXT [SOURCE]00README.TXT

NOTE: A final ERRATA.TXT file for ISEE-1 and ISEE-2 Averaged Fluxgate Magnetometer Data will be included with LOG_VOL_IDENT: USA_NASA_NSSD_IC2D_0011B

When this logical volume was closed, no errors were known to exist in the ISEE Averaged Fluxgate Magnetometer Data archival.