

DATA SET CATALOG # 176

64-077A-02A

MARINER 4

HELIUM MAGNETOMETER

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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

MARINER 4

HELIUM MAGNETOMETER

64-077A-02A

ASFP 00091

THIS DATA SET HAS BEEN RESTORED. ORIGINALLY IT CONTAINED ONE 7-TRACK, 556 BPI TAPE WRITTEN IN BCD. THERE IS ONE RESTORED TAPE WRITTEN IN EBCDIC. THE DR AND DS TAPE ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPE WAS CREATED ON A 7094 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBER AND THE TIME SPAN IS AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR01674	DS01674	D01577	1	11/28/64 - 10/01/65

MARINER 4

HELIUM MAGNETOMETER

64-077A-02A

This 7-track BCD tape has a header two records in length. The remaining records contain the day of year, period (1 to 8), the number of points used, the three hour means (SMN array) of BR, BT, BN, and B, the absolute values of BR and BT, Bn, and B for the rms deviations (RMS array) of the same variables. The format statements needed to read the tape are listed below. The variables appear on the format statements in the order listed above.

The right-handed coordinate system used is R, T, N, where $BR = BO$ and $BN = BO$ in the heliocentric solar polar coordinates r, O, o . Additional information such as trajectory data values of r, O, o is included on the attached sheets. In Table 1 the dates (time at earth) are taken to be the beginnings of 27 day periods at three-day intervals and the coordinates are those of the spacecraft 13-1/2 days later. The quantity r_m is in astronomical units.

D-15 77

C-2326

Mariner 4 Magnetometer 64-077A-02

Instrument description Space Research 6 (P907)

Operational Characteristics JGR 72, 1, (1) 1967

```

DATA A(132)/132*1Hb/
DIMENSION SMN (6), RMS (6)
DATA DAY/4HbDAY/,PER/4HbPER/,PTS/4HbPTS/
READ (10, 1)A
WRITE (6, 1)A
READ (10, 1)A
WRITE (6, 1)A
DO3 I = 1, 306
  READ (10, 2)DAY, KDAY, PER, KPRD, PTS, KGP, SMN, RMS
2  FORMAT(A4,I4,A4,I2,A4,I6,I2F9.4)
3  CONTINUE
1  FORMAT(132A1)

```

The Values are in the following columns on the printout;

<u>VALUES</u>	<u>COLUMN</u>
DAY	1-4
JULIAN DAY	5-8
PERIOD (PER)	9-12
NO. OF PERIOD (1-8)	13-14
PTS	15-18
NO. OF POINTS USED	19-24
3 HR. MEANS OF BR	25-33
3 HR. MEANS OF BT	34-42
3 HR. MEANS OF BN	43-51
3 HR. MEANS OF B	52-60
ABSOLUTE VALUES OF BR	61-69
ABSOLUTE VALUES OF BT	70-78
ABSOLUTE VALUES OF BN	79-87
ABSOLUTE VALUES OF B	88-96
RMS DEVIATIONS OF BR	97-105
RMS DEVIATIONS OF BT	106-114
RMS DEVIATIONS OF BN	115-123
RMS DEVIATIONS OF B	124-132

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SANTA BARBARA • SANTA CRUZ

UCLA SPACE SCIENCE CENTER
INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS
LOS ANGELES, CALIFORNIA 90024

April 21, 1970

EXTFP-Mariner 4 Interplanetary
Magnetic Field Tape

Spacecraft Mariner 4 was launched November 27, 1964. The data on the tapes are for the period from November 28, 1964, to ^{OCTOBER 1} September, 1965. During this time, Mariner 4 traveled from earth to the vicinity of Mars. This tape, EXTFP, consists of 3 reels and is a nonpacked binary tape generated on the 7094 machine. The blocksize of each record is 253 words (6 bytes/word) which includes the Fortran control word. The time increment between each data point given is 50.4 seconds. On each logical record 21 data points are returned by the following READ statement:

```
DIMENSION KALTIM(21), BIN(21,9), NCYC(21),NFRAME(21)
READ(20) (KALTIM(L), NCYC(L), NFRAME(L), (BIN(L,J), J=1, 9),
L = 1, 21)
```

A good format to write the Lth data point is
FORMAT (1X, 318, 9F9.3). For the Lth data point in
a record:

KALTIM(L): The Greenwich Mean Time at which the data were taken in seconds = day of year * 86,400 + hour * 3600 + minute * 60 + seconds. As an example, the first data point on tape is day 333 of 1964, 15 hours, 7 minutes, 6 seconds =

28825626 seconds. January 1, 1964, would have been day 1, not day 0 in our scheme. January 1, 1965, is taken to be day 1 again. Check your tape to see if this is so.

NCYC(L): The cycle number.

NFRAME(L): The frame number. It starts over again at the next cycle. Several frame readings were averaged to give 1 data point.

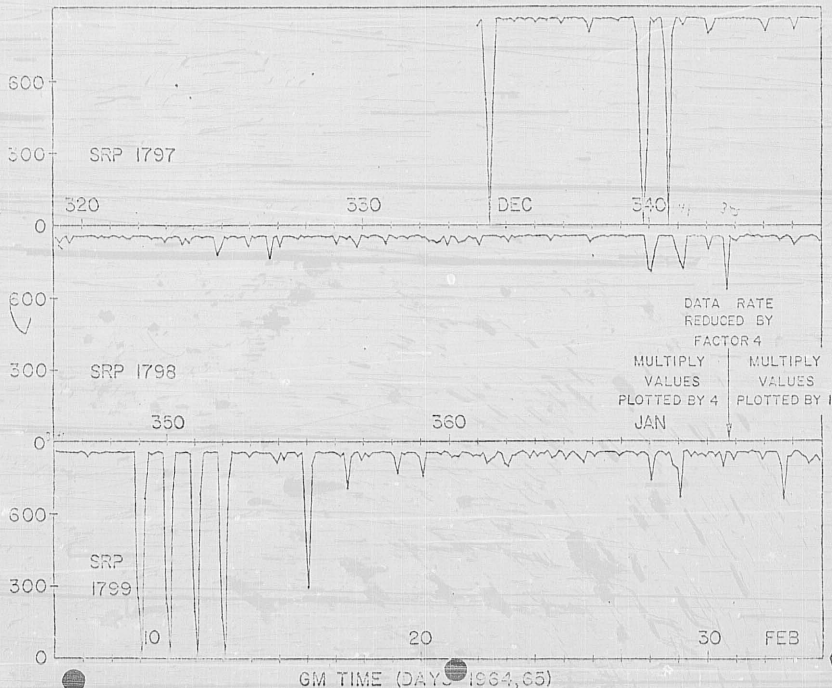
BIN: 9 interplanetary magnetic field variables. If a number in BIN is greater than or equal to 1.0E31, then that number is dummy data, i.e., don't use it. For the Lth data point in the record the 9 variables (BIN (L,J), J = 1, 9) are: BR, BT, BN, BP = $\text{SQRT}(\text{BN}^2 + \text{BT}^2)$, BL = $\text{SQRT}(\text{BR}^2 + \text{BT}^2)$, B, |BR|, |BT|, and |BN| where the last 3 quantities are absolute values. Some of these quantities are averages from points at higher data rates so sometimes |BIN(L, 1)| $\neq$ BIN(L,7), etc. B is the magnitude of the magnetic field. The B_R component is in the radial direction from the sun. $\text{BT} = B_\phi$ is the east-west component. $B_\theta = -\text{BN}$ is the "north-south" component. (B_R , B_θ , B_ϕ form the right-handed spherical polar coordinate system with θ measured from the sun's axis of rotation and where the r - ϕ plane is the sun's equatorial plane. For much additional information including the r , θ , ϕ position of spacecraft Mariner 4 as a function of time see:)

Coleman, P.J., Jr., L. Davis, Jr., E.J. Smith, and D.E. Jones, The polarity pattern of the interplanetary magnetic field during solar rotations 1798-1808, J. Geophys. Res., 72, 1637-1643, 1967.

Coleman, P.J., Jr., E.J. Smith, L. Davis, Jr., and D.E. Jones, Radial dependence of the interplanetary field: 1.0-1.5 AU, J. Geophys. Res., 74, 2826-2850, 1969.

Writeup by:
Ronald L. Rosenberg

NUMBER OF MEASUREMENTS

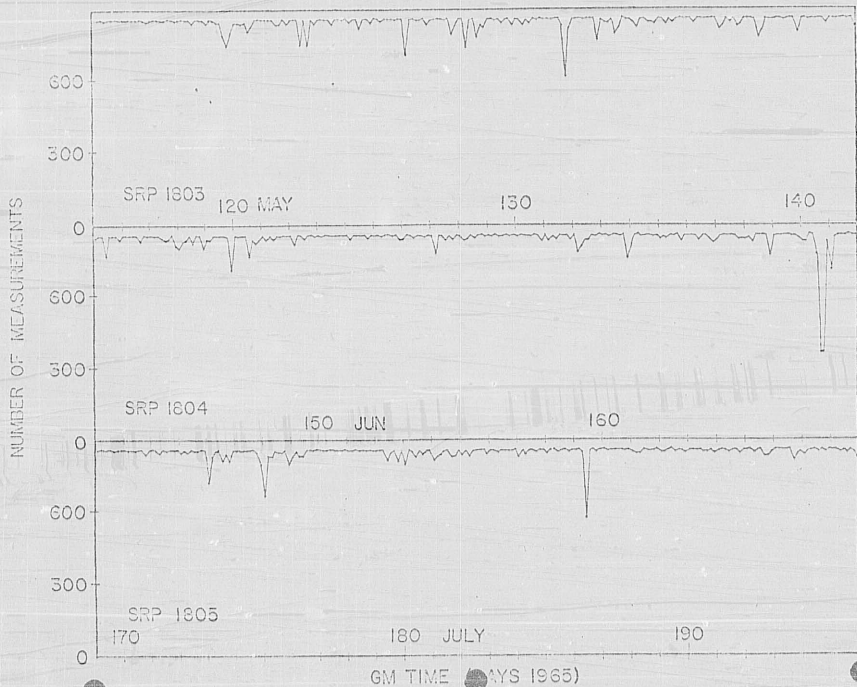


NUMBER OF MEASUREMENTS FOR FOUR PERIODS

MARINER 4



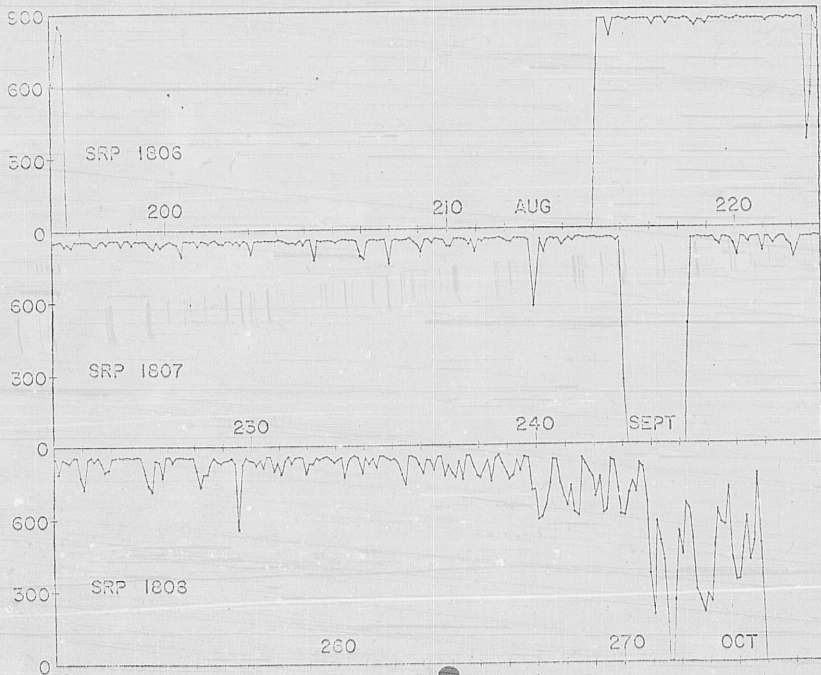
MARINER 4



NUMBER OF MEASUREMENTS FOR 3-HR PERIODS

MARINER 4

NUMBER OF MEASUREMENTS



GM TIME (DAYS 1965)

NUMBER OF MEASUREMENTS FOR 3-HR PERIODS

SATELLITE NAME - MARINER - IV

DATA SET ID 64-077A-0213

EXPERIMENT NAME - MAGNETOMETER

DATA SET NAME - NUMBER OF 10 POINT + TIMES OF 100 POINT GAP

DATE OF RUN JULY 06, 1970

THE FIRST TIME POINT OF THIS TAPE IS 641420 150705

THE FOLLOWING TIMES ARE FOR PERIODS GREATER THAN 5000 SECONDS

650715 125141 650803 34749

650831 11119 650902 70026

3 NUMBER OF TIME GAPS GREATER THAN 504 SEC

490962 TOTAL NUMBER OF LOGICAL RECORDS READ

651001 215919 LAST TIME READ

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UCLA SPACE SCIENCE CENTER
INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS
LOS ANGELES, CALIFORNIA 90024

January 10, 1969

Mr. John T. Campbell
Code 601
National Aeronautics and
Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Dear Mr. Campbell:

At the request of Paul J. Coleman, Jr., I am enclosing the Mariner 4 data tape from November 1964 (Day 333) to September 1965 (Day 274). This 7-track BCD tape has a header two records in length. The remaining records contain the day of year, period (1 to 8), the number of points used, the three hour means (SMN array) of BR, BT, BN, and B, the absolute values of BR and BT and the rms deviations (RMS array) of the same variables. The format statements needed to read the tape are listed below. The variables appear on the format statements in the order listed above.

The right-handed coordinate system used is R, T, N, where $BT = B\theta$ and $BN = -B\phi$ in the heliocentric solar polar coordinates r, θ, ϕ . Additional information such as trajectory data values of r, θ, ϕ is included on the enclosed sheets. In Table 1 the dates (time at earth) are taken to be the beginnings of 27 day periods at three-day intervals and the coordinates are those of the spacecraft 13-1/2 days later. The quantity r_m is in astronomical units.

Mr. John T. Campbell
January 10, 1969
Page 2

```
DATA A(132)/132*1Hb/  
DIMENSION SMN (6), RMS (6)  
DATA DAY/4HbDAY/,PER/4HbPER/,PTS/1HbPTS/  
READ (10, 1)A  
WRITE (6, 1)A  
READ (10, 1)A  
WRITE (6, 1)A  
DO3 I = 1, 306  
READ (10, 2)DAY, KDAY, PER, KPRD, PTS, KGP, SMN, RMS  
2  FORMAT(A4,14,A4,12,A4,16,12F9.4)  
3  CONTINUE  
1  FORMAT(132A1)
```

If you have any questions please feel free to contact me
at Area Code 213 825-3698.

Yours very truly,



Ronald Rosenberg

RR:hw

Enclosures: As stated

Table 1

Solar Rotation Number	Time at Earth		Time at Mariner		Mariner Coordinates at Mid-Point	
	Date	Day of Yr.	Day of Yr.	Hour	r_m (AU)	θ_m (degrees)
1797-9-6	29 Nov.	334	334	0.0	1.00	90.9
	9-7	02 Dec.	337	0.1	1.00	91.2
	9-8	05 Dec.	340	0.2	1.01	91.7
	9-9	08 Dec.	343	0.7	1.01	92.0
1798-9-1	11 Dec.	346	346	1.3	1.02	92.3
	9-2	14 Dec.	349	2.0	1.02	92.8
	9-3	17 Dec.	352	3.1	1.03	93.1
	9-4	20 Dec.	355	3.9	1.04	93.6
	9-5	23 Dec.	358	4.9	1.04	93.9
	9-6	26 Dec.	361	5.7	1.05	94.1
	9-7	29 Dec.	364	6.6	1.06	94.4
	9-8	01 Jan.	001	7.2	1.07	94.7
	9-9	04 Jan.	004	7.6	1.08	94.9
1799-9-1	07 Jan.	007	007	8.2	1.09	95.1
	9-2	10 Jan.	010	9.1	1.10	95.4
	9-3	13 Jan.	013	9.9	1.11	95.7
	9-4	16 Jan.	016	10.7	1.12	95.9
	9-5	19 Jan.	019	11.4	1.13	96.1
	9-6	22 Jan.	022	12.0	1.14	96.2
	9-7	25 Jan.	025	12.7	1.15	96.3
	9-8	28 Jan.	028	13.2	1.16	96.5
	9-9	31 Jan.	031	13.7	1.17	96.6
1800-9-1	03 Feb.	034	034	14.1	1.18	96.8
	9-2	06 Feb.	037	14.3	1.19	96.9
	9-3	09 Feb.	040	14.5	1.20	97.0
	9-4	12 Feb.	043	14.8	1.21	97.0
	9-5	15 Feb.	046	15.0	1.22	97.0
	9-6	18 Feb.	049	15.4	1.23	97.1
	9-7	21 Feb.	052	15.7	1.24	97.1
	9-8	24 Feb.	055	15.8	1.25	97.1
	9-9	27 Feb.	058	15.8	1.26	97.1
1801-9-1	02 Mar.	061	061	15.6	1.27	97.1
	9-2	05 Mar.	064	15.5	1.28	97.1
	9-3	08 Mar.	067	15.3	1.30	97.1
	9-4	11 Mar.	070	15.0	1.31	97.0
	9-5	14 Mar.	073	14.7	1.32	97.0
	9-6	17 Mar.	076	14.3	1.33	97.0
	9-7	20 Mar.	079	13.9	1.33	97.0
	9-8	23 Mar.	082	13.6	1.34	97.0
	9-9	26 Mar.	085	13.3	1.35	96.9

Table 1
(Continued)

Solar Rotation Number	Time at Earth		Time at Mariner		Mariner Coordinates at Mid-Point	
	Date	Day of Yr.	Day of Yr.	Hour	r_m (AU)	θ_m (degrees)
1802-9-1	29 Mar.	088	088	12.4	1.35	96.9
9-2	01 Apr.	091	091	11.8	1.37	96.8
9-3	04 Apr.	094	094	10.8	1.38	96.8
9-4	07 Apr.	097	097	9.9	1.39	96.7
9-5	10 Apr.	100	100	9.1	1.40	96.6
9-6	13 Apr.	103	103	8.1	1.41	96.5
9-7	16 Apr.	106	106	7.2	1.41	96.4
9-8	19 Apr.	109	109	5.7	1.42	96.3
9-9	22 Apr.	112	112	4.5	1.43	96.2
1803-9-1	25 Apr.	115	115	3.3	1.44	96.2
9-2	28 Apr.	118	118	2.9	1.45	96.1
9-3	01 May	121	121	2.3	1.45	96.0
9-4	04 May	124	124	0.8	1.46	96.0
9-5	07 May	127	126	23.5	1.47	95.9
9-6	10 May	130	129	22.1	1.47	95.8
9-7	13 May	133	132	20.4	1.48	95.7
9-8	16 May	136	135	19.8	1.49	95.5
9-9	19 May	139	138	17.2	1.49	95.3
1804-9-1	22 May	142	141	15.5	1.50	95.2
9-2	25 May	145	144	13.8	1.50	95.1
9-3	28 May	148	147	13.2	1.51	95.0
9-4	31 May	151	150	12.0	1.51	94.9
9-5	03 Jun.	154	153	10.2	1.52	94.8
9-6	06 Jun.	157	156	8.2	1.52	94.7
9-7	09 Jun.	160	159	6.3	1.53	94.5
9-8	12 Jun.	163	162	4.2	1.53	94.4
9-9	15 Jun.	166	165	2.1	1.54	94.3
1805-9-1	18 Jun.	169	167	23.9	1.54	94.1

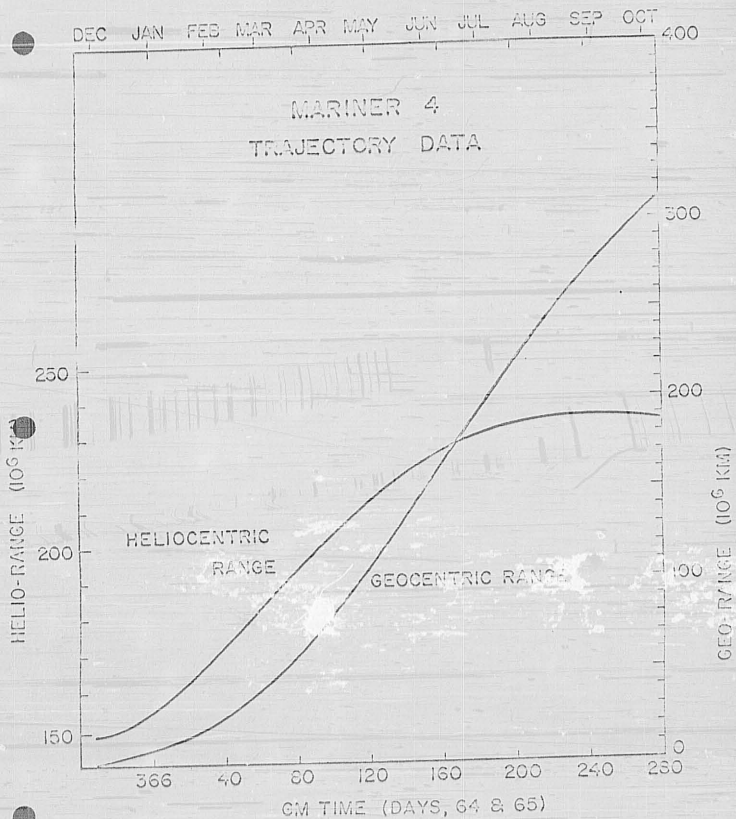


Figure 1

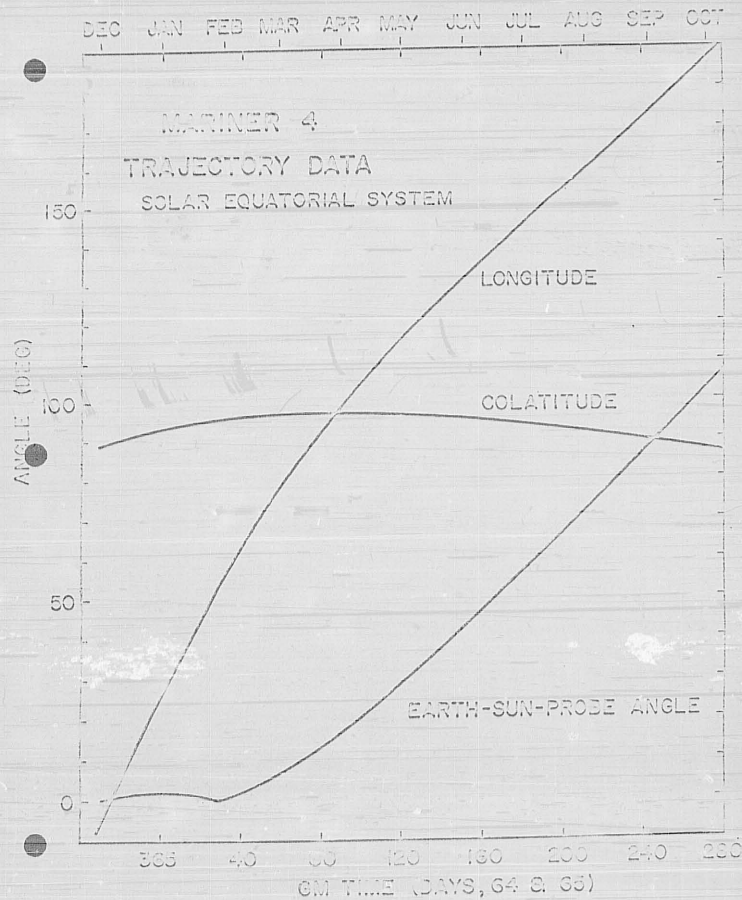
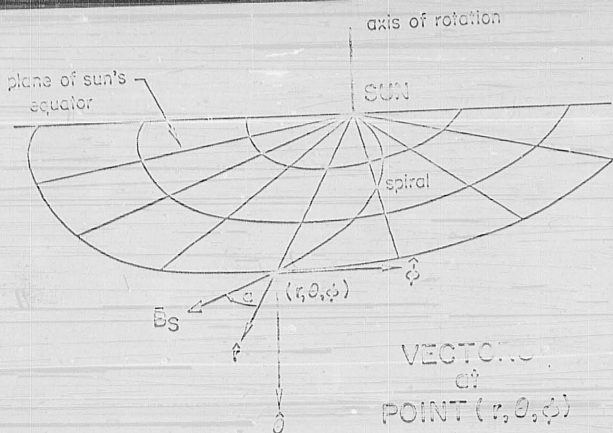


Figure 2



VECTORS
at
POINT (r, θ, ϕ)

(position of spacecraft)
special case: $\theta = 90^\circ$
SPIRAL FIELD $\vec{B}_S$



ARBITRARY FIELD $\vec{B}$

Figure Captions

Figure 1. Parameters of the trajectory of Mariner 4 versus time. Heliocentric and geocentric ranges are shown. Regular reception of the signals from the spacecraft ended for this phase of the flight on 1 October 1964, Day 274.

Figure 2. Parameters of the trajectory of Mariner 4 versus time. The colatitude and longitude are in a heliocentric spherical polar coordinate system. The polar axis is the sun's axis of rotation. The earth-sun-spacecraft angle is also shown.

Figure 3. Coordinate system and vectors used in describing the interplanetary magnetic field.

The Radial Dependence of the
Interplanetary Magnetic Field: Mariner 4

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2. LENGTH 132

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.3882	0.6407	1.1878	1.0759																
DAY 336 PER 3 PTS	3411	-2.1328	0.0449	-1.5219	4.1454	2.5513	1.6368	1.8953	1.8987	1	REC	23, LENGTH	132						
.8766	0.6266	1.2774	0.9633																
DAY 336 PER 4 PTS	3396	-2.1664	1.9004	-1.0702	4.3675	2.1750	2.6984	0.9317	2.3584	1	REC	24, LENGTH	132						
9369	0.7524	0.9164	1.3757																
DAY 336 PER 5 PTS	3428	-3.5252	1.6745	-1.7368	4.9851	3.5258	2.0291	0.8203	1.8918	1	REC	25, LENGTH	132						
.5876	0.4100	0.8175	1.5052																
Y 336 P R 6 PTS		-3. 1	2.0821	-1.2382	5.0248	3.8376	2.0860	7	8	1	REC	26, LENGTH	132						

[illegible]