21.0 this document is not valid
see Frank Otten
file 2 has correct list of variables

PIONEER PROGRAM

National Aeronautics and Space Administration
Ames Research Center
Moffett Field, California

TAPE FORMAT DESCRIPTION,

DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE

PIONEER DOCUMENT PC-262.06

APPROVAL:

NASA/ARC
Pioneer Project Manager, Charles F. Hall, Charles F Hall (Signature) 4/9/76 (Date)

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PIONEER F/G PROJECT

SPECIFICATION PC-262.06

TAPE FORMAT DESCRIPTION, DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Ames Research Center
Moffett Field, California

PIONEER F/G PROJECT

SPECIFICATION PC-262.06

TAPE FORMAT DESCRIPTION, DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE

March 10, 1976

1.0 SCOPE

This specification defines the format of the referenced Trajectory Tape, a new "save" tape. This tape is made as output from the Jet Propulsion Laboratory computer program DPTRAJ.

2.0 APPLICABLE DOCUMENTS

2.1 NASA/ARC SPECIFICATIONS

PC-262.00 Pioneer F/G Off-Line Data Processing System Description

PC-262.05 Pioneer Saturn: Trajectory Data User Requirements

3.0 REQUIREMENTS

3.1 GENERAL TAPE SPECIFICATIONS

The DPTRAJ Satellite Ephemeris Trajectory Tape contains time sequenced records of trajectory data. These records are written by DPTRAJ as output, and are usable as input to Pioneer Project and experimenter programs.

3.2 TAPE FORMATS

The DPTRAJ Satellite Ephemeris Trajectory Tape has a physical structure that meets JPL and UNIVAC standards. The physical record length and tape structure is shown in Figure 3.2.1.

The first three physical records contain header information. After header information, data records follow. The end of the tape is signaled by presence of a final physical record of 28 words, with 377777777777_8 in word three. The end of data is not terminated by an end-of-file.

The logical data consists of two types: header and time sequential data points. The header is made up of two logical records which occupy the first three physical record spaces. Logical header record one contains 375 words of BCD information and occupies the first two physical records. (Refer to Figure 3.2.1.) The second header record occupies physical record three (28 words). It has 377777777777_8 in word three; words 1, 2, and 4 through 28 are spare. Starting with physical record four, the time sequential data for each consecutive data point occupy three physical records each (375 double-word parameters).

The relationship between the logical header information and physical records is shown in Figure 3.2.2.

3.3 DETAILED DATA DESCRIPTION AND INTERPRETATION

read by STRAJ in SBPIO & RBF, output by STRAJECT

3.3.1 Time Annotated Trajectory Parameters

Each logical record of the described tape contains time annotated trajectory parameters. The following list describes and defines the available parameters; each requires one double-word for storage.

type	BCD NAME	TIME GROUP
R*8	ETSP50	(1) Time past 0^h January 1, 1950 (sec)*
R*8	JULDATA	(2) Julian Date (days)**
	VIGDAT	(3) Gregorian calendar data (year, month, day, hour, minute, second)
	TFLANC	(4) Time from launch (sec)
	TFINJE	(5) Time from initial epoch of trajectory (sec)
	ETMUTC	(6) ET-UTC (sec) ***
	DALARM	(7) DPTRAJ Alarm word, corresponding to this epoch (2 integer words)

*The time reference is ET (ephemeris time)
**The time reference is elapsed days from Noon, 1 January 4713 B.C.
***ET and UTC (Universal Time Coordinated)

3.3.2 Geocentric. The following parameters are defined in the inertial spherical coordinate system described on Figure 3.3.2. For this group the reference body is the Earth and the plane of reference is the Earth's true equator of date.

RANGRP	(8)	Range rate (km/sec); the time rate of change of the magnitude of the radius vector
MAGVEL	(9)	Speed of the spacecraft (km/sec)
INPATH	(10)	Inertial flight path angle (deg)
INAZIM	(11)	Inertial azimuth angle (deg)
REARPR	(12)	Radius to the spacecraft (km)
DECPRO	(13)	Declination of the spacecraft (deg)
RTASCP	(14)	Right ascension of the spacecraft (deg)
REARSU	(15)	Earth-Sun distance (km)
DECSUN	(16)	Declination of the Sun (deg)
RTASCS	(17)	Right ascension of the Sun (deg)
REARMO	(18)	Earth-Moon distance (km)
DECMOO	(19)	Declination of the moon (deg)
RTASCM	(20)	Right ascension of the moon (deg)

3.3.3 Heliocentric. For this group of parameters there are two coordinate systems centered at the Sun.

The following parameters are defined in the inertial spherical coordinate system described on Figure 3.3.3-a. For this group the reference body is the Sun and the plane of reference is the true ecliptic of date.

HRANGP	(21)	Radius to the S/C (km)
HMAGVP	(22)	Speed of the S/C (km/sec)
HINPTH	(23)	Inertial flight path angle (deg)
CELLTP	(24)	Celestial latitude of the S/C (deg)
CELLNP	(25)	Celestial longitude of the S/C (deg)

CELLTE (26) Celestial latitude of the Earth (deg)

CELLNE (27) Celestial longitude of the Earth (deg)

The following parameters are defined in the Sun-Earth-line cartesian coordinate system described on Figure 3.3.3-b.

XSCSEL (28) X-component of the S/C in the Sun-Earth system (km)

YXCSEL (29) Y-component of the S/C in the Sun-Earth system (km)

ZSCSEL (30) Z-component of the S/C in the Sun-Earth system (km)

SPSEXY (31) Sun-S/C distance in the X-Y plane of the Sun-Earth system (km); the projection of the Sun-S/C vector onto the X-Y plane

LNPSEL (32) Longitude of the S/C in the Sun-Earth system (deg)

PCBICB (33) Integrating central body(1 BCD word)

FERPFL (34) Flag for equinox and reference plane for items 35 through 62

3.3.4 <u>Inertial Cartesian</u>. The following parameters represent cartesian position and velocity vectors of the S/C from the Earth, Sun, Saturn and Jupiter. Figure 3.3.4 describes the inertial cartesian coordinate system. The plane of reference for these parameters is the mean ecliptic of 1950.0.

XPGSFF (35) X-component of the S/C (Earth centered) (km)

YPGSFF (36) Y-component of the S/C (Earth centered) (km)

ZPGSFF (37) Z-component of the S/C (Earth centered) (km)

DXPGSF (38) $\dot{X}$-time rate of change in the X-component (km/sec)

DYPGSF (39) $\dot{Y}$-time rate of change in the Y-component (km/sec)

DZPGSF (40) $\dot{Z}$-time rate of change in the Z-component (km/sec)

XPHSFF	(41)	X-component of the S/C (Sun centered) (km)
YPHSFF	(42)	Y-component of the S/C (Sun centered) (km)
ZPHSFF	(43)	Z-component of the S/C (Sun centered) (km)
DXPHSF	(44)	$\dot{X}$-time rate of change in the X-component (km/sec)
DYPHSF	(45)	$\dot{Y}$-time rate of change in the Y-component (km/sec)
DZPHSF	(46)	$\dot{Z}$-time rate of change in the Z-component (km/sec)
XP1SFF	(47)	X-component of the S/C (Saturn centered) (km)
YP1SFF	(48)	Y-component of the S/C (Saturn centered) (km)
ZP1SFF	(49)	Z-component of the S/C (Saturn centered) (km)
DXP1SF	(50)	$\dot{X}$-time rate of change in the X-component (km/sec)
DYP1SF	(51)	$\dot{Y}$-time rate of change in the Y component (km/sec)
DZP1SF	(52)	$\dot{Z}$-time rate of change in the Z component (km/sec)
XP2SFF	(53)	X-component of the S/C (Jupiter centered) (km)
YP2SFF	(54)	Y-component of the S/C (Jupiter centered) (km)
ZP2SFF	(55)	Z-component of the S/C (Jupiter centered) (km)
DXP2SF	(56)	$\dot{X}$-time rate of change in the X-component (km/sec)
DYP2SF	(57)	$\dot{Y}$-time rate of change in the Y-component (km/sec)
DZP2SF	(58)	$\dot{Z}$-time rate of change in the Z-component (km/sec)

Additionally:

B1MAGR	(59)	Saturn-S/C distance (km)
B1MAGV	(60)	Velocity of the S/C with respect to Saturn (km/sec)
B2MAGR	(61)	Jupiter-S/C distance (km)
B2MAGR	(62)	Velocity of the S/C with respect to Jupiter (km/sec)

3.3.5 Body-Fixed. The following parameters are referenced to a rotating coordinate system fixed to either the Earth, Saturn, or Jupiter. The mathematical models of the body-fixed system (equator, prime meridian, rotational dynamics) are defined in Document PC-262.05. The body-fixed coordinate system is shown on Figure 3.3.5.

- EARTH -

EALATP	(63)	Latitude of the S/C (deg)
EALONP	(64)	Longitude of the S/C (deg)
EAVELP	(65)	Velocity of the S/C (km/sec)
EAPTHP	(66)	Body-fixed path angle (deg)
EAAZIP	(67)	Body-fixed azimuth angle (deg)

- SATURN -

B1LATP	(68)	Latitude of the S/C (deg)
B1LONP	(69)	Longitude of the S/C (deg)
B1VELP	(70)	Velocity of the S/C (km/sec)
B1PTHP	(71)	Body-fixed path angle (deg)
B1AZIP	(72)	Body-fixed azimuth angle (deg)

- JUPITER -

B2LATP	(73)	Latitude of the S/C (deg)
B2LONP	(74)	Longitude of the S/C (deg)
B2VELP	(75)	Velocity of the S/C (km/sec)

B2PTHP	(76)	Body-fixed path angle (deg)
B2AZIP	(77)	Body-fixed azimuth angle (deg)

3.3.6 Angles. This group contains two types of angles:

(a) Three body angles;
(b) Cone and Clock angles.

All angles are in degrees.

The following list of parameters represent the angles between two radius vectors from the same vertex. As an example the Earth-S/C-Saturn angle is the minimum angle between the S/C-to-Earth vector and the S/C-to-Saturn vector. (See illustration of three body angles, Figure 3.3.6-a).

EPB1AN	(78)	Earth-S/C-Saturn
EPB2AN	(79)	Earth-S/C-Jupiter
EPSUAN	(80)	Earth-S/C-Sun
EPMOAN	(81)	Earth-S/C-Moon
CPEANG	(82)	Canopus-S/C-Earth
CPSANG	(83)	Canopus-S/C-Sun
MOPSAN	(84)	Moon-S/C-Sun
B1PB2A	(85)	Saturn-S/C-Jupiter
MOEPAN	(86)	Moon-Earth-S/C
SEPANG	(87)	Sun-Earth-S/C
ESPANG	(88)	Earth-Sun-S/C
SPB1AN	(89)	Sun-S/C-Saturn
SPB2AN	(90)	Sun-S/C-Jupiter
B1EPAN	(91)	Saturn-Earth-S/C
B2EPAN	(92)	Jupiter-Earth-S/C

The following parameters represent the cone and clock angles for three different cone-clock systems. In Figure 3.3.6-b, the typical cone-clock coordinate system is defined.

Sun-S/C-Canopus

CONECE	(93)	Cone angle of the Earth
CLCKCE	(94)	Clock angle of the Earth
CONEC1	(95)	Cone angle of Saturn
CLCKC1	(96)	Clock angle of Saturn
CONEC2	(97)	Cone angle of Jupiter
CLCKC2	(98)	Clock angle of Jupiter

Sun-S/C-Earth

CONEE1	(99)	Cone angle of Saturn
CLCKE1	(100)	Clock angle of Saturn
CONEE2	(101)	Cone angle of Jupiter
CLCKE2	(102)	Clock angle of Jupiter
CONEEC	(103)	Cone angle of Canopus
CLCKEC	(104)	Clock angle of Canopus

Sun-S/C-Saturn

CONE1E	(105)	Cone angle of the Earth
CLCK1E	(106)	Clock angle of the Earth
CONE12	(107)	Cone angle of Jupiter
CLCK12	(108)	Clock angle of Jupiter
CONE1C	(109)	Cone angle of Canopus
CLCK1C	(110)	Clock angle of Canopus

The following miscellaneous parameters are of interest.

PCBODY	(111)	Physical central body (IBCD word)
BODY01	(112)	BCD name of input body 1 (SPBOD (1))
BODY02	(113)	BCD name of input body 2 (SPBOD(2))
PERIAP	(114)	Flag for periapsis

(PERIAP = 0 for no closest approach,
= 1 for periapsis,
= 2 for apoapsis.)

3.3.7 Programmable Variables

The following parameters were selected from the DPTRAJ output using the "programmable variable" option and are included on the tape. Parameters (115 - 132 and 135 - 152) are cartesian position vectors for the spacecraft, Earth and Sun, defined with respect to an inertial coordinate system centered at each of four moons of Saturn. *Figure 3.3.4 describes the coordinate system. The plane of reference for these parameters is the mean ecliptic of 1950.0.

- MOON 1 -

XP1	(115)	X-component of the spacecraft (km)
YP1	(116)	Y-component of the spacecraft (km)
ZP1	(117)	Z-component of the spacecraft (km)
XE1	(118)	X-component of the Earth (km)
YE1	(119)	Y-component of the Earth (km)
ZE1	(120)	Z-component of the Earth (km)
XS1	(121)	X-component of the Sun (km)
YS1	(122)	Y-component of the Sun (km)
ZS1	(123)	Z-component of the Sun (km)

- MOON 2 -

XP2	(124)	X-component of the spacecraft (km)
YP2	(125)	Y-component of the spacecraft (km)
ZP2	(126)	Z-component of the spacecraft (km)
XE2	(127)	X-component of the Earth (km)
YE2	(128)	Y-component of the Earth (km)
ZE2	(129)	Z-component of the Earth (km)

* At this time, categorization of Saturn's moons by number is arbitrary, and specific assignments have not been made nor should be inferred. Definitions of moons will be provided at the time tape is created.

XS2	(130)	X-component of the Sun (km)
YS2	(131)	Y-component of the Sun (km)
ZS2	(132)	Z-component of the Sun (km)

The following two parameters are additional three body angles so defined in Section 3.3.6.

S6O1P	(133)	Sun - Moon 1 - S/C angle
S6O2P	(134)	Sun - Moon 2 - S/C angle

- MOON 3 -

XP1	(135)	X-component of the spacecraft (km)
YP1	(136)	Y-component of the spacecraft (km)
ZP1	(137)	Z-component of the spacecraft (km)
XE1	(138)	X-component of the Earth (km)
YE1	(139)	Y-component of the Earth (km)
ZE1	(140)	Z-component of the Earth (km)
XS1	(141)	X-component of the Sun (km)
YS1	(142)	Y-component of the Sun (km)
ZS1	(143)	Z-component of the Sun (km)

- MOON 4 -

XP2	(144)	X-component of the spacecraft (km)
YP2	(145)	Y-component of the spacecraft (km)
ZP2	(146)	Z-component of the spacecraft (km)
XE2	(147)	X-component of the Earth (km)
YE2	(148)	Y-component of the Earth (km)
ZE2	(149)	Z-component of the Earth (km)
XS2	(150)	X-component of the Sun (km)

YS2 (151) Y-component of the Sun (km)

ZS2 (152) Z-component of the Sun (km)

The following two parameters are additional three body angles so defined in Section 3.3.6.

S603P (153) Sun - Moon 3 - S/C angle

S604P (154) Sun - Moon 4 - S/C angle

4.0 PRODUCT ASSURANCE PROVISIONS

Not applicable.

5.0 HANDLING, SHIPPING, AND STORAGE

Not applicable.

6.0 NOTES

6.1 ABBREVIATIONS

See Section 6.1 of specification PC-262.00.

6.2 GLOSSARY OF TERMS

See Section 6.2 of specification PC-262.00.

Physical Record Length and Tape Structure

252 Words -- Record 1	Header Sequence
140 Words -- Record 2	
28 Words -- Record 3*	
252 Words -- Record 4	First Data Point Sequence
252 Words -- Record 5	
252 Words -- Record 6	
28 Words -- Record 7*	
252 Words -- Record 8	Second Data Point Sequence
252 Words -- Record 9	
252 Words -- Record 10	
28 Words -- Record 11*	
. . . .	
252 Words -- Record N-3	Last Data Point Sequence
252 Words -- Record N-2	
252 Words -- Record N-1	
28 Words -- Record N* (Final Physical Record: 377777777777_8 in Word 3)	

*Records 3, N have $37...7_8$ as word 3. All other 28 word records have zero as word 3.

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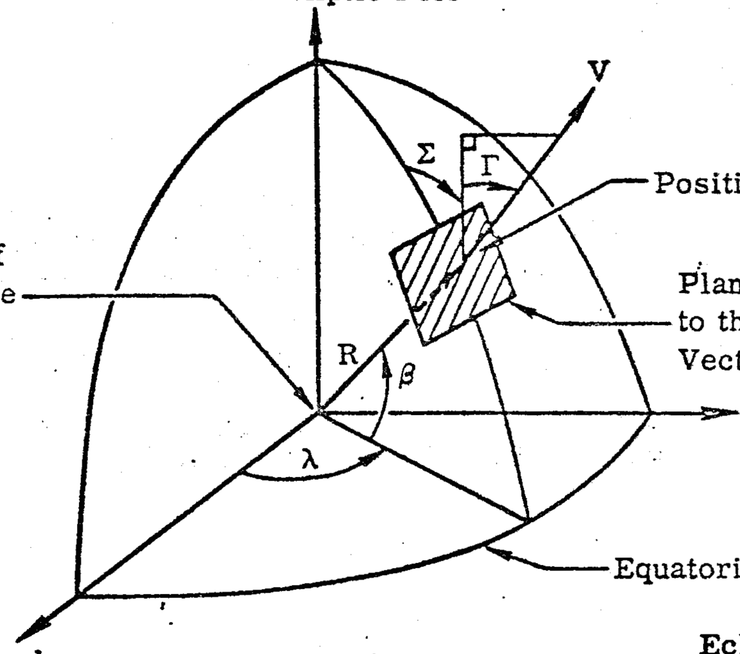
	DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE: PHYSICAL RECORD LENGTH AND TAPE STRUCTURE	DOC. NO. PC-262.06
		FIG. 3.2.1
	REV. NO. / DATE 3/10/76	SHEET 1 OF 1



The plane of reference in the Inertial Spherical Coordinate System shall be either the ecliptic plane or the equatorial plane of Earth.

R radius: The distance from the center of the reference body to the spacecraft

β declination (equatorial reference plane): The angle between the reference body-spacecraft radius vector and the reference body equatorial plane; measured positive north of the equatorial plane

β celestial latitude (ecliptic reference plane): The angle between the reference body-spacecraft radius vector and the reference body ecliptic plane; measured positive north of the ecliptic plane

λ right ascension (equatorial reference plane): The angle between the Vernal Equinox line and the projection of the reference body-spacecraft radius vector onto the Earth equatorial plane; measured eastward from the Vernal Equinox

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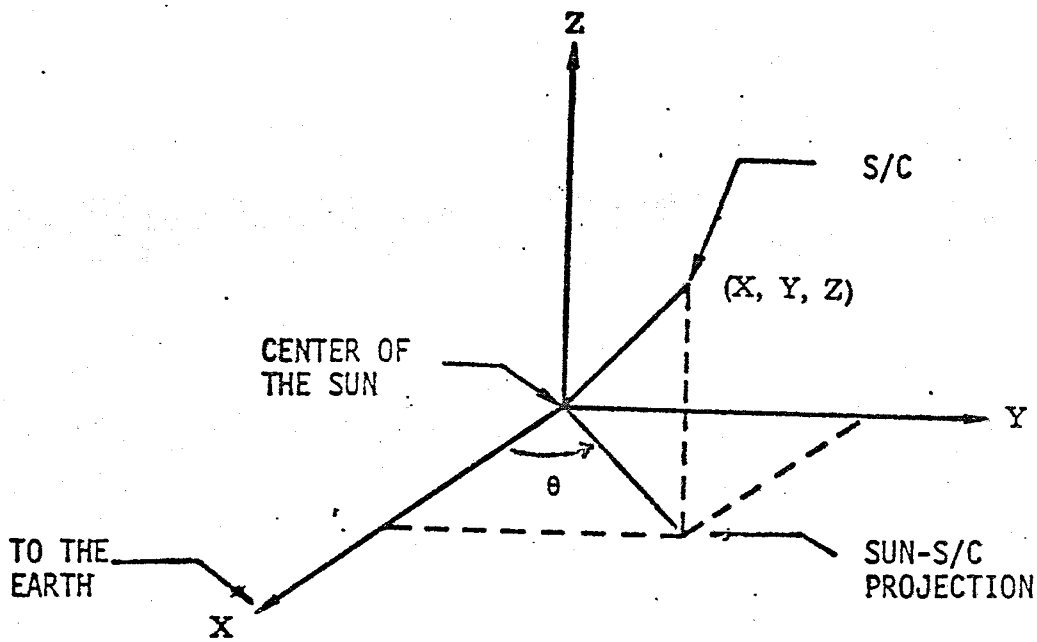
	INERTIAL SPHERICAL COORDINATE SYSTEM	DOC. NO. PC-262.06
		FIG. 3.3.3-a
	REV. NO. / DATE 3/10/76	SHEET 1 OF 2

λ celestial longitude (ecliptic reference plane): the angle between the Vernal Equinox line and the projection of the reference body-spacecraft radius vector onto the ecliptic plane; measured eastward from the Vernal Equinox line

V speed: the magnitude of the spacecraft inertial velocity

Γ inertial flight path angle: the angle between the spacecraft inertial velocity vector and the plane normal to the reference body-spacecraft radius vector; positive away from the center of the body

Σ inertial azimuth angle: the angle between the local meridian and the projection of the inertial velocity vector onto the plane normal to the reference body-spacecraft radius vector; measured positive east of north



X Positive towards the Earth

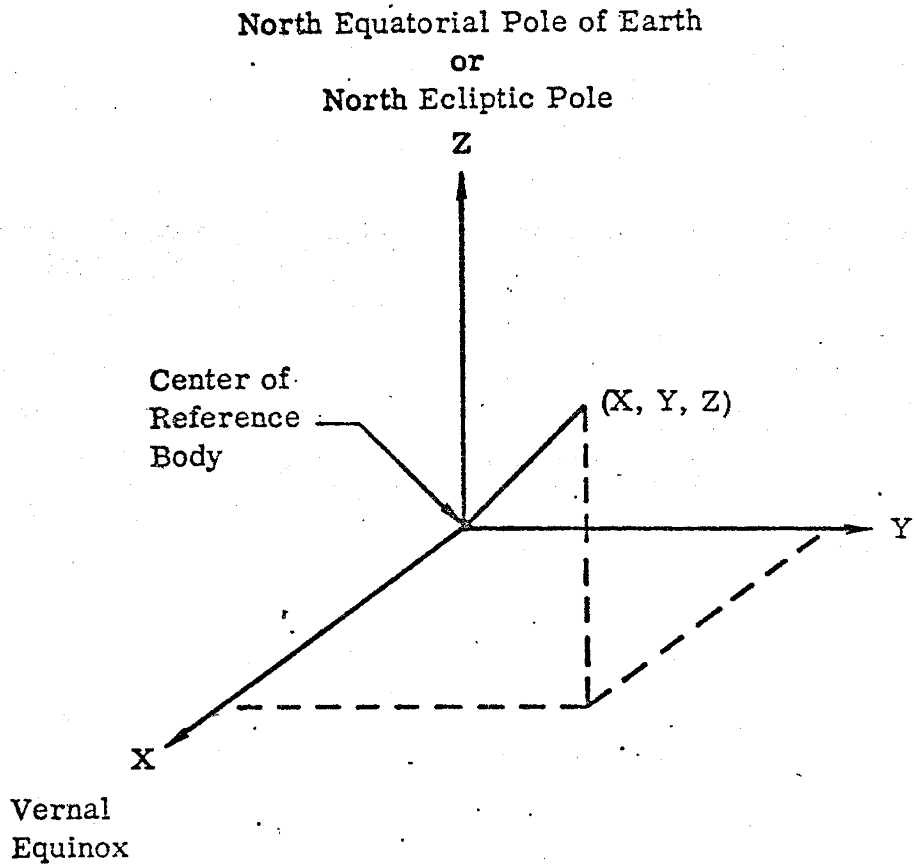
Y Positive from the Sun and perpendicular to the X-axis and lying in the ecliptic plane of date

Z Positive from the Sun completing the right hand system

θ Longitude of S/C

NOTE: This system rotates with the Earth about the Sun

REPRODUCED FROM	TITLE: SUN-EARTH-LINE CARTESIAN COORDINATE SYSTEM	PIONEER PROGRAM NASA AMES RESEARCH CENTER MOFFETT FIELD, CALIFORNIA
		DOC. NO. PC-262.06
		FIG. 3.3.3-b
	REV. NO. / DATE 3/10/76	SHEET 1 OF 1



The plane of reference in the Inertial Cartesian System shall be either the ecliptic plane or equatorial plane of the Earth.

X positive toward the Vernal Equinox and determined by the intersection of the mean Earth equator and ecliptic of 1950.0.

Y positive outward from the center of the reference body, perpendicular to and east of the X-axis and lying in the ecliptic or equatorial plane

Z positive toward the north ecliptic or equatorial pole of Earth and completes the orthogonal system

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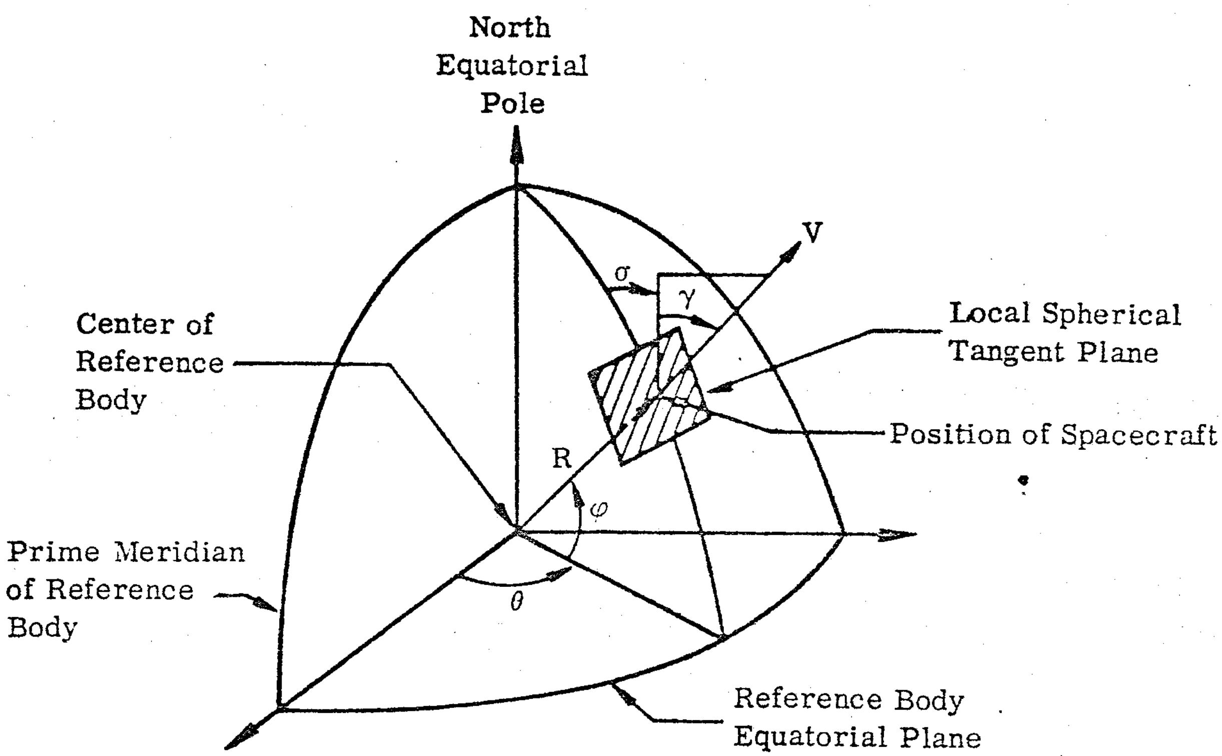
	INERTIAL CARTESIAN COORDINATE SYSTEM	DOC. NO. PC-262.06
		FIG. 3.3.4
	REV. NO. / DATE 3/10/76	SHEET 1 OF 1



R	radius: the distance from the center of the reference body to the spacecraft
φ	latitude: the body-centered latitude of the spacecraft measured positive north of the reference body's equator
θ	longitude: the longitude of the spacecraft measured eastward from the prime meridian of the reference body to the projection of the radius vector onto the equatorial plane
V	speed: the magnitude of velocity of the spacecraft
γ	flight path angle: the angle, measured positive away from the reference body between the relative velocity vector of the spacecraft and the local spherical tangent plane
σ	azimuth angle: the angle, measured eastward in the local spherical tangent plane, from true north to the projection of the relative velocity vector of the spacecraft onto the local spherical tangent plane

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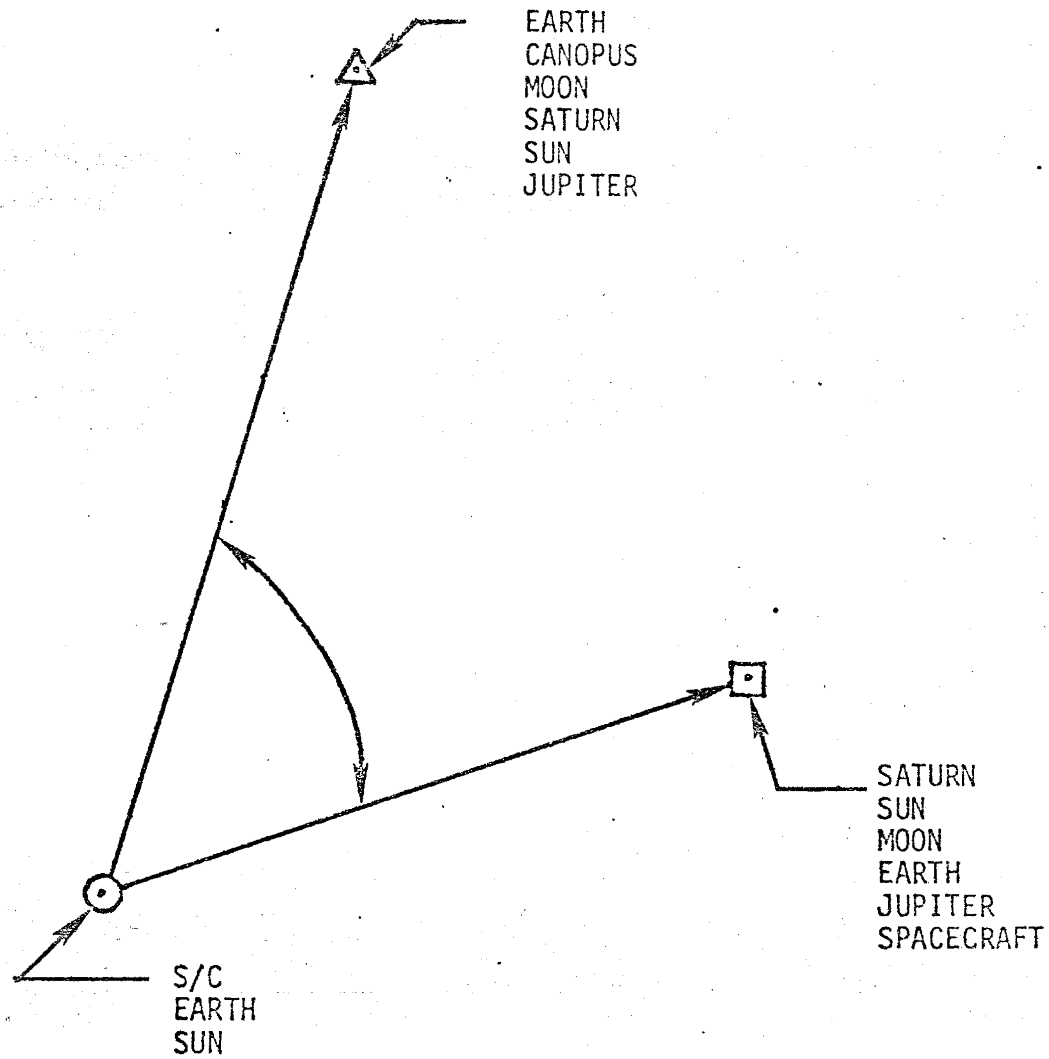
	BODY-FIXED SPHERICAL COORDINATE SYSTEM		DOC. NO. PC-262.06
			FIG. 3.3.5
	REV. NO.	DATE 3/10/76	SHEET 1 OF 1



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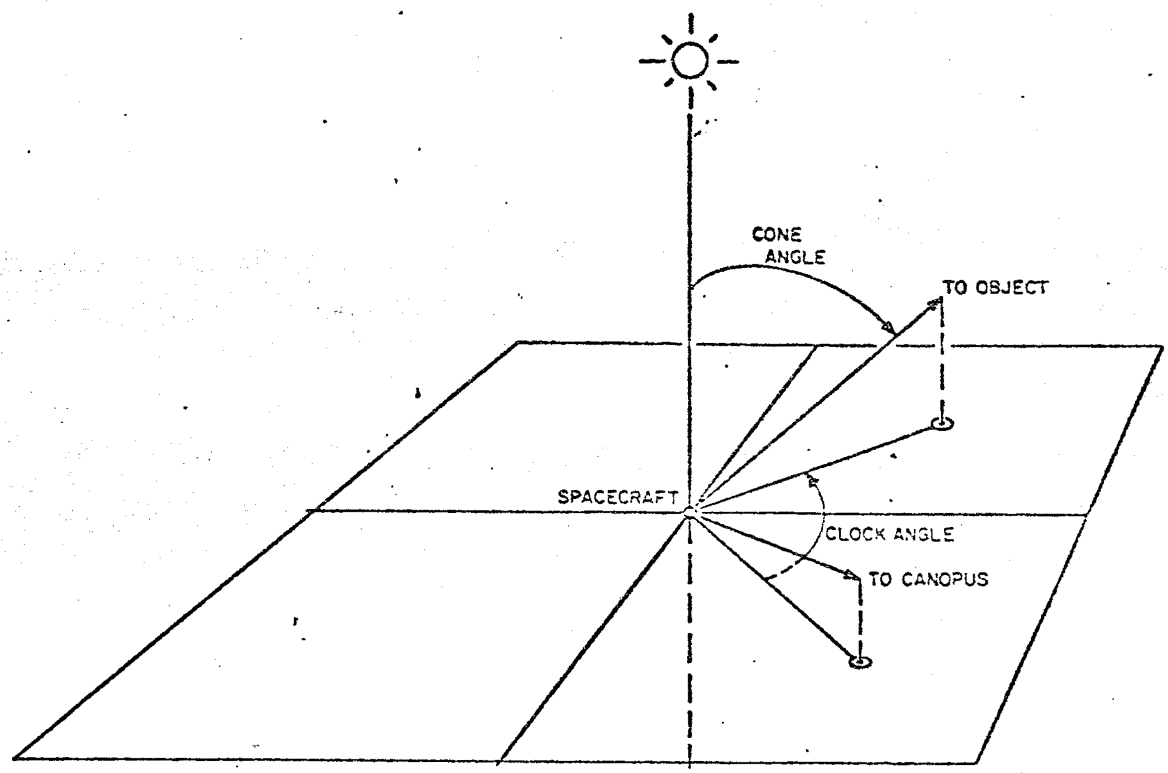
	THREE BODY ANGLES	DOC. NO. PC-262.06
		FIG. 3.3.6-a
	REV. NO. / DATE 3/30/76	SHEET 1 OF 1



Cone Angle of Object:	The angle from the spacecraft-Sun vector to the spacecraft-object-vector
Clock Angle of Object:	The angle measured clockwise (when looking towards the Sun) from the Sun-spacecraft-Canopus plane to the Sun-spacecraft-object plane

NOTE: Canopus can be replaced by the Earth or Saturn to form two additional systems.

REPRODUCED FROM	TITLE CONE, CLOCK ANGLES	PIONEER PROGRAM NASA AMES RESEARCH CENTER MOFFETT FIELD, CALIFORNIA
		DOC. NO. PC-262.06
		FIG. 3.3.6-b
	REV. NO. DATE 3/30/76	SHEET 1 OF 1

PHYSICAL RECORD DESCRIPTION

RECORD #1 (252 WORDS)

WORD							
1	375	NOT USED	ETSP50	JULDAT	VIGDAT	TFLANC	TFINJE
8	ETMUTC	DALARM	RANGRP	MAGVEL	INPATH	INAZIM	REARPR
15	DECPRO	RTASCP	REARSU	DECSUN	RTASTCS	REARMO	DECMOO
22	RTASCM	HRANGP	HMAGVP	HINPTH	CELLTP	CELLNP	CELLTE
29	CELLNE	XSCSEL	YSCSEL	ZSCSEL	SPSEXY	LNPSEL	ICBODL
36	FERPFL	XPGSFF	YPGSFF	ZPGSFF	DXPGSF	DYPGSF	DZPGSF
43	XPHSFF	YPHSFF	ZPHSFF	DXPHSF	DYPHSF	DZPHSF	XP1SFF
50	YP1SFF	ZP1SFF	DXP1SF	DYP1SF	DZP1SF	XP2SFF	YP2SFF
57	ZP2SFF	DXP2SF	DYP2SF	DZP2SF	B1MAGR	B1MAGV	B2MAGR
64	B2MAGV	EALATP	EALONP	EAVELP	EAPTHP	EAAZIP	B1LATP
71	B1LONP	B1VELP	B1PTHP	B1AZIP	B2LATP	B2LONP	B2VELP
78	B2PTHP	B2AZIP	EPB1AN	EPB2AN	EPSUAN	EPMOAN	CPEANG
85	CPSANG	MOPSAN	B1PB2A	MOEPAN	SEPANG	ESPANG	SPB1AN
92	SPB2AN	B1EPAN	B2EPAN	CONECE	CLCKCE	CONEC1	CLCKC1
99	CONEC2	CLCKC2	CONEE1	CLCKE1	CONEE2	CLCKE2	CONEEC
106	CLCKEC	CONE1E	CLCK1E	CONE12	CLCK12	CONE1C	CLCK1C
113	PCBODY	BODY01	BODY02	PERIAP	NOT USED	NOT USED	NOT USED
120	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
127	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
134	NOT USED	NOT USED	NOT USED	NOT USED	XP1	YP1	ZP1
141	XE1	YE1	ZE1	XS1	YS1	ZS1	XP2
148	YP2	ZP2	XE2	YE2	ZE2	XS2	YS2
155	ZS2	S601P	S602P	NOT USED	NOT USED	NOT USED	NOT USED
162	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	XP1
169	YP1	ZP1	XE1	YE1	ZE1	XS1	YS1
176	ZS1	SP2	YP2	ZP2	XE2	YE2	ZE2
183	XS2	YS2	ZS2	S603P	S604P	NOT USED	NOT USED
190	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
197	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
204	-- WORDS 204 THROUGH 252 ARE NOT USED --						

RECORD #2 (140 WORDS)

WORD	
1	-- WORDS 1 THROUGH 140 ARE NOT USED --

REPRODUCED FROM	TITLE	PIONEER PROGRAM NASA AMES RESEARCH CENTER MOFFETT FIELD, CALIFORNIA
	DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE (RECORD #1 AND #2)	DOC. NO. PC-262.06
		FIG. 3.2.2
	REV. NO. DATE 3/10/76	SHEET 1 OF 3

RECORD #3 (28 WORDS)

WORD							
1	NOT USED	NOT USED	377777777777_8	NOT USED	NOT USED	NOT USED	NOT USED
8	-- WORDS 8 THROUGH 28 NOT USED --						

RECORD #4 (252 WORDS)

WORD							
1		NOT USED	1	1	2	2	3
8	3	4	4	5	5	6	6
15	7	7	8	8	9	9	10
22	10	11	11	12	12	13	13
29	14	14	15	15	16	16	17
36	17	18	18	19	19	20	20
43	21	21	22	22	23	23	24
50	24	25	25	26	26	27	27
57	28	28	29	29	30	30	31
64	31	32	32	33	33	34	34
71	35	35	36	36	37	37	38
78	38	39	39	40	40	41	41
85	42	42	43	43	44	44	45
92	45	46	46	47	47	48	48
99	49	49	50	50	51	51	52
106	52	53	53	54	54	55	55
113	56	56	57	57	58	58	59
120	59	60	60	61	61	62	62
127	63	63	64	64	65	65	66
134	66	67	67	68	68	69	69
141	70	70	71	71	72	72	73
148	73	74	74	75	75	76	76
155	77	77	78	78	79	79	80
162	80	81	81	82	82	83	83
169	84	84	85	85	86	86	87
176	87	88	88	89	89	90	90
183	91	91	92	92	93	93	94
190	94	95	95	96	96	97	97
197	98	98	99	99	100	100	101
204	101	102	102	103	103	104	104
211	105	105	106	106	107	107	108
218	108	109	109	110	110	111	111
225	112	112	113	113	114	114	NOT USED
232	-- WORDS 232 THROUGH 252 ARE NOT USED --						

REPRODUCED FROM	TITLE	PIONEER PROGRAM NASA AMES RESEARCH CENTER MOFFETT FIELD, CALIFORNIA
	DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE (RECORD #3 AND #4)	DOC. NO. PC-262.06
		FIG. 3.2.2
	REV. NO. / DATE 3/10/76	SHEET 2 OF 3

RECORD #5 (252 WORDS)

WORD							
1	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
8	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
15	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
22	NOT USED	NOT USED	111	111	112	112	113
29	113	114	114	115	115	116	116
36	117	117	118	118	119	119	120
43	120	121	121	122	122	123	123
50	124	124	125	125	126	126	127
57	127	128	128	129	129	130	130
64	131	131	132	132	133	133	NOT USED
71	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
78	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	134
85	134	135	135	136	136	137	137
92	138	138	139	139	140	140	141
99	141	142	142	143	143	144	144
106	145	145	146	146	147	147	148
113	148	149	149	150	150	151	151
120	152	152	153	153	154	154	
127	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
134	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
141	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
148	-- WORDS 148 THROUGH 252 ARE NOT USED --						

RECORD #6 (252 WORDS)

WORD	
1	-- WORDS 1 THROUGH 252 ARE NOT USED --

RECORD #7 (28 WORDS)

WORD							
1	NOT USED	NOT USED	000000000000	NOT USED	NOT USED	NOT USED	NOT USED
8	-- WORDS 8 THROUGH 28 NOT USED --						

REPRODUCED FROM	TITLE	PIONEER PROGRAM NASA AMES RESEARCH CENTER MOFFETT FIELD, CALIFORNIA
	DPTRAJ SATELLITE EPHEMERIS TRAJECTORY TAPE (RECORDS #5, #6, & #7)	DOC. NO. PC-262.06
		FIG. 3.2.2
	REV. NO. / DATE 3/10/76	SHEET 3 OF 3