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SD-4060 OCPLT4 PROGRAM USERS' GUIDE

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SD-4060 OCPLT4 PROGRAM USERS' GUIDE

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ABSTRACT

This report contains a brief description of the Stromberg Datagraphixs 4060 (SD-4060) Orbit Comparison Plot (OCPLT4) Program, along with user information and a source program listing. This program was developed by Computer Sciences Corportation under Task Assignment 096 to supersede the SC-4020 OCPLT4 Program, which was developed in early 1970. The object program is currently on tape number 564M, and filed under Program Number 498 at GSFC Program library.

In addition to correcting several errors that existed in the original program, this program incorporates the following new features:

- For any satellite whose observations are processed by the Definitive Orbit Determination System (DODS), the orbital uncertainty estimates (OUE) can be obtained via appropriate card input with no major modification to the program.
- All satellite-related information (e.g., plotter scales, cutoff limits, plotting frequencies) is user controlled via card input.
- Not all components of OUE must be obtained. The user has the option of obtaining only the radial component if there is no need for the other two components.
- The altitude and time graph formats are controlled by the user and are not stored for specific satellites.

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SECTION 1 - INTRODUCTION

The purpose of the SD-4060 OCPLT4 Program is to generate an instruction tape for the Stromberg Datagraphixs 4060 (SD-4060) plotter (see Reference 1). The resulting graphs display component differences between two satellite position vectors within an overlapping time period. These differences are called the orbital uncertainty estimates (OUE). The following set of three orthogonal vector components is plotted:

- The radial component
- The component normal to the radial component in the orbital plane
- The component normal to the radial component and normal to the orbital plane

Each component is plotted on an individual graph.

The components can be plotted on either a linear or a logarithmic ordinate scale, and against an altitude or a time abscissa scale. The choice of abscissa scale is a function of the satellite's altitude. Low-altitude satellites with several revolutions per day are usually plotted against a time scale, and the results are called time graphs, whereas high-altitude satellites which complete only one revolution in several days are usually plotted on an altitude scale, and the results are called altitude graphs. When requested, these graphs also display the time distribution plots of observations used in obtaining the converged elements that provide the overlapping ephemerides. These graphs provide the experimenter with the OUE that can be used for analyzing definitive orbit results (see Reference 2).

OCPLT4 provides OUE graphs for any satellite whose observations are processed by the Definitive Orbit Determination System (DODS) on the IBM System/360.

Inputs to the SD-4060 OCPLT4 Program include the vector compare (VC) tapes, which are generated by DODS Ephemeris Comparison Subsystem; and a working-observations-file tape, which is generated by the DODS Differential Correction (DC) Subsystem.

Output from the SD-4060 OCPLT4 Program consists of a printout detailing what was accomplished by the run, and an instructions tape for the SD-4060 plotter to plot the OUEs. Usually, the SD-4060 plotter will provide 16-mm microfilm frames, one frame for each OUE graph, although 35-mm can be requested. Hard copies can be obtained from either film format upon request.

The SD-4060 OCPLT4 Program has been compiled under FORTRAN IV, level H, optimization level 2, on the Goddard Space Flight Center (GSFC) IBM System/360 Model 95, operating under OS using Release 19.6. No changes are necessary to run this program on the M&DO IBM System/360 Model 75.

The remaining sections of this user's guide present detailed information on program input (with sample deck setup), program output (including error messages), sample plotter output graphs, and operating information (with timing estimates). Also presented are the programming approach utilized, brief descriptions of subroutines, and a source program compilation listing.

SECTION 2 - PROGRAM INPUT

2.1 USER OPTIONS

All satellite-related variables are user controlled in this version of OCPLT4. Variables include satellite name, ID number, and date of run, all of which appear on the plots. Grid labeling and grid spacing are also user controlled to provide the flexibility required to process a wide variety of satellites. Other user inputs are the upper and lower cutoff limits for graphs. These inputs allow the user to control the overall appearance of the plots.

The user controls the following in a single job submission: the type of abscissa (altitude or time[1]); the type of ordinate scale (linear or logarithmic); whether or not observation data distribution will be plotted; and whether the radial component only, or all three OUE components, will be plotted.

2.2 TAPE INPUT

OCPLT4 requires at least two input tapes. The first, the VC tape, is generated by DODS using function 1 of the COMPARE verb (see Reference 3). This is a nine-track EBCDIC tape which is loaded on any 2400 series tape drive. It contains the Orbit Comparison Report (see Reference 3). This report is obtained by comparing two overlapping ephemerides (satellite-position time histories). Both ephemerides must be generated at equally spaced and corresponding time points in the overlap region. The differences between the two satellite position vectors at each point in time are expressed as differences between three orthogonal components of the vectors. The Orbit Comparison Report consists of a tabulation of the two ephemerides, the three component differences (which are the OUEs), and the total vector difference as a function of time. Several Orbit Comparison Reports (also called VC Reports) could be written onto a single file

[1]Either plot, or both, may be generated from a single job submission.

on a tape, and several files could be written onto a single tape, but they must appear in ascending time order. OCPLT4 will process up to 24 VC files in a single job submission.

The second tape is the working-observations-file tape. This is a nine-track binary tape which is likewise loaded on any 2400 series tape drive. It contains the working observations data (see Reference 4), as generated by DODS using the SETDC verb (see Reference 3). It should contain the observations from a time period which extends by at least three hours on both sides of the period covered by all of the VC files to be plotted. These observations could be in concentric or nonconcentric time order. This is determined by the relationship between the epoch of elements and the start time used in creating the working-observations-file tape. When the epoch date precedes, or is equal to, the start time of data, observations will be in ascending time order (nonconcentric). If epoch is between start and end time, observations will be in concentric order. In case no data distribution plots are requested, a tape must still be mounted; it may be a dummy tape. When using the SETDC verb for this purpose, the standard DODS Job Control Language (JCL) should be overridden so that the working-observations-file data are output on tape instead of disk.

2.3 CARD INPUT

At least 15 data cards are required for each OCPLT4 run. These cards must appear in the data deck in the order indicated by card number (Card 1, Card 2, etc.). The format for each card is defined on the following pages.

CARD 1

Format	Column	Internal Variable Name	Description
A1	1	CON	Indicates whether data on working observations file tape is concentric edited: = C, concentric edited ≠ C, not concentric edited
1X	2		Blank
A8	3-10	SNAME	Satellite name (e.g., SSS-1) (left justified)
1X	11		Blank
I5	12-16	ISAT	Satellite identification no. (e.g., 71961)
1X	17		Blank
I6	18-23	IRUN	Computer run date in YYMMDD format (e.g., 720912)
1X	24		Blank
I1	25	LOG	Indicates type of scale on Y-axis of graph: = 0, linear scale = 1, log scale
1X	26		Blank
I1	27	MANY	Controls labeling interval for the hours scale (X-axis) on the data distribution plot when altitude graphs are desired: = 0, label every hour = 1, label every 4 hours; this prevents overcrowding of the hours labels and as a rule should be used when there are more than 2 days between apogee and perigee

CARD 2

Format	Column	Internal Variable Name	Description
F10.0	1-10	XL	Lower limit of X-coordinate on altitude graph, thousands of km
F10.0	11-20	XR	Upper limit of X-coordinate on altitude graph, thousands of km
F10.0	21-30	YB1[1]	Lower limit of Y-coordinate on altitude or time graph, radial component (km)
F10.0	31-40	YB2[1]	Same as above except for in-plane component
F10.0	41-50	YB3[1]	Same as above except for normal-to-plane component
F10.0	51-60	YT1[1]	Upper limit of Y-coordinate on altitude or time graph, radial component (km)
F10.0	61-70	YT2[1]	Same as above except for in-plane component
F10.0	71-80	YT3[1]	Same as above except for normal-to-plane component

[1]When the log mode is being used, these limits must be integer powers of 10.

CARD 3

Format	Column	Internal Variable Name	Description
F10.0	1-10	XGRID	Length of interval for drawing grid along the X-axis, altitude option only (thousands of km)
F10.0	11-20	XLABEL	Length of interval for labeling grid along the X-axis, altitude option only (thousands of km)
F3.1	21-23	FMTX	Format for labeling grid along the X-axis, altitude option only. FMTX is of the form W.D, where W is the maximum number of characters in a label, including decimal point but not the sign; and D is the number of places to be displayed to the right of the decimal. If the X-axis were to be labeled from 0. to 140., FMTX would be 4.0.

NOTE: This card must be included, but should be left blank when using the time option only.

CARD 4

Format	Column	Internal Variable Name	Description
F10.0	1-10	YGRID1[1]	Length of interval for drawing grid along the Y-axis of altitude or time graph, radial component (km)
F10.0	11-20	YGRID2[1]	Same as above except for in-plane component
F10.0	21-30	YGRID3[1]	Same as above except for normal-to-plane component
F10.0	31-40	YLAB1[1]	Length of interval for labeling grid along the Y-axis of altitude or time graph, radial component (km)
F10.0	41-50	YLAB2[1]	Same as above except for in-plane component
F10.0	51-60	YLAB3[1]	Same as above except for normal-to-plane component
F3.1	61-63	FMTY1	Format for labeling grid along the Y-axis of altitude or time graph, radial component (see FMTX on card 3)
1X	64		Blank
F3.1	65-67	FMTY2	Same as above except for in-plane component
1X	68		Blank
F3.1	69-71	FMTY3	Same as above except for normal-to-plane component
1X	72		Blank

[1]These fields should be left blank when using the log mode, since the log mode provides its own grid generation and labeling for the Y-axis.

CARD 5

Format	Column	Internal Variable Name	Description
F10.0	1-10	ERRL01	Lower cutoff limit. If the radial component is less than ERRL01, the component is set equal to ERRL01 and plotted. ERRL01 is in km.
F10.0	11-20	ERRL02	Same as above except for in-plane component
F10.0	21-30	ERRL03	Same as above except for normal-to-plane component
F10.0	31-40	ERRHI1	Upper cutoff limit. If the radial component is greater than ERRHI1, the component is divided by 10 before plotting, and an appropriate message is displayed on the plotted output. ERRHI1 is in km. If, after dividing by 10, the value of ERRHI1 is still exceeded, data are plotted outside the graph (user should then increase the scale accordingly and resubmit this run).
F10.0	41-50	ERRHI2	Same as above except for in-plane component
F10.0	51-60	ERRHI3	Same as above except for normal-to-plane component

CARD 6

Format	Column	Internal Variable Name	Description
I6	1-6	IDAT	YYMMDD of start time of period to be plotted
1X	7		Blank
I6	8-13	IDAT1	YYMMDD of end time

CARD 7

Format	Column	Internal Variable Name	Description
I4	1-4	IH	Hours and minutes of start time (HHMM), where HH = hour-of-day MM = minute-of-hour (Cannot precede start time on first VC report to be plotted)

CARD 8

Format	Column	Internal Variable Name	Description
A4	1-4	TIMEY[1]	Indicates type of graph to be plotted. If = TIME, only time graphs are plotted; if left blank, both altitude and time graphs are plotted.

[1]For time graphs only--user must specify TIMEY = TIME and NSS6 = 0 or blank. For altitude graphs only--user must leave TIMEY blank and specify NSS6 = 1 (see Card 9).

CARD 9

Format	Column	Internal Variable Name	Description
I1	1	NSS1	Dummy, leave blank
I1	2	NSS2	Dummy, leave blank
I1	3	NSS3	Dummy, leave blank
I1	4	NSS4	Data distribution flag: = 1, eliminate data distribution part of graphs = 0, do not eliminate data distribution part of graphs
I1	5	NSS5	Debug printout flag: = 1, suppress debug printout = 0, do not suppress debug printout
I1	6	NSS6[1]	Graph flag: = 1, suppress time graphs = 0, generate both altitude and time graphs

[1]For time graphs only--user must specify TIMEY = TIME and NSS6 = 0 or blank. For altitude graphs only--user must leave TIMEY blank and specify NSS6 = 1.

CARD 10

Format	Column	Internal Variable Name	Description
I1	1	NCOMP	Indicates number of range difference vector components to be plotted: = 1, only the radial component is plotted = 3, all three components are plotted
1X	2		Blank
F3.0	3-5	TFREQ	Plotting interval for time graphs (minutes) (Equals the frequency of selecting points from VC report, must be integral multiples of T3DIFF × 60) (See Card 11)
1X	6		Blank
F8.0	7-14	APOGEE[1]	Satellite apogee (to nearest km)
1X	15		Blank
F8.0	16-23	PERIGE[1]	Satellite perigee (to nearest km)

[1]Used to determine the plotting interval for altitude graphs.

CARD 11

Format	Column	Internal Variable Name	Description
F4.0	1-4	T3DIFF	Time between comparison points, in seconds (available from VC output)

CARD 12

Format	Column	Internal Variable Name	Description
A6	1-6	TAPE[1]	VC tape number
1X	7		Blank
I2	8-9	IFILE[2]	Number of VC reports on this tape

[1]One card per tape must be specified for each VC tape number for any combination of tapes and files on tape, up to 24 files. There may be more than one file per tape.

[2]There may be more than one VC report per file and more than one file per tape. IFILE = total number of VC reports on the specified tape.

CARD 13

Format	Column	Internal Variable Name	Description
None			Blank card; delimiter for comparison tapes

CARD 14

Format	Column	Internal Variable Name	Description
A6	1-6	TAPE	Working-observations-file tape number
1X	7		Blank
I2	8-9	IFILE	= 1 (Only one file will be processed per single submission. The time span of data must extend on both sides of the total VC reports time span.)

CARD 15

Format	Column	Internal Variable Name	Description
None			Blank card; indicates end of card input.

NOTE: There can be more than 15 data cards because card 12 may be repeated up to 24 times.

Appendix A provides a sample deck input.

2.4 FILES

The SD-4060 OCPLT4 Program uses only one file, a temporary disk data set, FT22F001. This data set contains time-sorted information from the working-observations-file tape and is used in plotting the data distribution portion of altitude or time graphs. There is a record for each observation. These records have the following format.

Format	Internal Variable Name	Description
1X		Blank
A4	NOSTOP	Indicates end of data. In the last record, NOSTOP is blank. In all other records, NOSTOP is ABCD.
3X		Blank
I6	ITIME8	YYMMDD
1X		Blank
I4	ITIME9	Hour-of-day and minute-of-hour (HHMM)
1X		Blank
I2	ITYPE	Type of observation: = 1, R — range data = 2, ℓ — minitrack direction cosines = 3, m — minitrack direction cosines data = 9, $\dot{R}$ — range-rate data = 17, RAO-X — radio antenna observation angles data = 18, RAO-Y — radio antenna observation angles data

SECTION 3 - PROGRAM OUTPUT

3.1 TAPE OUTPUT

The program's output is a seven-track binary instruction tape (data set SC4060ZZ), which is used as input to the SD-4060 plotter. The format of this tape is described in Reference 5.

3.2 SYSTEM PRINTER OUTPUT

This section presents information on normal printer output and on error message output.

3.2.1 Normal Printer Output

As processing is initiated, the program prints out some of the input variables to enable the user to spot check possible input errors along with the start and end times of the first VC report to be plotted. As processing proceeds, the first task of the program is to rearrange the concentric sorted observations from the working-observation-file tape in ascending time order, when necessary. The time and type of the rearranged observations are printed out. Each rearranged time and type is preceded by the letters "ABCD."

When both altitude and time graphs are requested along with the data distribution plots, as in the sample output (see Appendix B), the program will first plot altitude graphs for each of the three OUE components from the first VC report, with the associated data distribution information and then the time graphs with the associated data distribution graphs. To indicate that the program has finished reading the VC report, a flag "AT 1004" is printed. The backspacing of this VC report, needed when both altitude and time graphs are requested, is shown by A3COMP=7 until the VC report is backed to the first data point. ITGPH indicates that the time plots will be plotted next. This sequence is repeated until all VC reports have been processed.

The main portion of the printout is concerned with the data distribution portion of the graphs. Because the data distribution is identical for all three OUE components, they appear in triplicate. When altitude graphs are plotted, the portion of orbit being plotted is indicated by apogee-to-perigee (A-P) or perigee-to-apogee (P-A) pass. The time span between A-P or P-A is indicated by the PERIOD PLOTTED, and the YYMMDD HHMM of the start and end times of the period, and also by the integer hour difference between the start and end times. For time graphs, this period is fixed at 24 hours.

The type and quantity of data available from the working-observation-file tape during the period being plotted is also indicated. The number denoted in the message "... PASSES PLOTTED xx" refers to the number of minutes containing one or more observations from a single station. Thus, if within 1 minute, one or more observations were obtained from one station; the number of passes is increased by one and one asterisk is plotted in the data distribution plot at a location corresponding to the hour and minute of the observation.

Refer to Appendix B for a more detailed description of normal printer output.

3.2.2 Debug Output

As a further aid to the user, debug printout will be displayed if column 5 on data card 9 is 0 or is left blank.

This printout, which supplements the normal printout, contains several flags to help identify where in the program the computation takes place, the values of several key variables, the computed location in plotter units of the first point to be plotted, the hours for altitude plots, and the geocentric distances for the time plots and their coordinates on the respective graphs.

3.2.3 Error Message Output

If the start year-month-day of the current VC report is greater than the end year-month-day of the previous report, the message TIME SPAN INCORRECT

ON THIS VC REPORT will be printed, along with the start and end year-month-day in question. Finally, the message OCPLT4 WILL PROCEED TO NEXT VC REPORT TO SEARCH FOR CORRECT TIME SPAN will be printed.

If the time period to be plotted extends beyond the end time of the time-sorted working observations file information on the temporary disk data set, the message REQUESTED TIME SPAN TO BE PLOTTED EXCEEDS OBSERVATION TIME will be printed, and program execution will terminate.

The Integrated Graphics Software (IGS) System is a subroutine library used by OCPLT4 to generate an instruction tape for the SD-4060 plotter. In the event that OCPLT4 gives an illegal command to the IGS System (such as a command to plot a number off scale), an appropriate error message from the IGS System will be printed. A complete list of these error messages can be found in Table 3-4 of Reference 1, and is reproduced verbatim in Appendix C.

3.3 GRAPHIC OUTPUT

The final products of this program are graphs which display the OUE for an orbit, along with the data distribution information. This section describes the two types of graphs (altitude and time) generated by the OCPLT4 Program. Appendix B illustrates a complete set of altitude and time graphs.

3.3.1 Altitude Graphs

Altitude graphs are usually requested when a satellite's orbital period is greater than 24 hours. An altitude graph presents the OUE components as a function of geocentric distance, and also includes a separate data distribution plot.

Six altitude graphs are normally generated for each orbital period. The abscissa of each graph represents the satellite's radial distance from the center of the earth in 1000-km units. The first three graphs (Figures B-2 through B-4) are plotted for one-half an orbit, from apogee to perigee; and the other three graphs (Figures B-5 through B-7) are plotted for the remaining half of the orbit,

from perigee to apogee. The ordinates of the three graphs for each half orbit are the three components of the range difference vector: the radial component, the component in the orbital plane normal to the radial component, and the component normal to the orbital plane. Two altitude graphs will be generated when user specifies radial component only.

At the bottom of each graph is a separate plot, which is produced at the user's request. The observations that are available from the working-observations-file tape are represented on this plot versus universal time (UT) (see Figures 3-1 and 3-2). The time span of this plot corresponds to half of the orbital period. Asterisks represent the data distribution for three sets of observation types: radio antenna observation (RAO) X and Y angles; Minitrack direction cosines (ℓ and m); and range and range rate (R and $\dot{R}$). The asterisks become darker as more observations are available at a given time, as from several stations (see Figure 3-3). When no observations are available on the tape, during the time interval of a plot, or if a blank observation tape is mounted, the message NO DATA FOR THIS PERIOD will appear in place of the asterisks (see Figure 3-2).

The following user input information appears in the title of each graph:

Run date (e.g., 720912)
Satellite name (e.g., SSS-1)
Satellite ID (e.g., 71961)

The grid spacing and coordinate labeling are user controlled.

The numbers along the altitude OUE curve indicate UT in hours of day along the trajectory. These hour numbers start with the hour of apogee and end with the hour of perigee for the apogee-perigee graphs, and are in reversed order for the perigee-apogee graphs. As would be expected, these times are generally not equally spaced.

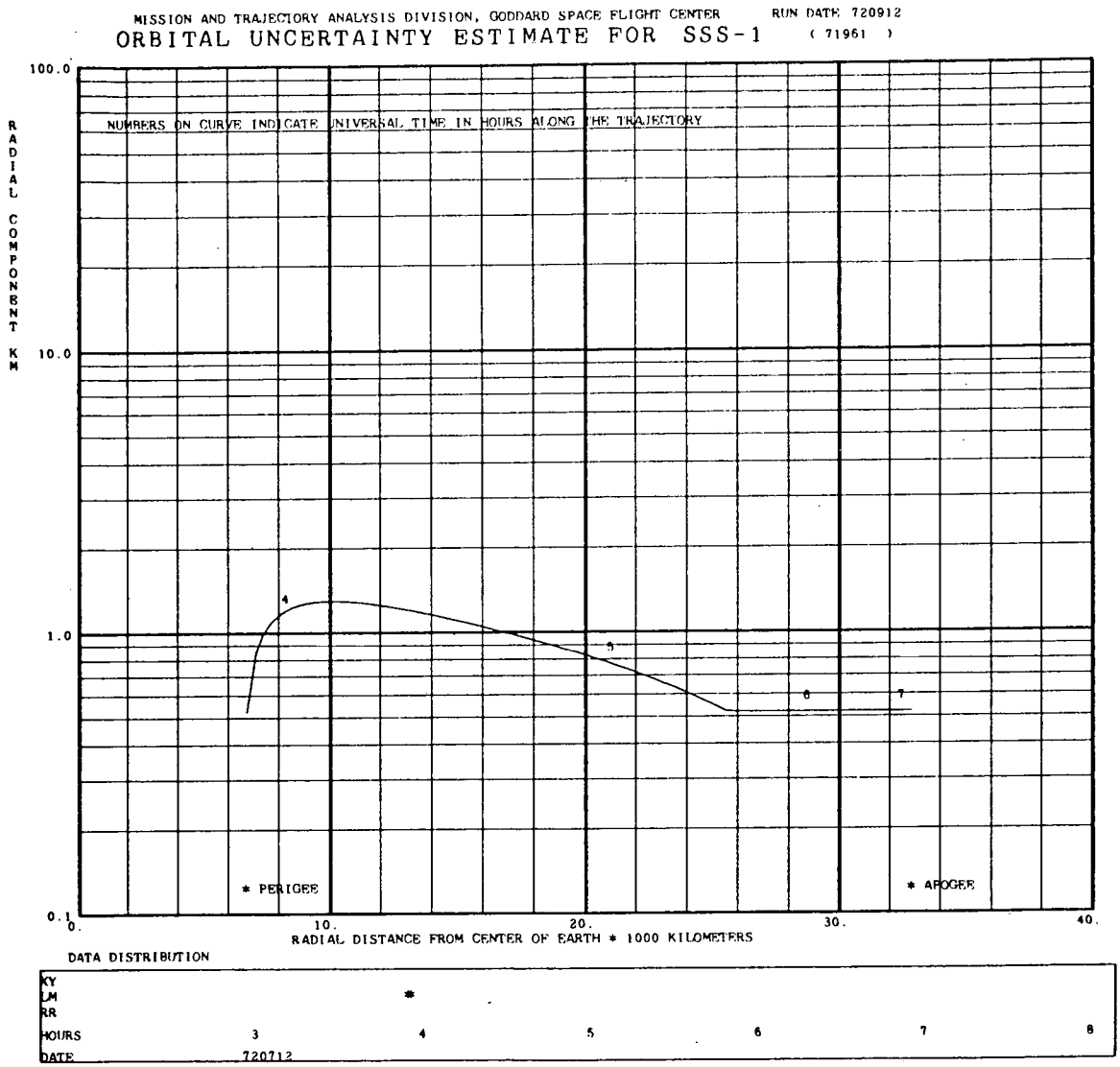

Figure 3-1. Altitude Graph of Perigee-Apogee Radial Component

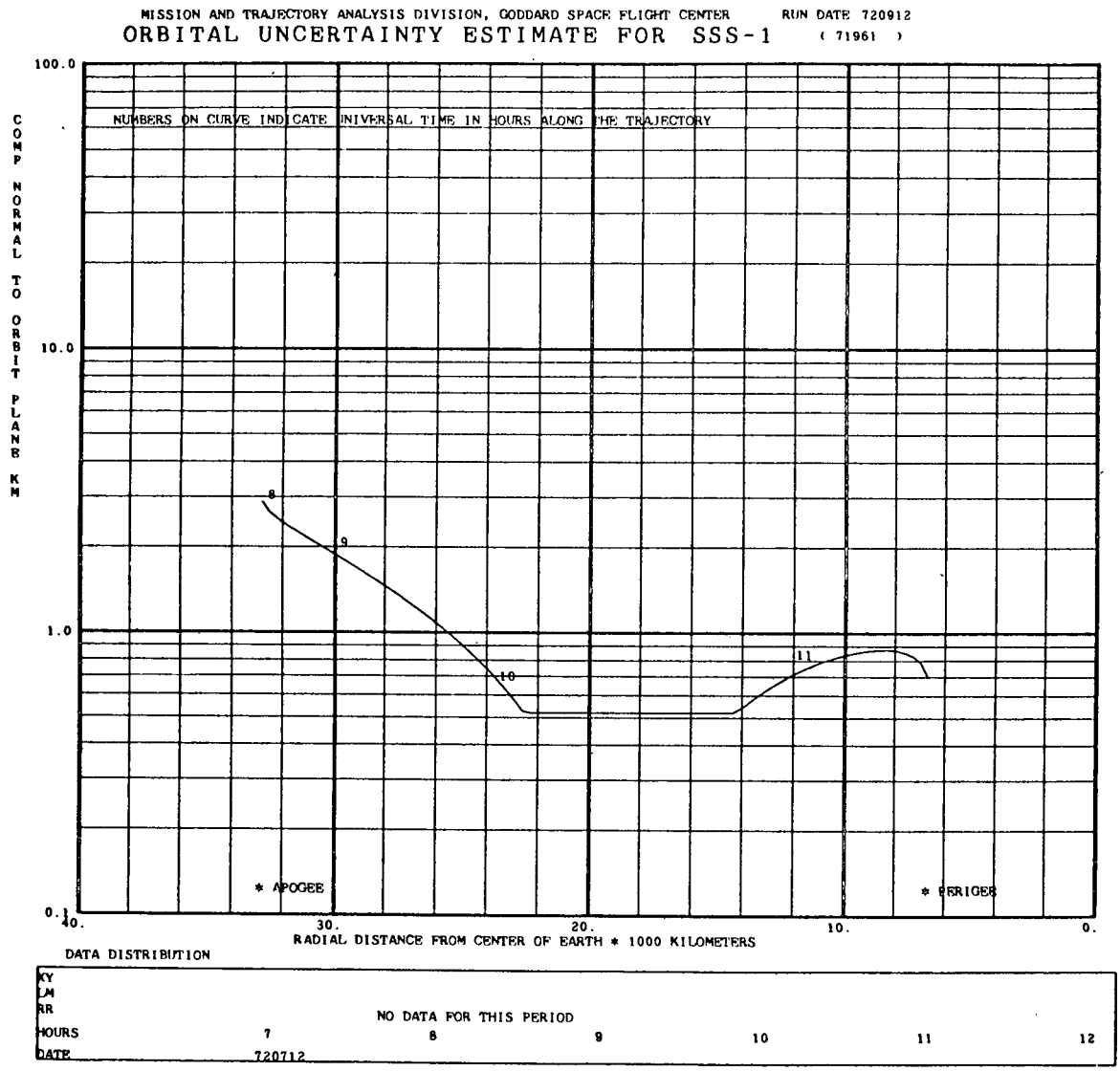

Figure 3-2. Altitude Graph of Apogee-Perigee Component Normal to Orbital Plane

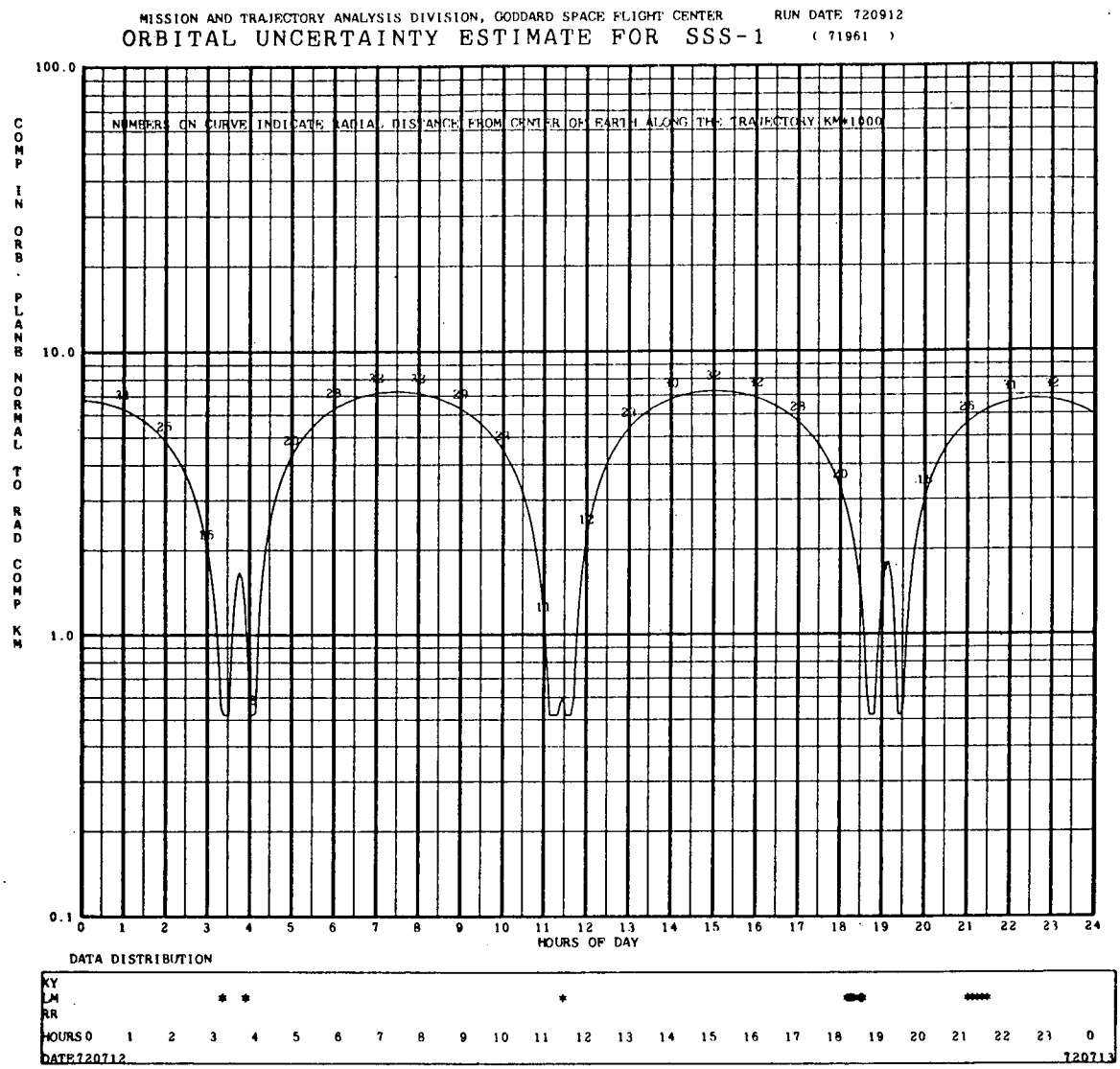

Figure 3-3. Time Graph Component in Orbital Plane Normal to Radial

A similar time span is printed in the data distribution plot; however, the time spacing in this plot is uniform. The units here are also UT, and they correspond to the hours of the day for the data distribution. In addition, the observation dates appear on the data distribution plots. A date is printed for every computed day within the trajectory's time span (see Appendix B, Figure B-1).

3.3.2 Time Graphs

Time graphs are usually requested for satellites with short orbital periods (two or more revolutions per day). The time graph is basically similar to the altitude graph, with the following exceptions:

- Three graphs are normally generated, one for each component of the OUE, for each 24-hour period, starting at midnight UT.
- The abscissa of each graph is divided into hours of day UT.
- The numbers which appear along the OUE curves indicate radial distance from the center of the earth along the trajectory, in 1000-km units.

The remainder of the graph is similar to the altitude graph.

The data distribution plot in the time graph presents the same types of observational data as the altitude graph. The plot corresponds to the 24-hour period covered in the OUE portion of the graph.

SECTION 4 - OPERATING INFORMATION AND SAMPLE JCL SETUP

4.1 OPERATING INFORMATION

This section describes the minimum system configuration for the OCPLT4 Program and gives timing estimates for program execution.

4.1.1 System Configuration

For the IBM System/360 Model 95 or Model 75, the minimum system configuration required to support the SD-4060 OCPLT4 Program consists of the following:

- Three nine-track tape drives.
- One seven-track tape drive.
- Direct access space for an intermediate file.
- Standard system input and output files.
- The system data set for the SD-4060 named SYS2.SC4060 or SYS2.SD4060.
- An SD-4060 plotter.

4.1.2 Timing

A reasonable IBM System/360-95 timing estimate for OCPLT4 to process and plot a period of 1 month of data for 90 time graphs using a program load module is as follows:

CPU = 3 minutes
I/O = 15 minutes

No timing estimate is needed for the SD-4060 plotter; however, turnaround is usually a few days.

4.2 JCL REQUIREMENTS

Figure 4-1 shows the Job Control Language (JCL) required to execute OCPLT4 using the program load module.

Data set SC4060ZZ is the seven-track output instructions tape used for input to the SD-4060 plotter. Data set FT20 is allocated to the nine-track VC tapes. There can be as many as 24 of these VC files or tapes. Each file requires an FT20 card. Data set FT23F001 is a nine-track working-observations-file tape. For detailed information on these tapes, see Subsections 2.2 and 3.1. Data set FT22F001 is a required intermediate disk file, described in Subsection 2.3.

```
//USER JOB CARD

//EXEC LOADER,REGION=390K,PARM='SIZE=390K'
//GO.SYSLIB DD DSN=SYS2.SC4060,DISP=SHR
//GO.SYSLIN DD DSN=OBJSET,UNIT=2400-9,DISP=(OLD,PASS),VOL=SER=XXXXX,[1]
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(1,BLP)
//GO.FT06F001 DD DCB=BLKSIZE=141,SPACE=(CYL,(5,1))
//GO.SC4060ZZ DD DSN=BURKE[2],UNIT=7TRACK,
// DCB=(DEN=1,TRTCH=C,RECFM=F,BLKSIZE=1024),
// LABEL=(1,BLP),DISP=(NEW,PASS),VOL=SER=BLANK[3]
//GO.FT20F001 DD UNIT=2400-9,VOL=SER=XXXXX[4],LABEL=(1,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHIl
      .
      .
      .
//GO.FT22F001 DD UNIT=DISK,DISP=(NEW,PASS),DCB=(BLKSIZE=22,RECFM=F),
// DSN=&B3,SPACE=(CYL,(4,2))
//GO.FT23F001 DD UNIT=2400-9,LABEL=(,BLP),VOLUME=SER=XXXXX,[5]
// DCB=(RECFM=VBS,LRECL=104,BLKSIZE=3436),DISP=(OLD,PASS)
//GO.DATA5 DD *
```

NOTES:

1. OCPLT4 system tape number
2. Data set name for output tape (user-specified)
3. Output tape number (assigned by computer operator or user-specified)
4. VC tape number (user-specified). There may be as many as 24 FT20F0xx cards in a single OCPLT4 run. These cards must be in ascending time order, one for each VC file. See Appendix A for samples showing how data set names and labels change for succeeding files.
5. Working-observations-file tape number (user-specified)

Figure 4-1. JCL Setup for Executing the OCPLT4 Program (SD-4060 Version)

SECTION 5 - PROGRAMMING METHOD AND SUBROUTINE DESCRIPTIONS

5.1 PROGRAMMING METHOD

The first function performed by OCPLT4 is that of reading data cards and initializing variables for control of titling, grid generating, and grid labeling. Values read from input cards are carried into the grid drawing subroutine, TITLES. This information remains constant during execution of the entire program. Before the working-observations-file tape is processed for the data distribution portion of the plots, the tape is first time-sorted and rewritten on disk. This must be done in case the data on the working-observations-file tape was sorted concentrically.

During execution of the program for altitude graphs (see Figures 3-1 and 3-2), each P-A and A-P period is determined. Component values from the VC report are selected for plotting when the radial distance has changed by at least ΔR km for the previous value, where ΔR equals the quantity (A-P)/100.

Once a period has been completed, the subroutine DATAPT is called to plot data distribution within the time span of the period. The subroutine TIMTCK is also called to develop a time scale along the component curve to allow correlation between time and altitude. Time values are plotted on altitude graphs at 5-hour intervals for altitudes above a radial distance of 100,000 km, and at 1-hour intervals for altitudes below a radial distance of 100,000 km.

When time graphs are to be generated (see Figure 3-3), the three range difference vector components are plotted against time (one day per graph). Subroutine ALTCK is called to develop an altitude scale along the curve, for correlation with time. Altitude values to the nearest kilometer are plotted at 1-hour intervals along the time curves.

5.2 SUBROUTINE DESCRIPTIONS

This section lists the subroutines the OCPLT4 Program uses from the SD-4060 subroutine library, and describes the main routine (MAIN) and the calling sequences for the nine subroutines of the OCPLT4 source program. A listing of the source program appears in Appendix D.

5.2.1 SD-4060 Subroutines Used

The OCPLT4 Program uses the generalized subroutines for the SD-4060 (see Reference 1) to generate all plots. These subroutines do the plotting, generate the grids, and label the graphs and grids. The following is a list of the SD-4060 subroutines used by OCPLT4:

PAGEG	XNORMZ	NUMBRG	EXITG
LEGNDG	YNORMZ	LABELG	
GRIDG	OBJCTG	SETSMG	
SUBJEG	MODESG	LINESG	

5.2.2 OCPLT4 Source Program Subroutines

5.2.2.1 MAIN Routine

MAIN contains all the logic that controls the various options available to the user, computes all the coordinates for generating the OUE graphs, and also serves as the executive routine for all other subroutines. The following steps are the primary divisions of the MAIN routine:

1. After initializing constants and flags that identify the options requested by the user, reading input cards and checking requests for consistency, and printing several messages to the user, the program will proceed, if no inconsistencies exist; otherwise the job is terminated.

2. MAIN will rearrange the observations from the working observation file in time ascending order, if necessary.

3. MAIN will call on A5READ to read the first (next) VC report and will select and restore the OUE values along with the corresponding time and range to be used in generating the OUE graphs.

4. If altitude graphs are requested, MAIN will determine whether an A-P or P-A segment should be plotted next. Then the values of OUE components are checked by MAIN to ensure that they are within the requested limits. If a value is below the requested lower limit, it will be set to the lower limit and plotted. If it is above the upper limit, the value is divided by 10 and checked again. Should the new value exceed the upper limit, a message will be printed to that effect (see page 2-7). This process is continued until the entire graph for each OUE component is constructed from the information on one VC report. Similar activites take place when time plots are requested.

5. After each OUE graph is constructed, the corresponding data distribution plot is developed, if requested.

6. All the plotting information and instructions to generate the OUE graphs for each VC report are stored on the output tape. When one VC report is finished, the next report is read and processing starts with step 3. This is repeated until all VC reports have been processed. Then the program terminates.

5.2.2.2 Subroutine DATAPT

This subroutine computes coordinates for and plots the data distribution between the times bounding each graph.

The calling sequence for subroutine DATAPT is:

CALL DATAPT (ITME1, ITME2, ITME3, ITME4, XIX, INDTE)

Argument	Description
ITME1	Start YYMMDD
ITME2	Start HHMM
ITME3	End YYMMDD
ITME4	End HHMM
XIX	Location on page of left limit of data distribution graph computed in internal units used by the plotting routine
INDTE	Indicates whether it is an altitude or a time graph, and whether or not this pass-through requires reading of data tape or plotting of previously determined points: = 0, read and store data distribution points to be plotted for the altitude graph = 1, read and plot the stored points on the altitude graph = 3, same as 1, but for time graphs = 4, same as 0, but for time graphs

5.2.2.3 Subroutine TIMTCK

TIMTCK plots the hours along the OUE curves for the altitude graphs.

The calling sequence for subroutine TIMTCK is:

CALL TIMTCK (JK, JNDTE)

Argument	Description
JK	Indicates number of values to be plotted
JNDTE	Indicates type of component to be plotted: = 0, radial component = 1, component in orbital plane normal to the radial component = 2, component normal to the orbital plane

5.2.2.4 Subroutine ALTCK

ALTCK plots the satellite's geocentric distance along the OUE curves for the time graphs.

The calling sequence for subroutine ALTCK is:

CALL ALTCK (KJ, JNDTE)

The ALTCK argument description is the same as for TIMTCK (with KJ replacing JK).

5.2.2.5 Subroutine TITLES

TITLES plots and labels the graphs.

The calling sequence for subroutine TITLES is:

CALL TITLES (MTYPE, MSKIP)

Argument	Description
MTYPE	Indicates the component to be plotted: = 1, radial component = 2, component in the orbital plane normal to the radial component = 3, component normal to the orbital plane
MSKIP	Indicates the part of the graph to be plotted or that cards are to be read: = 0, plot altitude graph from apogee to perigee = 1, plot time graph = 2, plot altitude graph from perigee to apogee = 5, read data cards = 6, label titles above graphs

5.2.2.6 Subroutine TAPES

This subroutine reads and stores all VC tape numbers and the working-observations-file tape number, as well as the number of VC reports on each VC tape. This subroutine terminates program execution when all the VC reports on all input VC tapes have been processed.

The calling sequence for subroutine TAPES IS:

CALL TAPES (IBLAP)

Argument	Description
IBLAP	Indicates whether input data cards 12 and 13 are to be read or whether to process the next VC report: = 0, read the next VC report on file; if none is available, read next file on tape; if none, request the next tape to be mounted on tape drive; if none, proceed to terminate job. = 5, read and store all tape numbers from cards 12 and 13.

5.2.2.7 Subroutine BSFTAP

BSFTAP backspaces the current VC report on file to the beginning of that report, if necessary (i.e., when both the altitude and the time graphs are to be plotted and the program has finished the altitude graph, the report is backspacing to do the time graph).

The calling sequence for subroutine BSFTAP is:

CALL BSFTAP (NF)

Argument	Description
NF	FORTRAN file number of VC report to be backspaced

5.2.2.8 Subroutine TCONV0

TCONV0, which was incorporated from DODS, converts times from DODS units to calendar units.

The calling sequence for subroutine TCONV0 is:

CALL TCONV0 (TIMDUT, IOUTIM, SEC)

Argument	Description
TIMDUT	Number of DODS units of time (DUT) from 0^h September 18, 1957, to the calendar time

Argument	Description
IOUTIM	The array containing the year, month, day, hour, and minute of calendar time
SEC	Seconds of minutes of calendar time (less than 1 minute)

5.2.2.9 Subroutine A5READ

A5READ reads data from the VC report and converts the components into a form useful for the main program. Conversion is done by separating the decimal and exponential portions of the components and of the range.

The calling sequence for subroutine A5READ is:

CALL A5READ (ITIME5, ITIME6, RAD1, IEXP1, RAD2, IEXP2, RAD3, IEXP3, RAN1, IEXP4, I3EOF)

Argument	Description
ITIME5	YYMMDD
ITIME6	HHMM
RAD1	Decimal portion of the radial component ($0 < RAD1 < 1$)
IEXP1	Exponent associated with RAD1
RAD2	Decimal portion of the component in the orbital plane normal to the radial component ($0 < RAD2 < 1$)
IEXP2	Exponent associated with RAD2
RAD3	Decimal portion of the component normal to the orbital plane ($0 < RAD3 < 1$)
IEXP3	Exponent associated with RAD3
RAN1	Decimal portion of the reference range vector ($0 < RAN1 < 1$)
IEXP4	Exponent associated with RAN1
I3EOF	End-of-file indicator: = 1, end-of-file = 0, not end-of-file

5.2.2.10 Subroutine B5READ

B5READ reads UT from the working-observations-file tape and converts this time to calendar time.

The calling sequence for subroutine B5READ is:

CALL B5READ (I3YMD, I3HM, I3TYP)

Argument	Description
I3YMD	YYMMDD of observation
I3HM	HHMM of observation
I3TYP	Type of observation: = 1, R range data = 2, ℓ) minitrack direction cosines data = 3, m) = 9, $\dot{R}$ range-rate data = 17, X) RAO angle data = 18, Y)

APPENDIX A – SAMPLE INPUT DECK SETUP

The following list of cards is a sample input deck, including the JCL cards. The OUEs to be plotted are time graphs for the SSS-1 satellite for the time period August 11, 1972, to September 10, 1972. See Section 2.3 and Figure 4-1 for a description of card images. This sample input was not used to obtain the sample output (Appendix B), but is presented to show the changes on FT20F0xx cards for multiple VC report tapes.

```
//ZBNJBSSS JOB (GI0141841E,P,G00080,005005),95.QQQ,MSGLEVEL=(1,1)
// EXEC LOADER,REGION=390K,PARM='SIZE=390K'
//GO.SYSLIB DD DSN=SYS2.SC4060,DISP=SHR
//GO.SYSLIN DD DSN=OBJSET,UNIT=2400-9,DISP=(OLD,PASS),VOL=SER=1241M,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200),LABEL=(1,BLP)
//GO.FT06F001 DD DCB=BLKSIZE=141,SPACE=(CYL,(5,1))
//GO.SC4060ZZ DD DSN=BURKE,UNIT=7TRACK,
// DCB=(DEN=1,TRTCH=C,RECFM=F,BLKSIZE=1024),
// LABEL=(1,BLP),DISP=(NEW,PASS),VOL=SER=BLANK
//GO.FT20F001 DD UNIT=2400-9,VOL=SER=2924P,LABEL=(1,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI1
//GO.FT20F002 DD UNIT=2400-9,VOL=REF=*.FT20F001,LABEL=(2,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI2
//GO.FT20F003 DD UNIT=2400-9,VOL=REF=*.FT20F001,LABEL=(3,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI3
//GO.FT20F004 DD UNIT=2400-9,VOL=REF=*.FT20F001,LABEL=(4,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI4
//GO.FT20F005 DD UNIT=2400-9,VOL=REF=*.FT20F001,LABEL=(5,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI5
//GO.FT20F006 DD UNIT=2400-9,VOL=REF=*.FT20F001,LABEL=(6,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI6
//GO.FT20F007 DD UNIT=2400-9,VOL=REF=*.FT20F001,LABEL=(7,BLP),
```

```
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI7
//GO.FT20F008 DD UNIT=2400-9,VOL=SER=33976H,LABEL=(1,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI8
//GO.FT20F009 DD UNIT=2400-9,VOL=REF=*.FT20F008,LABEL=(2,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI9
//GO.FT20F010 DD UNIT=2400-9,VOL=REF=*.FT20F008,LABEL=(3,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI10
//GO.FT20F011 DD UNIT=2400-9,VOL=REF=*.FT20F008,LABEL=(4,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI11
//GO.FT20F012 DD UNIT=2400-9,VOL=REF=*.FT20F008,LABEL=(5,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI12
//GO.FT20F013 DD UNIT=2400-9,VOL=REF=*.FT20F008,LABEL=(6,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI13
//GO.FT20F014 DD UNIT=2400-9,VOL=REF=*.FT20F008,LABEL=(7,BLP),
// DCB=(LRECL=133,RECFM=FBA,BLKSIZE=3325),DISP=(OLD,KEEP),DSN=PHI14
//GO.FT22F001 DD UNIT=DISK,DISP=(NEW,PASS),DCB=(BLKSIZE=22,RECFM=F),
//              DSN=&B3,SPACE=(CYL,(4,2))
//GO.FT23F001 DD UNIT=2400-9,LABEL=(1,BLP),VOL=SER=2684P,
//              DCB=(RECFM=VBS,LRECL=104,BLKSIZE=3436),DISP=(OLD,PASS)
//GO.DATA5 DD *
```

CARD 1 `C SSS-1  71961 720919 1`

CARD 2 `0.0  40.0  .1  .1  .1  100.  100.  100.`

CARD 3 `2.0  10.0  4.0`

CARD 4 `5.1 5.1 5.1`

CARD 5 `.52  .52  .52  100.  100.  100.`

CARD 6 `720811 720910`

CARD 7 `0000`

CARD 8 `TIME`

CARD 9 `1`

CARD 10 `3 3.0  33200.  6700.`

CARD 11 `60.`

CARD 12a `2924P  14`

CARD 12b `33976H 14`

CARD 13

CARD 14 `2684P  01`

CARD 15

```
/*
```

APPENDIX B - SAMPLE OUTPUT

The SD-4060 OCPLT4 Program output consists of two parts: the IBM System/360 printer output, and the SD-4060 plotter output.

The printer output provides the user with a description of the accomplished processing and reflects user input information, type of plot requested (time, altitude, or both), period to be plotted, plotting interval on graphs, input tape numbers, types and number of observations plotted in the data distribution box, and additional messages when appropriate or as requested by the debug option.

Figure B-1 is a sample printout for the SSS-1 satellite. Usually, only time plots are required for this satellite; however, in this run both time and altitude plots were requested. The definitions given below are numbered to correspond to the entries on Figure B-1.

1. Displays part of the input parameters. (See description of input card images.)

2. Total period to be plotted--July 12, 1972, to July 30, 1972.

3. Time and altitude plots are requested.

4. Apogee and perigee heights as input by user.

5. All three components of the OUEs are plotted (NCOMP). Interval between points on time graphs (TFREQ). Interval between points on altitude graphs (RFREQ).

6. Interval between comparisons on VC report.

7. VC tape number (contains 14 VC reports).

8. Working-observations-file tape number (with one file).

9. Start and end time of first VC report that is being processed (both at 0 hours).

10. Indicates that the data on working-observations-file tape from 720710 0534 to 720710 2047 was rearranged into time ascending order. The data from 720710 2048 to 720812 1838 was in proper time order. The total time span of the observations on tape 2814H is from 720710 0534 to 720812 1838.

11. The first portion of altitude graph to be plotted is an apogee-to-perigee pass.

12. The period plotted for this portion of the graph is from 720712 0001 to 720712 0349. The start time of the above period corresponds to the time of the first data point on the first VC report. However, it does not always correspond to an apogee or perigee point. Subsequent start times do correspond to proper labels.

13. These dates correspond to dates in item 12. The first date appears on the left corner of the data distribution box. The second date, if different, appears as the last date in the plot (see Figures B-2 and B-8).

14. The difference between the last and the first hour printed in the data distribution plots.

15. Type and quantity of data plotted in the data distribution plot. This reflects the contents of the observations in the working-observations-file tape (tape number 2814H). However, "passes" refers to the number of asterisks in the data distribution plot. Only one observation per minute is plotted and counted in this number.

16. Items 12 through 15 are repeated for each component of the OUE, if all three components are plotted.

17. Items 12 through 16 are repeated for all A-P and P-A passes until the entire VC report is plotted for altitude plots.

18. Indicates completion of a VC report.

19. Indicates the back spacing of the VC report to the beginning of the report when both altitude and time graphs are requested. No backspacing is needed when only one option is requested.

20. Indicates that time graphs are being prepared by the program.

21. IDATE is the start date; ITIME6 is the start hour of the data on the time graphs. The data distribution box information, similar to these described for the altitude graphs (items 12 through 16) is repeated. This time the span of the graphs and plots is 24 hours.

22. When an entire VC report has been processed for both options, if needed, the next VC report is called in and the start and end time of the VC report is printed as is the information from 9 through 21. This is repeated until all VC reports on all VC tapes are processed.

Because SSS-1 completes approximately three orbits in a 24-hour period, there are six sets of altitude plots, two for each orbit (see Figures B-2 through B-7), and one set of time plots (see Figures B-8 through B-10). Each set consists of the three OUE components.

The plotter output provides the graphic display of the OUE component (see Section 3.3). Figure B-2 through B-10 show a typical set of altitude and time graphs. The altitude graphs consist of two sets: apogee-perigee and perigee-apogee.

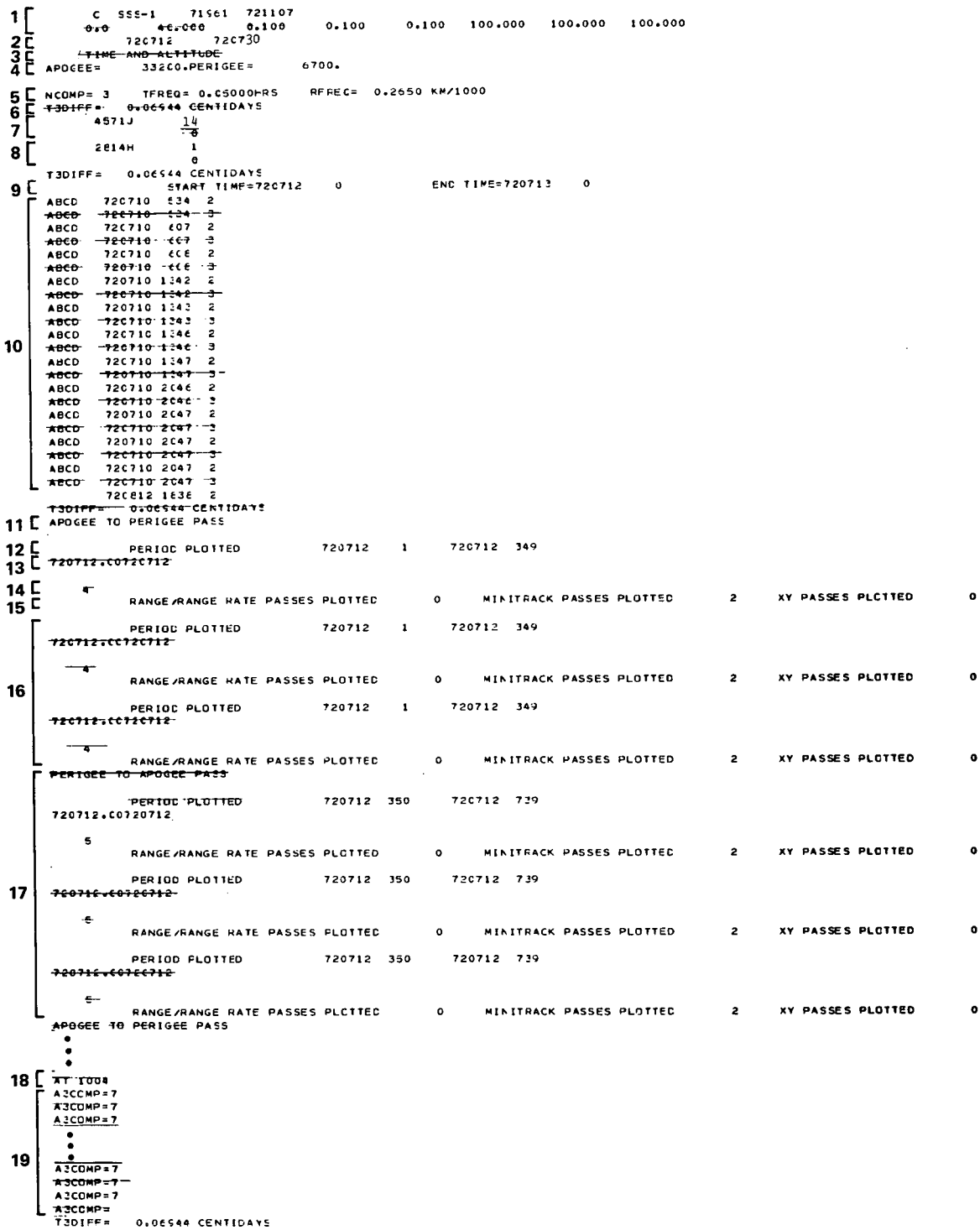

Figure B-1. Sample Printout for the SSS-1 Satellite (1 of 2)

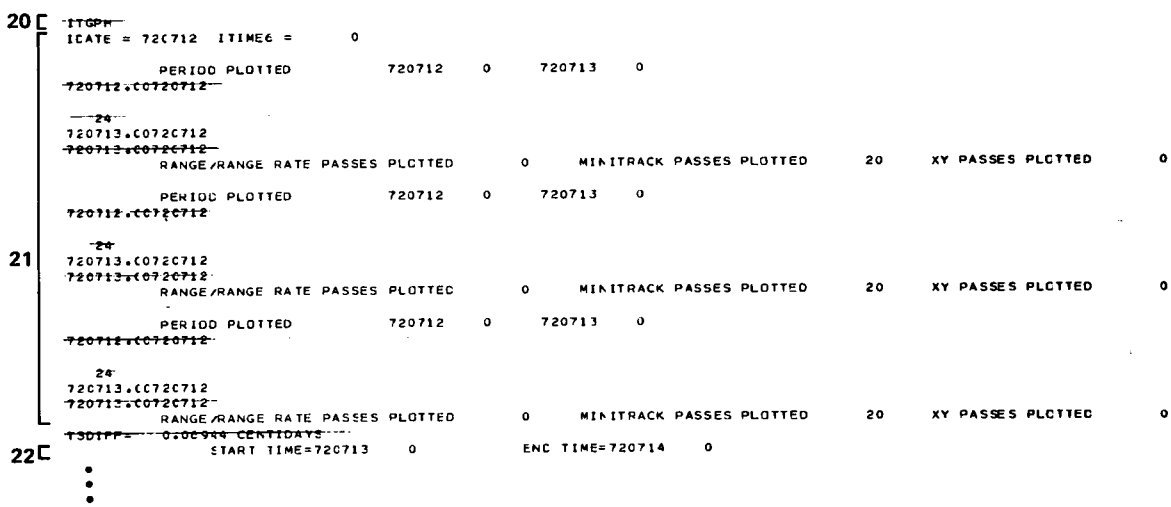

Figure B-1. Sample Printout for the SSS-1 Satellite (2 of 2)

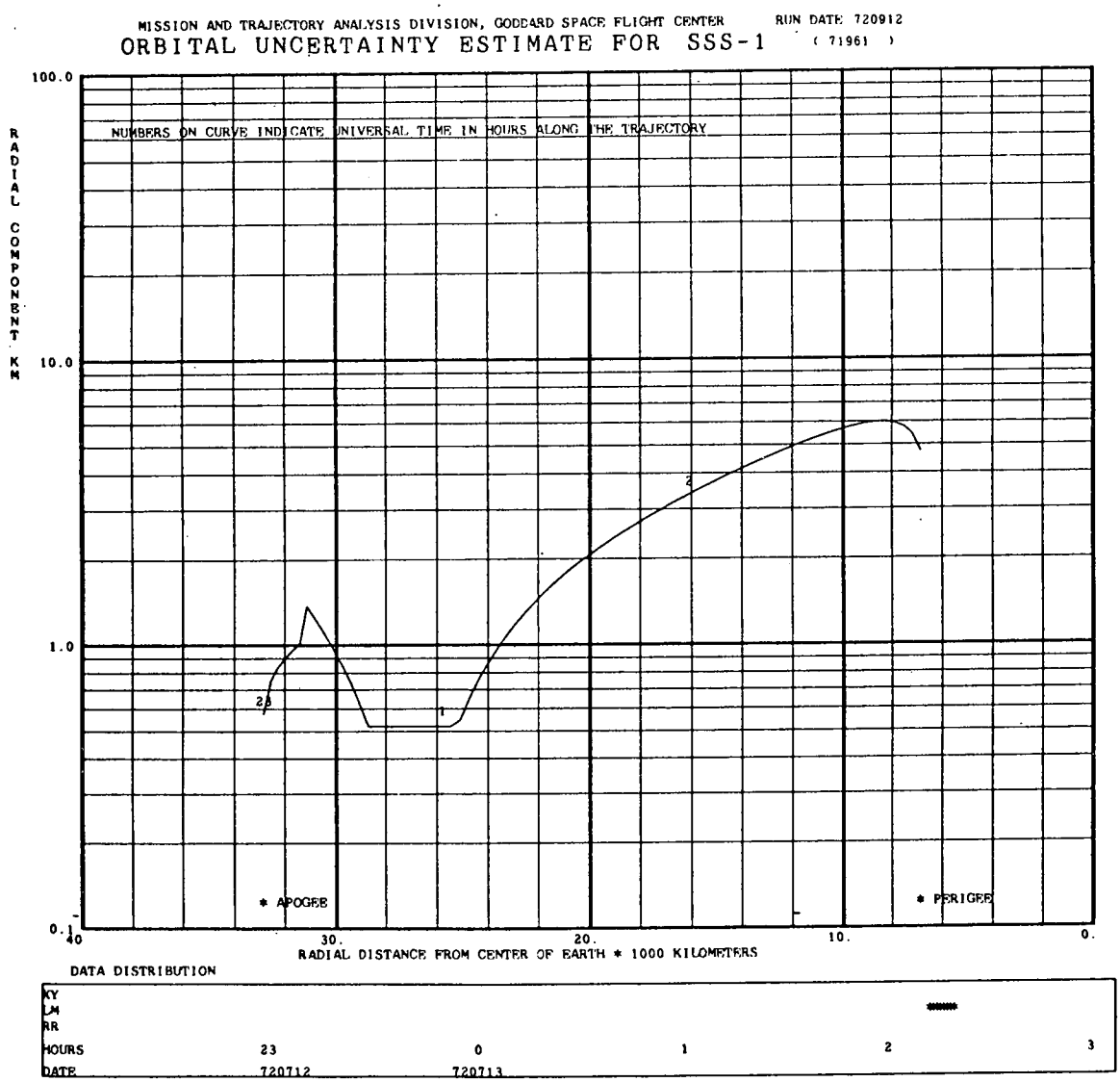

Figure B-2. Altitude Graph for SSS-1 Satellite, Apogee-Perigee Radial Component

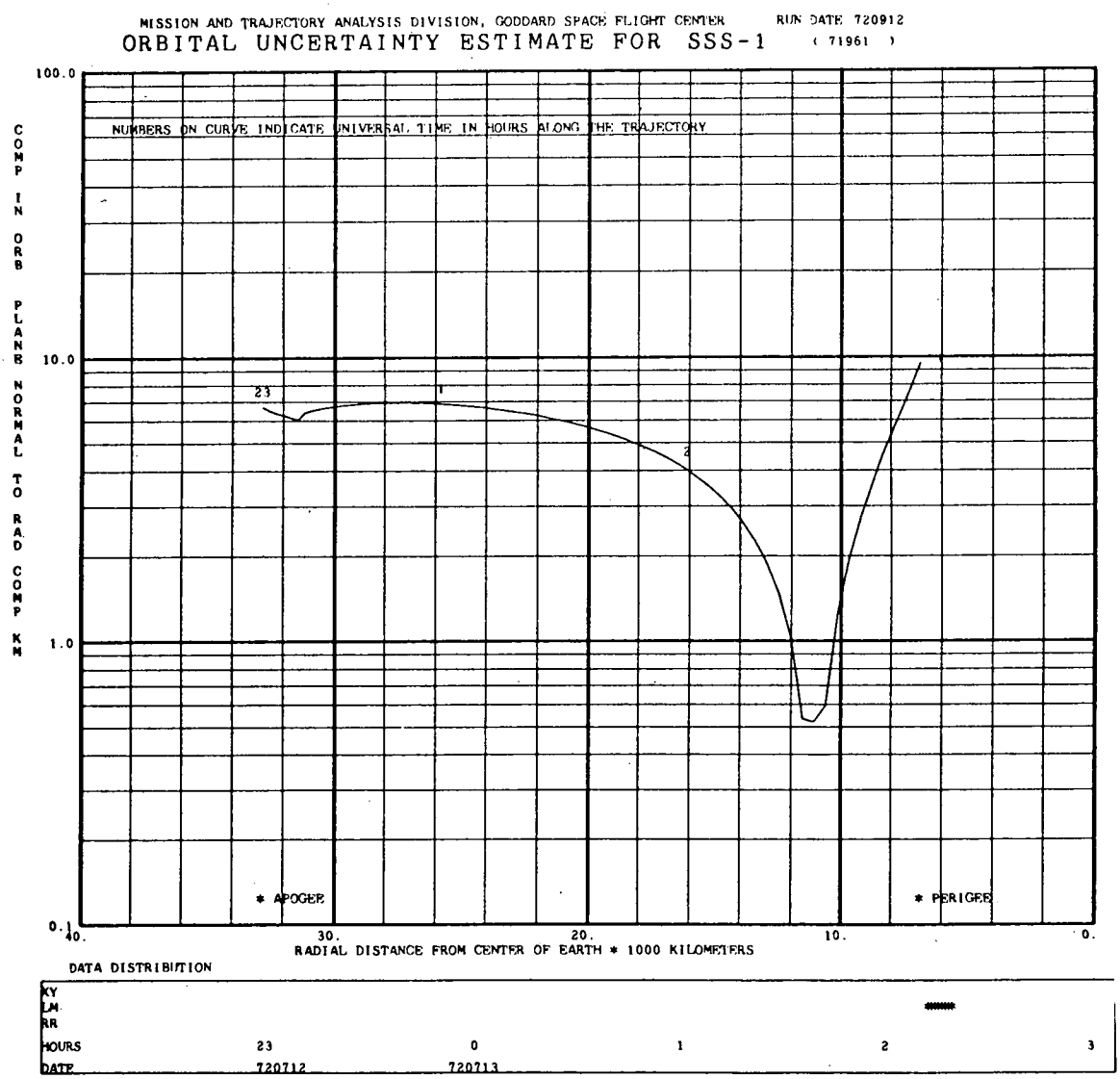

Figure B-3. Altitude Graph for SSS-1 Satellite, Apogee-Perigee Component in Orbital Plane Normal to Radial Component

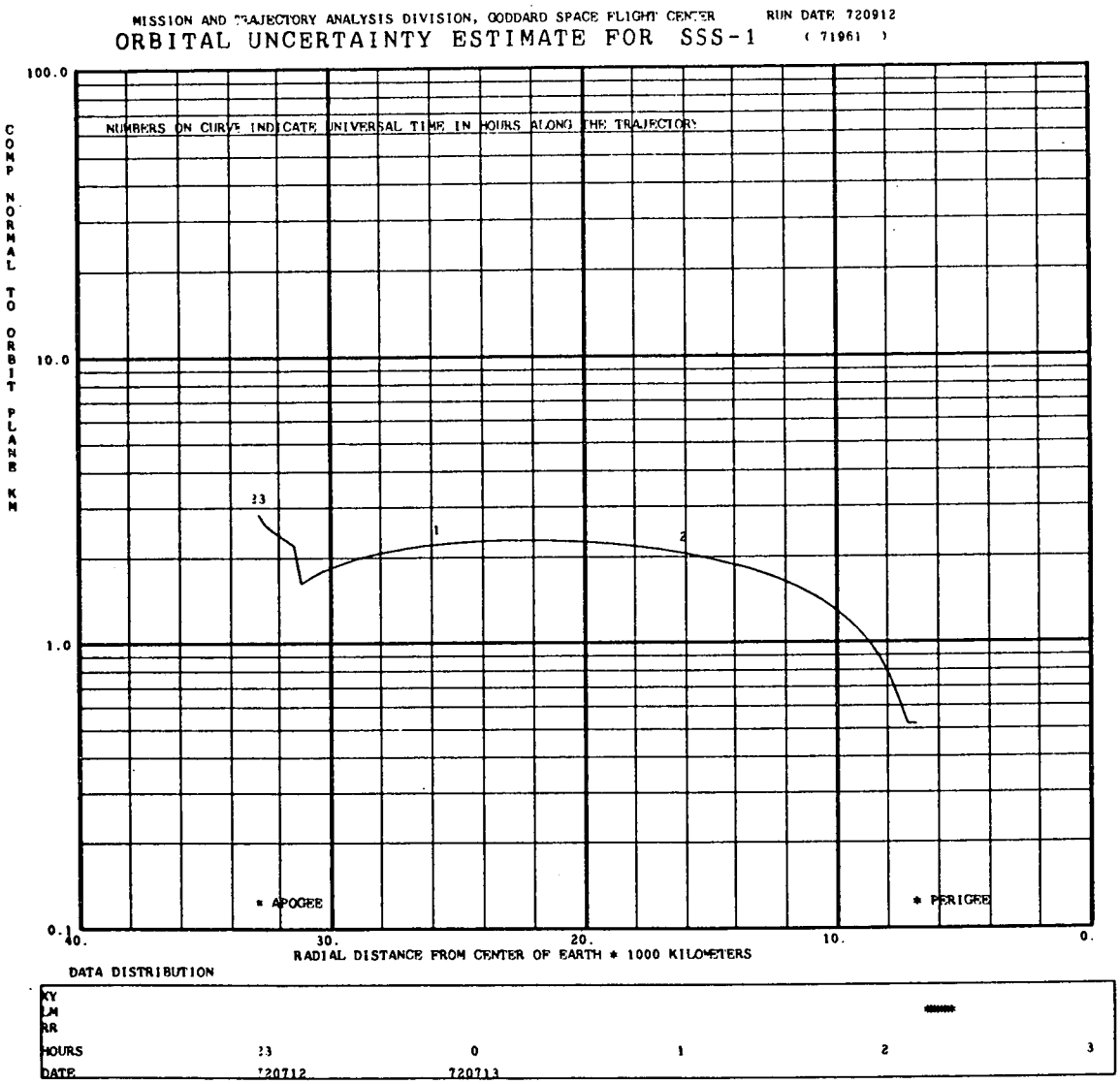

Figure B-4. Altitude Graph for SSS-1 Satellite, Apogee-Perigee Component Normal to Orbital Plane

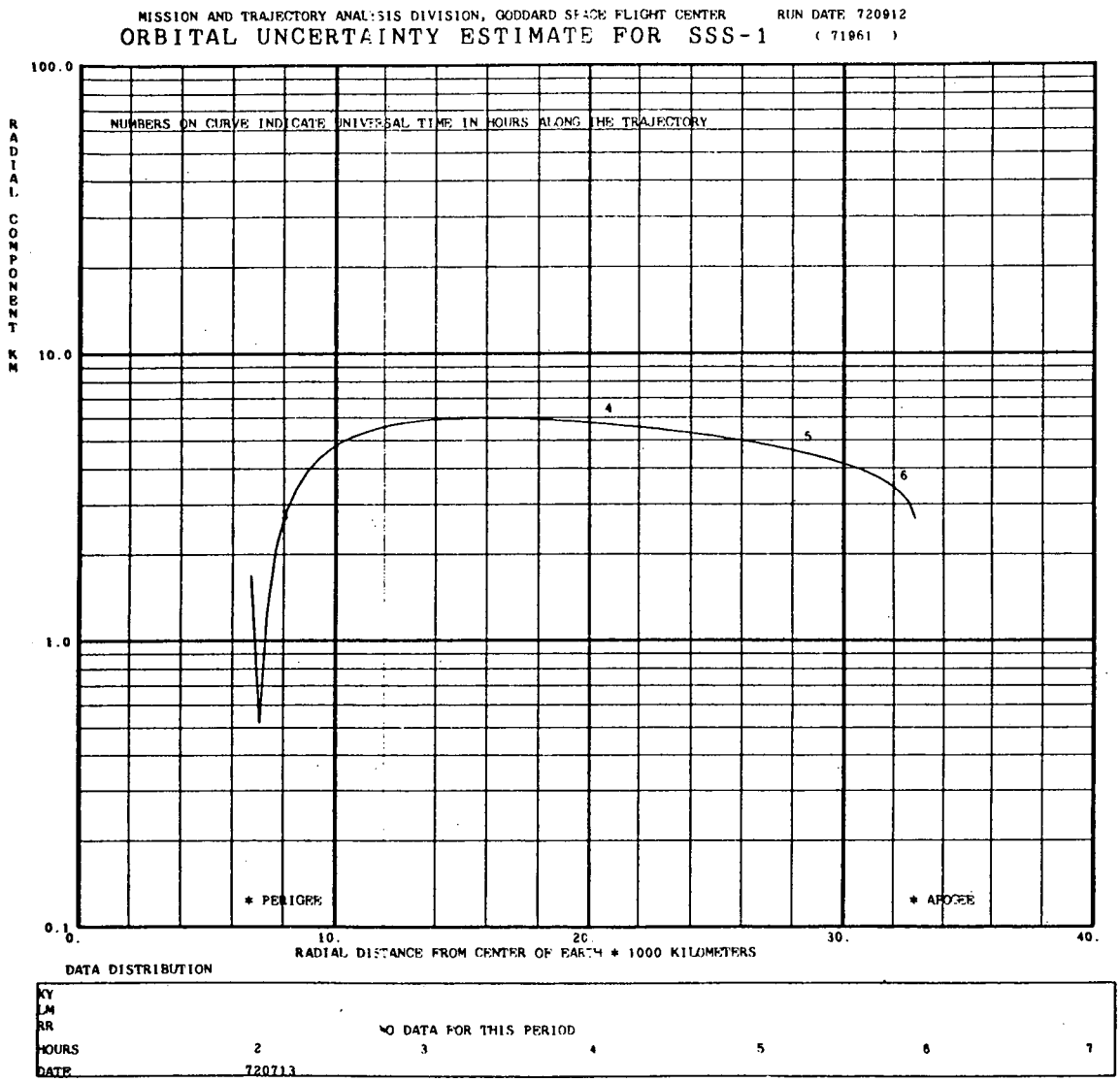

Figure B-5. Altitude Graph for SSS-1 Satellite, Perigee-Apogee Radial Component

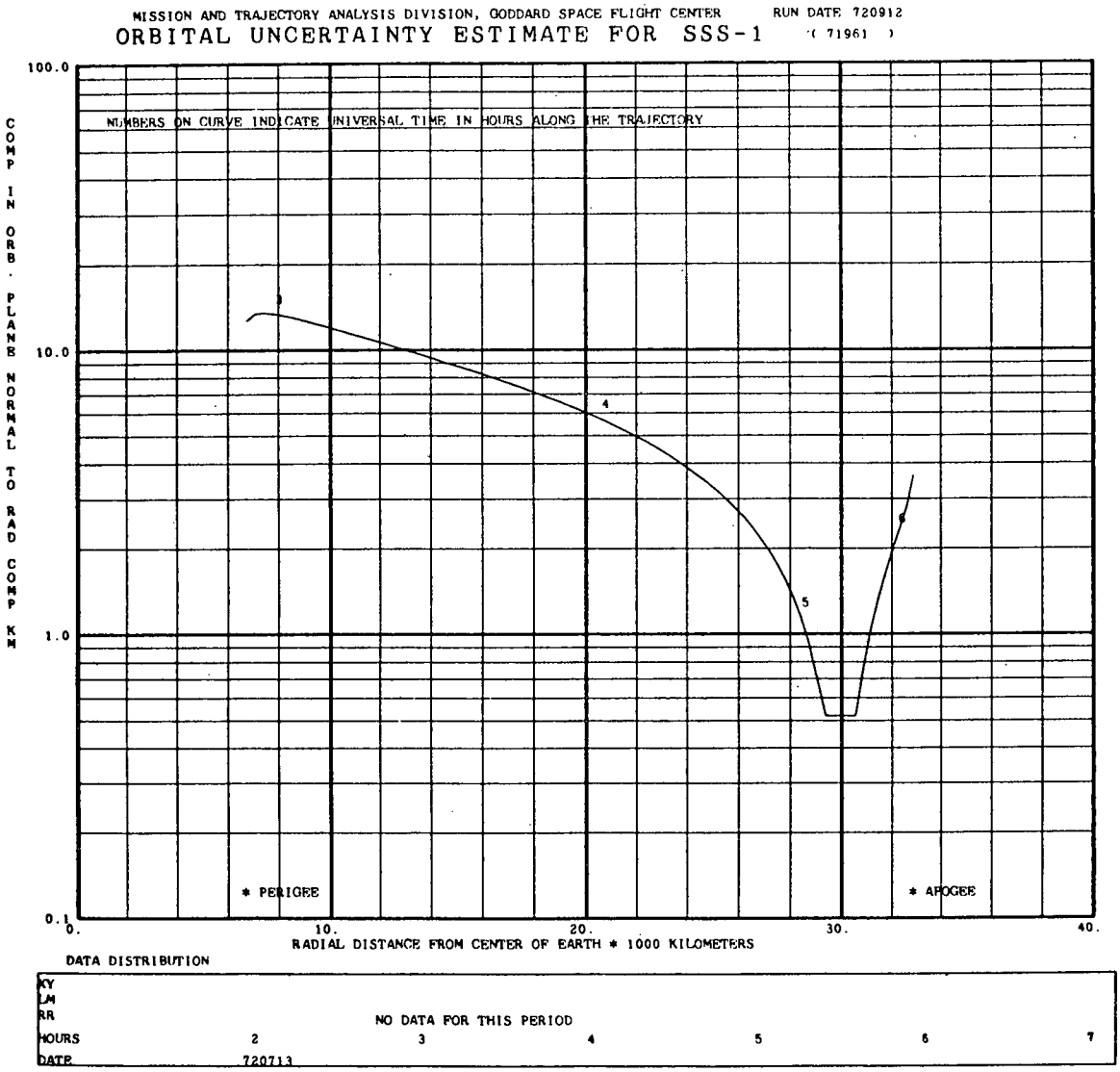

Figure B-6. Altitude Graph for SSS-1 Satellite, Perigee-Apogee Component in Orbital Plane Normal to Radial Component

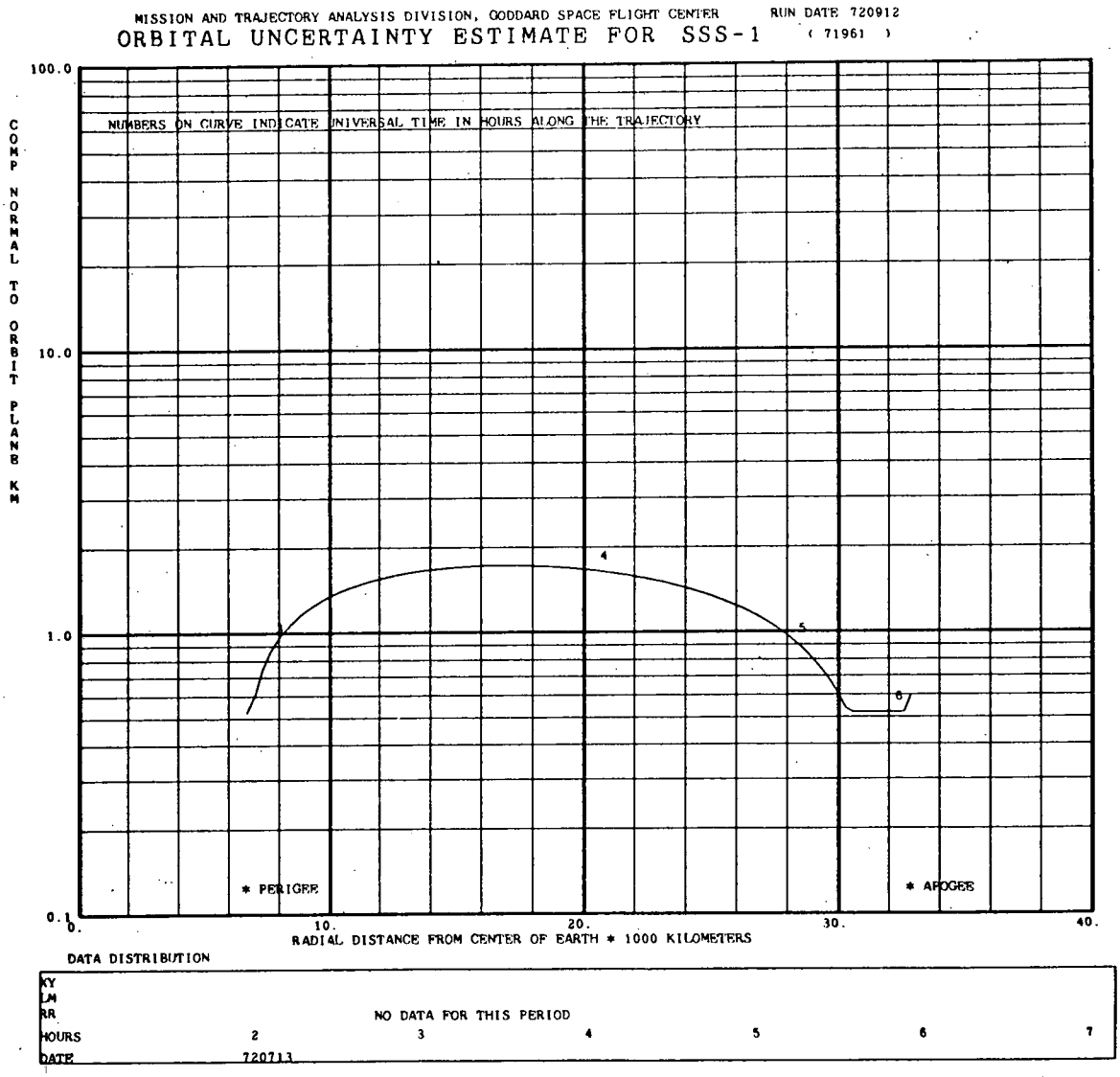

Figure B-7. Altitude Graph for SSS-1 Satellite, Perigee-Apogee Component Normal to Orbital Plane

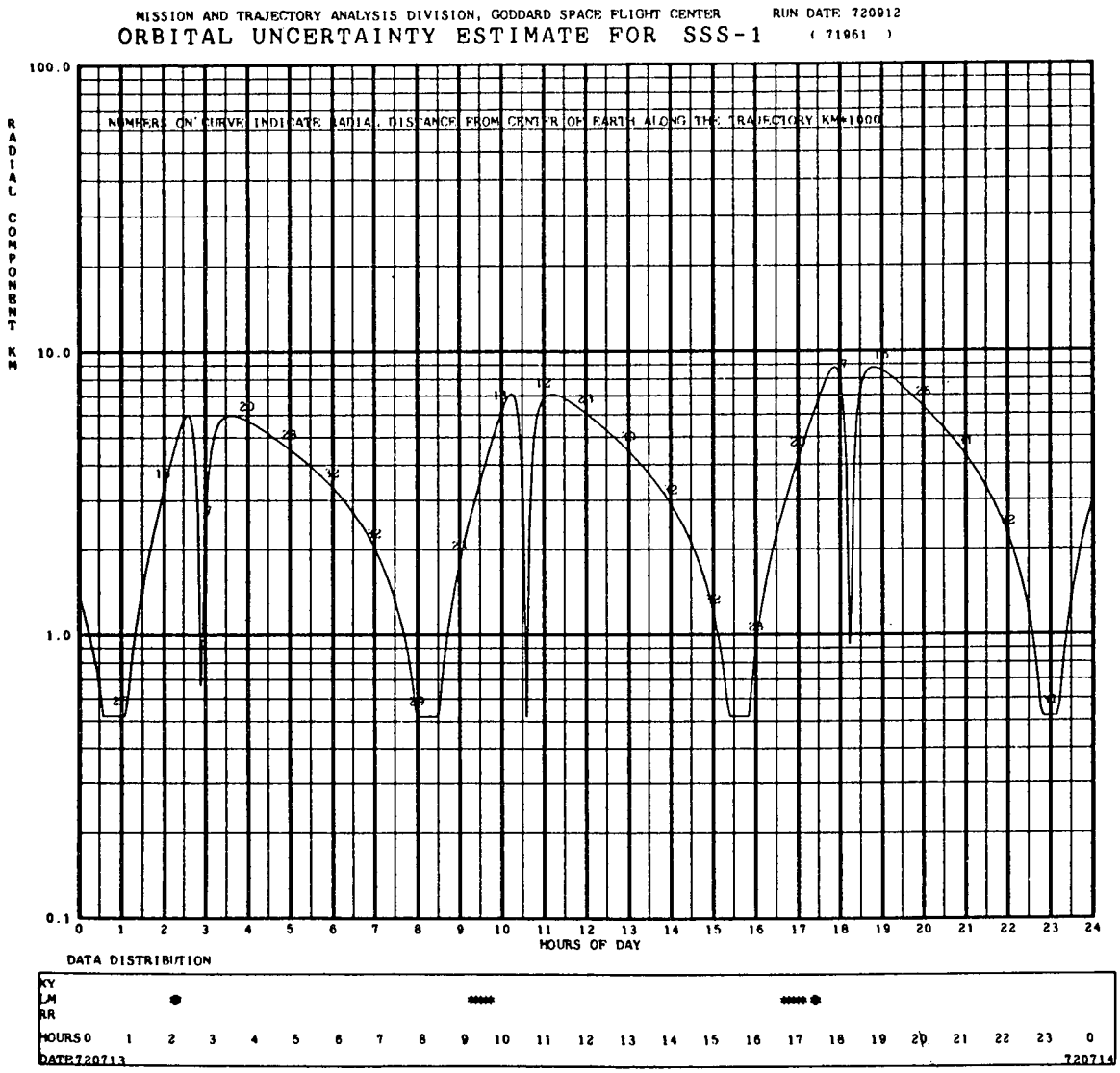

Figure B-8. Time Graph for SSS-1 Satellite, Radial Component

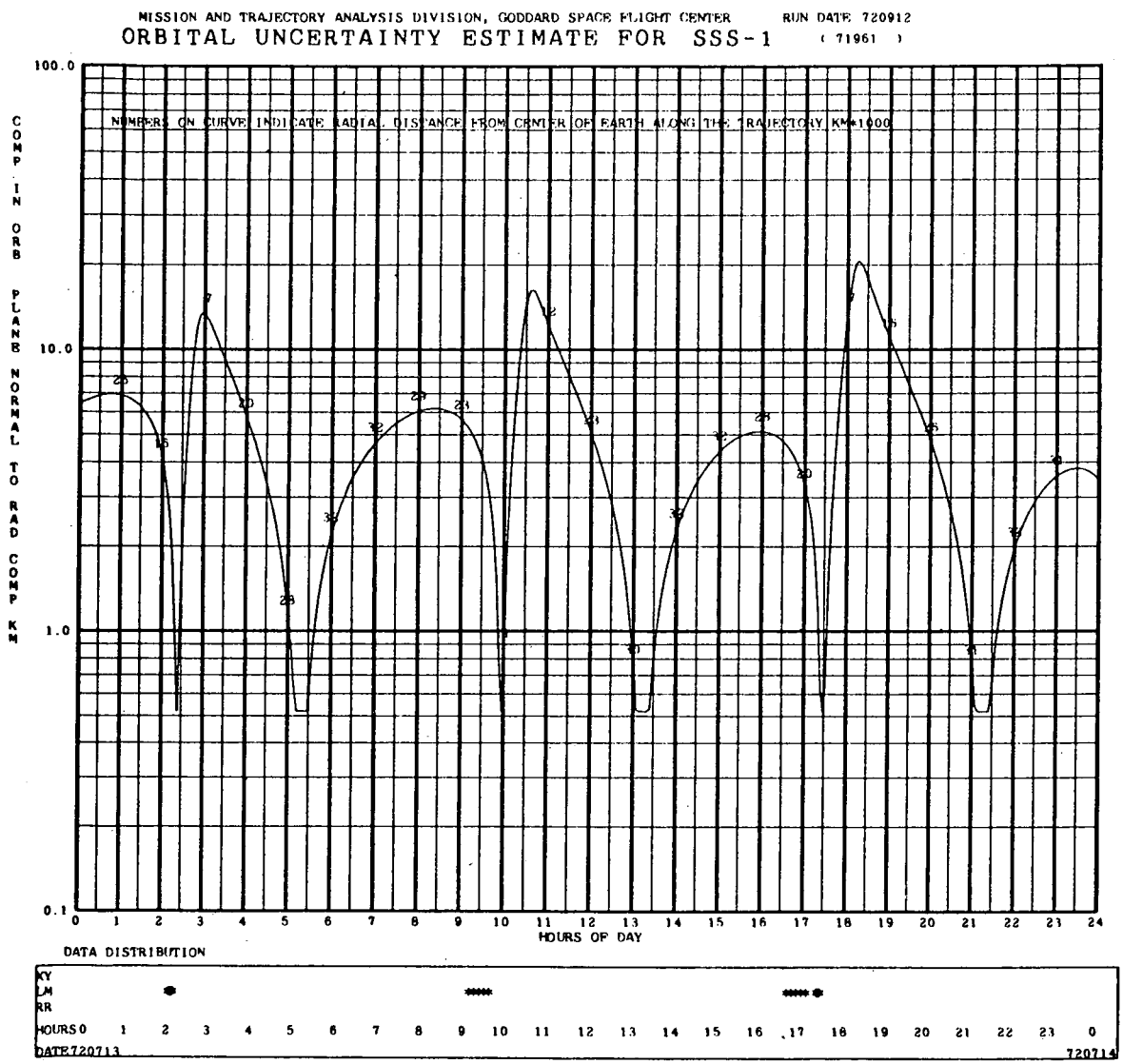

Figure B-9. Time Graph for SSS-1 Satellite, Component in Orbital Plane Normal to Radial Component

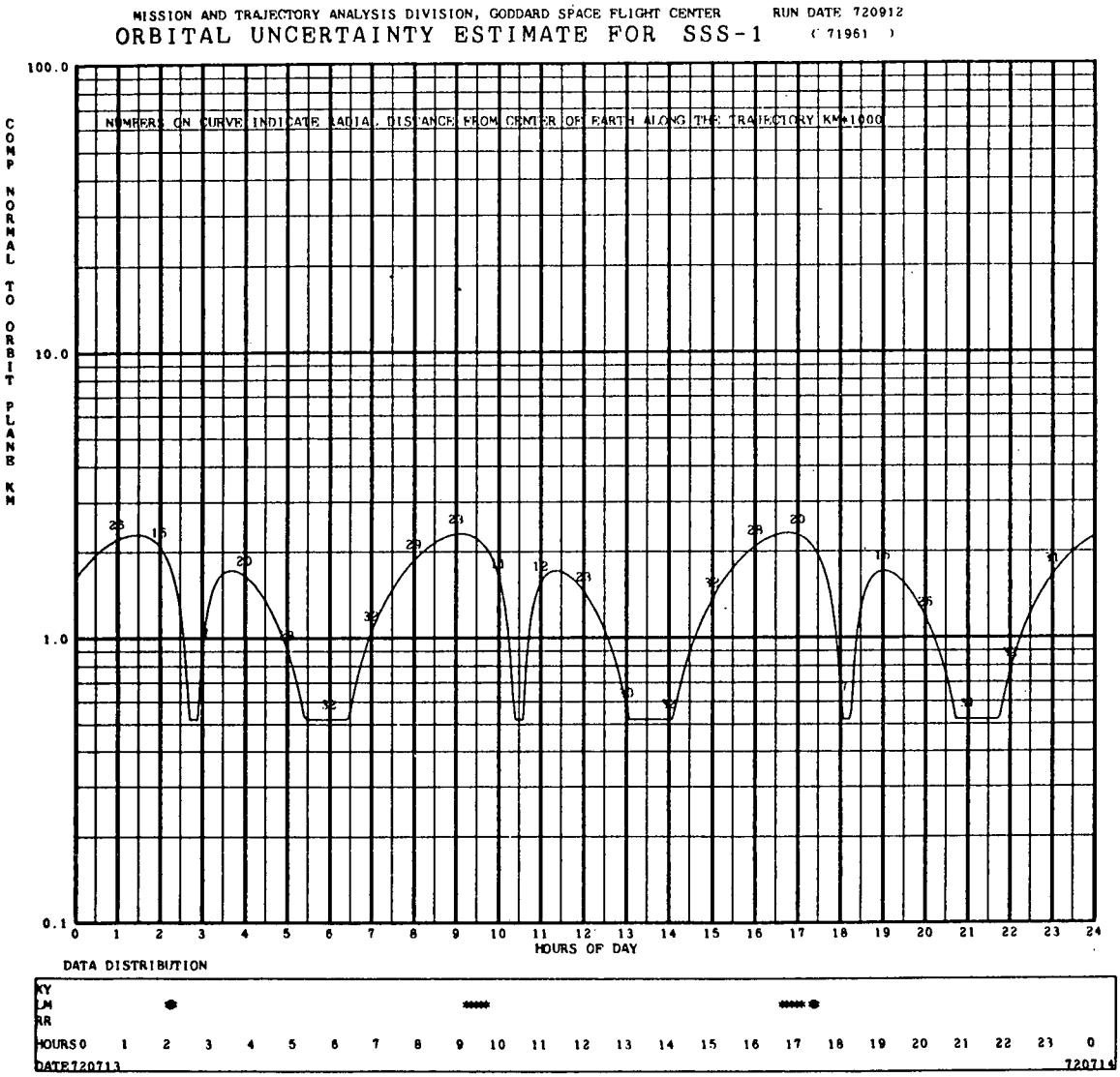

Figure B-10. Time Graph for SSS-1 Satellite, Component Normal to Orbital Plane

APPENDIX C - INTEGRATED GRAPHICS SOFTWARE (IGS) ERROR CODE

TABLE 3-4

IGS ERROR CODE

THIS TABLE DESCRIBES THE MEANING OF EACH POSSIBLE IGS ERROR MESSAGE. WHEN AN ERROR OCCURS, SUBROUTINE ERRZZ IS CALLED TO PRINT OUT AN ERROR MESSAGE. THE ERROR MESSAGE WILL READ AS FOLLOWS
YOU HAVE COMMITTED ERROR NO. 'NO' DURING THE PLOTTING OF FRAME NO. XX
THE ERROR VALUE WAS VALUE(I), VALUE(F), VALUE(A).
CONTROL IS RETURNED AFTER THE MESSAGE IS PRINTED--THE JOB IS NOT TERMINATED.

NO	SUBROUTINE	VALUE	DESCRIPTION
1	GETSMG	NO	ILLEGAL MODE SET NUMBER IN CALL.
2	LEGNDG	N	ILLEGAL CHARACTER COUNT IN CALL.
3	LINESG	NO	ILLEGAL NUMBER IN CALL.
4	MODESG	ITAPE	ILLEGAL TAPE NO. IN CALL.
5	NUMBRG	FMT	ILLEGAL FORMAT IN CALL.
6	OBJCTG	-	MAX X OR Y LE MIN X OR Y IN CALL.
7	PAGEG	-	ILLEGAL ARGUMENTS IN CALL.
8	POINTG	N	ILLEGAL NUMBER IN CALL.
9	SEGMTG	N	ILLEGAL NUMBER IN CALL.
10	TABSG	N	ILLEGAL NUMBER IN CALL.
13	LABELG	-	ILLEGAL FORMAT IN CALL.
12	GRIDG	-	GRID TOO SMALL TO DRAW.
11	MLTPLG	NLINES	ILLEGAL NUMBER IN CALL.
14	TITLEG	-	ILLEGAL ARGUMENTS IN CALL.
15	SETUPG	-	ILLEGAL ARGUMENTS IN CALL.
16	SUBJEG	-	MAX X OR Y EQ MIN X OR Y.
17	LABELG	-	ILLEGAL ARGUMENTS IN CALL.
18	LABELG	-	GRID TOO SMALL TO LABEL.
19	LABELG	-	ZERO SUBJECT SPACE.
20	GRIDG	-	ILLEGAL ARGUMENTS IN CALL.
21	SETUPG	-	NOT ENOUGH ROOM TO DRAW A GRID.
22	SETUPG	-	DENSITY LE 0.
23	SETSMG	N	ILLEGAL MODE SET NO. IN CALL.
24	SETUPG	-	GRID WILL NOT FIT ON PAGE.
25	TEXTG	N	ILLEGAL CHARACTER COUNT IN CALL.
26	LABELG	-	LABELS WILL NOT FIT ON PAGE.
27	PACKZZ	-	NO INITIALIZATION CALL TO MODESG.
28	GRAPHG	N	ILLEGAL ARGUMENT IN CALL.
29	SUBJEG	-	MINUS VALUE FOR LOG GRID.
30	SETUPG	-	TOO MANY CYCLES IN LOG GRID.
31	VECTZZ	-	NO VECTOR CHARACTER FONT INITIALIZED.
32	SCALZZ	X	BAD X-COORDINATE.
34	VECTZZ	CHAR.	CHARACTER NOT IN FONT.
35	TITLEG	-	NOT ENOUGH ROOM TO TITLE GRID.
36	VECTZZ	CHAR	REQUEST FOR NON-EXISTENT VECTOR CHAR CASE.
37	NVECZ	NP	BYTE NUMBER IS ZERO OR NEGATIVE.
100	PSUBJG		MAX. THETA EQUAL TO MIN THETA AND/OR MAX. RADIUS EQUAL TO MIN. RADIUS.
33	SCALZZ	Y	BAD Y-COORDINATE.
101	PSUBJG	-	MIN. RADIUS GREATER THAN MAX RADIUS.
102	PGRAPG	N	ILLEGAL ARGUMENT IN CALL.
103	VECAZZ	-	MORE THAN 360. DEG. OF CHARACTERS.
104	VECAZZ	N	ILLEGAL ARGUMENT IN CALL.
105	PLINEG	N	ILLEGAL ARGUMENT IN CALL.
106	POLPTG	N	ILLEGAL ARGUMENT IN CALL.
107	PSEGMG	N	ILLEGAL ARGUMENT IN CALL.
108	PMLTLG	N	ILLEGAL ARGUMENT IN CALL.
109	POLEG	N	ILLEGAL ARGUMENT IN CALL.
110	PVESZZ	N	ILLEGAL ARGUMENT IN CALL.
111	PLABLG	-	ILLEGAL FORMAT IN CALL.
112	PLABLG	-	ILLEGAL AXIS.
113	PLABLG	-	ZERO SUBJECT SPACE.
114	PVEAZZ	N	ILLEGAL ARGUMENT IN CALL.

TABLE 3-4 (CON'T)

115	BOXG	N	ILLEGAL ARGUMENT IN CALL
116	CLASFG	LEVEL	ILLEGAL ARGUMENT IN CALL.
202	SUBJ3D	ZMIN	MINIMUM Z = MAXIMUM Z.
201	SUBJ3D	YMIN	MINIMUM Y = MAXIMUM Y
200	SUBJ3D	XMIN	MINIMUM X = MAXIMUM X.
117	PSETG	MODE	ILLEGAL ARGUMENT IN CALL
203	PLOTS3	X	X MAXIMUM X.
204	PLOTS3	X	X MINIMUM X.
205	PLOTS3	Y	Y MAXIMUM Y.
206	PLOTS3	Y	Y MINIMUM Y.
207	PLOTS3	Z	Z MAXIMUM Z
208	PLOTS3	Z	Z MINIMUM Z

APPENDIX D - SD-4060 OCPLT4 SOURCE PROGRAM COMPILATIONS LISTINGS

This appendix presents a compilations listings of the SD-4060 OCPLT4 source program. The subroutines are listed as follows:

```
//ZBNJEPLT JOB (GI0141641E,P,CCCC80,C01C01),QQQ,MSGLEVEL=(1,1)
// EXEC FORTRANH,PARM='MAP,ID,OPT=2',REGION=500K
XXDEFAULT PROC FORTRAN=IEKAA00,NBLK=40                                  00000100
XXSOURCE  EXEC PGM=&FORTRAN,REGION=300K                                 00000200
IEF653I SUBSTITUTION JCL - PGM=IEKAA00,REGION=300K
//SOURCE.SYSLIN DD DSN=FKS,UNIT=(2400-9,,DEFER),DISP=(NEW,PASS),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200,DEN=3),
// LABEL=(1,BLP,,OUT),VOL=SER=S64M
X/SYSLIN   DD  DSN=&&OBJMOD,SPACE=(3200,(&NBLK,10),,,ROUND),UNIT=DISK,  00000300
IEF653I SUBSTITUTION JCL - DSN=&&OBJMOD,SPACE=(3200,(40,10),,,ROUND),UNIT=DISK,
XX              DISP=(MOD,PASS),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)    00000400
//SOURCE.SYSPRINT DD SPACE=(CYL,(5,1))
X/SYSPRINT DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),         00000500
XX             UNIT=(DISK,SEP=SYSLIN)                                   00000600
XXSYSPUNCH DD  SYSOUT=B,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280)            00000700
//SOURCE.SYSUDUMP DD SYSOUT=A
X/SYSUDUMP DD  SYSOUT=A,SPACE=(TRK,5)                                   00000800
XXSYSUT1   DD  SPACE=(TRK,(3,5)),UNIT=(DISK,SEP=(SYSLIN,SYSPRINT))      00000900
XXSYSUT2   DD  SPACE=(CYL,(1,1)),                                       00001000
XX             UNIT=(DISK,SEP=(SYSLIN,SYSPRINT,SYSUT1))                 00001100
//SOURCE.SYSIN DD *
//
IEF236I ALLOC. FOR ZBNJEPLT SOURCE
IEF237I 0C3   ALLOCATED TO SYSLIN
IEF237I 331   ALLOCATED TO SYSPRINT
IEF237I 332   ALLOCATED TO SYSPUNCH
IEF237I 333   ALLOCATED TO SYSUDUMP
IEF237I 334   ALLOCATED TO SYSUT1
IEF237I 332   ALLOCATED TO SYSUT2
IEF237I 233   ALLOCATED TO SYSIN
```

Figure D-1. JCL Used in Compilation of SD-4060 OCPLT4 Program

```
LEVEL 20.1 (AUG 71)                    OS/360  FORTRAN H

      COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                        SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
ISN 0002              COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10   9007
                     10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)   0008
                     1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                              0009
ISN 0003              COMMON ERRL01,ERRL02,ERRL03,ERRHI1,ERRHI2,ERRHI3
ISN 0004              COMMON AMODE(200),CON,MANY,LOG
ISN 0005              COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
ISN 0006              DATA INCRD,JSYOUT/5,6/
ISN 0007              DATA NOSTOP/4HAECD/
ISN 0008              DATA CONN/1HC/                                                       0012
ISN 0009              DATA SORTST/4H      /                                                0013
ISN 0010              DATA TIMLY/4HTIME/                                                   0017
ISN 0011              DATA STRT1/4HYYMM/                                                   0021
ISN 0012              DIMENSION X2(120),X3(120),X4(120),X5(120),X6(120),X7(120),X8(120),
                     1 X9(120),Y2(120),Y3(120),Y4(120),Y5(120),Y6(120),Y7(120),Y8(120),
                     2 Y9(120)
ISN 0013              DIMENSION X1(120),Y1(120)
ISN 0014              DIMENSION XHR3(1500),RANGE(1500),RANGE1(1500),RANGE2(1500)
ISN 0015              DIMENSION SAVE1(120),SAVE2(120),SAVE3(120),SAVE4(120)
ISN 0016              DIMENSION IOUTM(5)
ISN 0017              REAL*8 TIMOUT,TIMEND
ISN 0018              INTEGER A5, A7, B3, B5
ISN 0019              INTEGER UPPER1,UPPER2,UPPER3,BIG1,BIG2,BIG3,TOP1,TOP2,TOP3
ISN 0020              WRITE(JSYOUT,2)
ISN 0021            2 FORMAT(1H1)
ISN 0022              A5 = 20
ISN 0023              A7 = 21
ISN 0024              B3 = 22
ISN 0025              B5 = 23
ISN 0026              SEC = 0.
ISN 0027              XRAN1=0.
ISN 0028              IXIY=8
ISN 0029              MTYPE=1
ISN 0030              JINX=0                                                               0029
ISN 0031              NOGO=0                                                               0030
ISN 0032              MSKIP=5                                                              0031
ISN 0033              CALL MODESG(AMODE,0)
ISN 0034              CALL SETSMG(AMODE,19,1366.)
ISN 0035              CALL SETSMG(AMODE,20,1023.)
ISN 0036              CALL TITLES (MTYPE,MSKIP)                                            0032
ISN 0037              ITAPE=1                                                              0033
ISN 0038              IGOR1=1                                                              0034
ISN 0039              JK=0                                                                 0035
ISN 0040              MSKIP=0                                                              0036
ISN 0041              IADD=0                                                               0037
ISN 0042              ISET=0                                                               0038
ISN 0043            1 ISET1=1                                                              0039
ISN 0044              ITERM=0                                                              0040
ISN 0045              IGOR=0                                                               0041
ISN 0046              I=0                                                                  0042
ISN 0047              READ 102,TIMEY                                                       0044
ISN 0048          102 FORMAT (A4)                                                          0045
ISN 0049              READ 3050,NSS1,NSS2,NSS3,NSS4,NSS5,NSS6
ISN 0050         3050 FORMAT (6I11)
ISN 0051              IF(TIMEY.EQ.SORTST.AND.NSS6.EQ.0) PRINT 9101
ISN 0053         9101 FORMAT(6X,'TIME AND ALTITUDE')
ISN 0054              IF(TIMEY.EQ.TIMLY.AND.NSS6.EQ.0) PRINT 9102,TIMEY
ISN 0056         9102 FORMAT(6X,A4)
ISN 0057              IF(TIMEY.EQ.SORTST.AND.NSS6.EQ.1) PRINT 9103
ISN 0059         9103 FORMAT(6X,'ALTITUDE')
ISN 0060              IF(TIMEY.EQ.TIMLY.AND.NSS6.EQ.1) PRINT 9104
ISN 0062         9104 FORMAT(6X,'CONFLICTING USER INPUT*****CHECK DATA CARDS 8 AND 9')
ISN 0063              READ(INCRD,103) NCOMP,TFREQ,APOGEE,PERIGE
ISN 0064          103 FORMAT(I1,1X,F3.0,1X,F8.0,1X,F8.0)
ISN 0065              TFREQ=TFREQ/60.
ISN 0066              XRANGE=(APOGEE-PERIGE)/1000.
ISN 0067              RFREQ=XRANGE/100.
ISN 0068              WRITE(JSYOUT,106)APOGEE,PERIGE
ISN 0069          106 FORMAT(1H,'APOGEE=',F11.0,'PERIGEE=',F11.0)
ISN 0070              WRITE(JSYOUT,105) NCOMP,TFREQ,RFREQ
ISN 0071          105 FORMAT(1H0,6HNCOMP=,I2,4X,6HTFREQ=,F8.5,3HHRS,4X,6HRFREQ=,F8.4,
                     1       8H KM/1000)
                  C    *READ ANY OPTIONAL INPUT TIME DIFFERENCE
```

Figure D-2. MAIN Routine (1 of 13)

```
ISN 0072            READ 3052, T3DIFF
ISN 0073          3052 FORMAT (F4.0)
ISN 0074            IF (T3DIFF.NE.0.) T3DIFF=T3DIFF/864.
ISN 0076            IF (T3DIFF.EQ.0.) T3DIFF = 60./864.
ISN 0078            33DIFF=((T3DIFF*864.)/60.)+.1
ISN 0079            IDIFF=IFIX(S3DIFF)
ISN 0080            PRINT 1011,T3DIFF
ISN 0081          1011 FORMAT(1H ,'T3DIFF=',F10.5,1X,'CENTIDAYS')
ISN 0082            IF(NSS5.EQ.0) PRINT 3,IDIFF
ISN 0084            3  FORMAT(1H ,'IDIFF=',I3,1X,'MINUTES =T3DIFF')
ISN 0085            IBLAP=5                                                  0046
ISN 0086            CALL TAPES(IBLAP)                                        0047
ISN 0087            IF (ISET.NE.0) GO TO 25                                  0049
                  C *  THE PURPOSE OF THIS SEGMENT IS TO DETERMINE END TIME AND
                  C *    STATION TYPE VALUES
ISN 0089           14 CONTINUE
ISN 0090          3100 READ (B5, END = 3150)
ISN 0091            GO TO 3100
ISN 0092          3150 BACKSPACE B5
ISN 0093            BACKSPACE B5
ISN 0094            CALL B5READ (JTME, JTME1, ITYPE(1))
ISN 0095            REWIND B5
ISN 0096            IF(NSS5.EQ.0) PRINT 332,JTME,JTME1
ISN 0098          332  FORMAT(1H ,'JTME  = ',I6,2X,'JTME1  = ',I6)
ISN 0099           25 READ(A5,104,END=26) STRT2
ISN 0100           26 IF(TIMLY.NE.STRT2) GO TO 25
ISN 0102            READ (A5,107) IT1,IT2,IT3,IT4
ISN 0103          107 FORMAT(40X,I6,1X,I4,22X,I6,1X,I4)
ISN 0104            TIMOUT = 0.
ISN 0105            IOUTIM(1) = IT3/10000
ISN 0106            IOUTIM(2) = (IT3 - 10000*IOUTIM(1))/100
ISN 0107            IOUTIM(3) = IT3 - (10000*IOUTIM(1) + 100*IOUTIM(2))
ISN 0108            IOUTIM(4) = IT4/100
ISN 0109            IOUTIM(5) = IT4 - 100*IOUTIM(4)
ISN 0110            CALL TCONV0 (TIMOUT, IOUTIM, SEC)
ISN 0111            TIMEND = TIMOUT
ISN 0112            PRINT 1011,T3DIFF
ISN 0113            PRINT 108,IT1,IT2,IT3,IT4
ISN 0114          108 FORMAT(1H ,15X,'START TIME=',I6,1X,I4,11X,'END TIME=',I6,1X,I4)
ISN 0115            IF (ISET.EQ.1) GO TO 31                                  0074
                  C CHECK FOR TIME PERIOD COVERED ON VECTOR COMPARISON TAPE   0075
ISN 0117           23 I=I+1                                                  0082
ISN 0118            IF (CON.NE.CONN) GO TO 27                                0083
ISN 0120          232 CALL B5READ (ITIME8(I), ITIME9(I), ITYPE(I))
ISN 0121            IF (I.EQ.1) GO TO 23                                     0086
ISN 0123            IF (I.LT.7) GO TO 233                                    0087
ISN 0125            IF (ITIME8(I).EQ.ITIME8(I-1).AND.ITIME9(I).EQ.ITIME9(I-1).AND.ITYP  0088
                  1E(I).EQ.ITYPE(I-1)) GO TO 232                             0089
ISN 0127            IF (ITIME8(I).EQ.ITIME8(I-2).AND.ITIME9(I).EQ.ITIME9(I-2).AND.ITYP  0090
                  1E(I).EQ.ITYPE(I-2)) GO TO 232                             0091
ISN 0129            IF (ITIME8(I).EQ.ITIME8(I-3).AND.ITIME9(I).EQ.ITIME9(I-3).AND.ITYP  0092
                  1E(I).EQ.ITYPE(I-3)) GO TO 232                             0093
ISN 0131            IF (ITIME8(I).EQ.ITIME8(I-4).AND.ITIME9(I).EQ.ITIME9(I-4).AND.ITYP  0094
                  1E(I).EQ.ITYPE(I-4)) GO TO 232                             0095
ISN 0133            IF (ITIME8(I).EQ.ITIME8(I-5).AND.ITIME9(I).EQ.ITIME9(I-5).AND.ITYP  0096
                  1E(I).EQ.ITYPE(I-5)) GO TO 232                             0097
ISN 0135            IF (ITIME8(I).EQ.ITIME8(I-6).AND.ITIME9(I).EQ.ITIME9(I-6).AND.ITYP  0098
                  1E(I).EQ.ITYPE(I-6)) GO TO 232                             0099
ISN 0137          233 IF (ITIME8(I).LT.ITIME8(I-1)) GO TO 23                 0100
ISN 0139            IF (ITIME8(I).GT.ITIME8(I-1)) GO TO 24                   0101
ISN 0141            IF (ITIME9(I).LE.ITIME9(I-1)) GO TO 23                   0102
ISN 0143           24 I=I-1                                                  0103
ISN 0144            IF (I.EQ.0) GO TO 27                                     0104
ISN 0146            WRITE (B3,202) NOSTOP,ITIME8(I),ITIME9(I),ITYPE(I)
ISN 0147            PRINT 202    ,  NOSTOP,ITIME8(I),ITIME9(I),ITYPE(I)
ISN 0148            GO TO 24                                                 0106
ISN 0149           27 CALL B5READ (ITIME8(1), ITIME9(1), ITYPE(1))
ISN 0150            IF (ITIME8(1).EQ.JTME) GO TO 17                          0108
ISN 0152            GO TO 29                                                 0109
ISN 0153           17 IF (ITIME9(1).EQ.JTME1) GO TO 28                       0110
ISN 0155           29 WRITE (B3,202) NOSTOP,ITIME8(1),ITIME9(1),ITYPE(1)
ISN 0156            GO TO 27                                                 0112
ISN 0157           28 WRITE (B3,202) SORTST,ITIME8(1),ITIME9(1),ITYPE(1)
ISN 0158            PRINT 202,     SORTST,ITIME8(1),ITIME9(1),ITYPE(1)
ISN 0159          202 FORMAT (1X, A4, 3X, I6, 1X, I4, 1X, I2)
ISN 0160            END FILE B3
```

Figure D-2. MAIN Routine (2 of 13)

```
ISN 0161            REWIND 83
ISN 0162            IF (TIMLY.EQ.TIMEY) GO TO 1004
ISN 0164         31 CONTINUE
ISN 0165            PRINT 1011,T3DIFF
ISN 0166        104 FORMAT (7X, A4)
ISN 0167            IF (ITGPH.EQ.1) GO TO 749                                  0124
ISN 0169            IF (ISET,EQ,1) GO TO 39
ISN 0171            ISTART=1                                                   0126
ISN 0172            IF(NSS5.EQ.0) PRINT 211,ISTART
ISN 0174      2000  IF (TIMLY.EQ.TIMEY) GO TO 25                               0127
ISN 0176        39  CONTINUE
ISN 0177       889  READ (A5,890) CHC
ISN 0178       890  FORMAT (1X,A4)
ISN 0179            IF (CHC.NE.STRT1) GO TO 889
ISN 0181        40  CONTINUE
ISN 0182            LARGE1=0
ISN 0183            LARGE2=0
ISN 0184            LARGE3=0
ISN 0185            CALL AEREAD (ITIME5, ITIME6, RAD1, IEXP1, RAD2, IEXP2, RAD3,
                   1IEXP3, RAN1, IEXP4, I3EOF)
ISN 0186            IF (I3EOF.EQ.1) GO TO 1004
                  C READ IN LINE OF VECTOR COMPARISON TAPE                     0134
ISN 0188            TIMDLT = 0.
ISN 0189            IOUTIM(1) = ITIME5/10000
ISN 0190            IOUTIM(2) =(ITIME5 - 10000*IOUTIM(1))/100
ISN 0191            IOUTIM(3) = ITIME5 - (10000*IOUTIM(1) + 100*IOUTIM(2))
ISN 0192            IOUTIM(4) = ITIME6/100
ISN 0193            IOUTIM(5) = ITIME6 - 100*IOUTIM(4)
ISN 0194            CALL TCONVO (TIMOUT, IOUTIM, SEC)
ISN 0195            TIMDLT = TIMDLT + T3DIFF
ISN 0196            IF (TIMDLT.GE.TIMEND) GO TO 1004
                  C CHECK FOR END OF VECTOR COMPARISON TAPE                     0137
ISN 0198         60 RAD1=RAD1*10.0**IEXP1                                      0138
ISN 0199            RAD2=RAD2*10.0**IEXP2                                      0139
ISN 0200            RAD3=RAD3*10.0**IEXP3                                      0140
ISN 0201            RAN1=(RAN1*10.0**IEXP4)/1000.0                             0141
                  C CONVERSON OF NUMBERS TO REAL                               0142
ISN 0202            IF(RAD1.LT.ERRLO1) RAD1=ERRLO1
ISN 0204            IF(RAD2.LT.ERRLO2) RAD2=ERRLO2
ISN 0206            IF(RAD3.LT.ERRLO3) RAD3=ERRLO3
ISN 0208            IF(RAD1.GT.ERRHI1) LARGE1=1
ISN 0210            IF(RAD1.GT.ERRHI1) RAD1=RAD1/10.
ISN 0212            IF(RAD2.GT.ERRHI2) LARGE2=1
ISN 0214            IF(RAD2.GT.ERRHI2) RAD2=RAD2/10.
ISN 0216            IF(RAD3.GT.ERRHI3) LARGE3=1
ISN 0218            IF(RAD3.GT.ERRHI3) RAD3=RAD3/10.
ISN 0220            IF (ITIME5.LT.IIDAT) GO TO 40                              0149
ISN 0222            IF (IIDAT.EQ.ITIME5.AND.ITIME6.LT.IH) GO TO 40             0150
ISN 0224            IF (ITIME5.EQ.IIDAT1) GO TO 1004                           0151
ISN 0226            IF (IGOP1.NE.1) GO TO 2008                                 0152
ISN 0228            ITJ=ITIME6                                                 0153
ISN 0229            ITK=(ITIME6/100)*100                                       0154
ISN 0230            IKL=ITJ-ITK                                                0155
ISN 0231            IF (IKL.EQ.0) GO TO 810                                    0156
ISN 0233            IF(IKL.LT.IDIFF) GO TO 810
ISN 0235         62 IF (ISTART.EQ.1) GO TO 75                                  0157
ISN 0237            IF (ISTART.EQ.2) GO TO 70                                  0158
ISN 0239            IF (ISTART.EQ.3) GO TO 80                                  0159
ISN 0241            IF (ISTART.EQ.4) GO TO 90                                  0160
                  C CHECK TO SEE WHICH GRAPH IS TO BE PLOTTED                  0161
ISN 0243        810 IF (RAN1.GT.100.0) GO TO 811                               0162
ISN 0245            JK=JK+1                                                    0163
ISN 0246            MHOURS(JK)=ITJ/100                                         0164
ISN 0247            RANGE5(JK)=RAN1                                            0165
ISN 0248            ERROR(JK)=RAD1                                             0166
ISN 0249            ERROR1(JK)=RAD2                                            0167
ISN 0250            ERROR2(JK)=RAD3                                            0168
ISN 0251            IF(NSS5.EQ.0) PRINT 336,JK,MHOURS(JK)
ISN 0253       336  FORMAT(1H ,'MHOURS (',I3,') = ',I6)
ISN 0254            GO TO 62                                                   0172
ISN 0255      2008  IF (ITIME5.LT.ITIM88) GO TO 40                            0173
ISN 0257            IF (ITIME5.GT.ITIM83) GO TO 2006                           0174
ISN 0259            IF (ITIME6.LT.ITIM99) GO TO 40                             0175
ISN 0261            IGOP1=1                                                    0176
```

Figure D-2. MAIN Routine (3 of 13)

```
ISN 0262          IF(NSS5.EQ.0) PRINT 335,ITIME5,ITIME6
ISN 0264      335 FORMAT(1H ,'ITIME5= ',I6,2X,'ITIME6 = ',I6)
ISN 0265          GO TO 62                                                  0180
ISN 0266      2006 PRINT 2007                                               0181
ISN 0267      2007 FORMAT(1H1,37HTIME SPAN INCORRECT ON THIS VC REPORT)
ISN 0268          PRINT 2009,ITIME8,ITIM99                                  0183
ISN 0269      2009 FORMAT(1H0,34HEND TIME OF LAST CORRECT VC REPORT,1X,I6,1X,I4)
ISN 0270          PRINT 2010,IT1,IT2,IT3,IT4                                0185
ISN 0271      2010 FORMAT(1H0,30HTIME SPAN ON THIS VC REPORT IS,1X,I6,1X,I4,13X,I6,
                  1 1X,I4)
ISN 0272          PRINT 2011                                                0187
ISN 0273      2011 FORMAT(1H0,6SHOCPLT4 WILL PROCEED TO NEXT VC REPORT TO SEARCH FOR
                  1CORRECT TIME SPAN)
ISN 0274          GO TO 127                                                 0193
ISN 0275       811 IF (JK.EQ.0) GO TO 61                                    0194
ISN 0277          ITTK=ITK/100                                              0195
ISN 0278          IF (ITTK.LT.MHOURS(JK))ITTK=ITTK+24                       0196
ISN 0280          IHDIF=ITTK-MHOURS(JK)                                     0197
ISN 0281          IF (IHDIF.GT.4) GO TO 61                                  0198
ISN 0283          GO TO 62                                                  0199
ISN 0284       61 JK=JK+1                                                   0200
ISN 0285          MHOURS(JK)=ITJ/100                                        0201
ISN 0286          RANGE5(JK)=RAN1                                           0202
ISN 0287          ERROR(JK)=RAD1                                            0203
ISN 0288          ERROR1(JK)=RAD2                                           0204
ISN 0289          ERROR2(JK)=RAD3                                           0205
ISN 0290          IF(NSS5.EQ.0) PRINT 336,JK,MHOURS(JK)
ISN 0292          GO TO 62                                                  0209
ISN 0293       75 XRAN1=RAN1                                                0210
ISN 0294          TOP1=0
ISN 0295          TOP2=0
ISN 0296          TOP3=0
ISN 0297          CALL ASREAD (ITIME5, ITIME6, RAD1, IEXP1, RAD2, IEXP2, RAD3,
                  1IEXP3, RAN1, IEXP4, I3EOF)
ISN 0298          IF (I3EOF.EQ.1) GO TO 1004
ISN 0300          TIMOUT = 0.
ISN 0301          IOUTIM(1) = ITIME5/10000
ISN 0302          IOUTIM(2) =(ITIME5 - 10000*IOUTIM(1))/100
ISN 0303          IOUTIM(3) = ITIME5 - (10000*IOUTIM(1) + 100*IOUTIM(2))
ISN 0304          IOUTIM(4) = ITIME6/100
ISN 0305          IOUTIM(5) = ITIME6 - 100*IOUTIM(4)
ISN 0306          CALL TCONV0 (TIMOUT, IOUTIM, SEC)
ISN 0307          TIMOUT = TIMOUT + T3DIFF
ISN 0308          IF (TIMOUT.GE.TIMEND) GO TO 1004
ISN 0310          RAD1=RAD1*10.0**IEXP1                                     0216
ISN 0311          RAD2=RAD2*10.0**IEXP2                                     0217
ISN 0312          RAD3=RAD3*10.0**IEXP3                                     0218
ISN 0313          RAN1=(RAN1*10.0**IEXP4)/1000.0                            0219
ISN 0314          IF(RAD1.LT.ERRLO1) RAD1=ERRLO1
ISN 0316          IF(RAD2.LT.ERRLO2) RAD2=ERRLO2
ISN 0318          IF(RAD3.LT.ERRLO3) RAD3=ERRLO3
ISN 0320          IF(RAD1.GT.ERRHI1) TOP1=1
ISN 0322          IF(RAD1.GT.ERRHI1) RAD1=RAD1/10.
ISN 0324          IF(RAD2.GT.ERRHI2) TOP2=1
ISN 0326          IF(RAD2.GT.ERRHI2) RAD2=RAD2/10.
ISN 0328          IF(RAD3.GT.ERRHI3) TOP3=1
ISN 0330          IF(RAD3.GT.ERRHI3) RAD3=RAD3/10.
ISN 0332          IF (XRAN1.GT.RAN1) GO TO 76                               0226
ISN 0334          IF (XRAN1.EQ.RAN1) GO TO 75                               0227
ISN 0336          X1(1)=RAN1                                                0228
ISN 0337          Y1(1)=RAD1                                                0229
ISN 0338          X2(1)=RAN1                                                0230
ISN 0339          Y2(1)=RAD2
ISN 0340          X6(1)=RAN1                                                0232
ISN 0341          Y6(1)=RAD3                                                0233
ISN 0342          I=1                                                       0234
ISN 0343          ITME1=ITIME5                                              0237
ISN 0344          ITME2=ITIME6                                              0238
ISN 0345          ISET1=0                                                   0239
ISN 0346          ISTART=3                                                  0240
ISN 0347          IF(NSS5.EQ.0) PRINT 211,ISTART
ISN 0349      211 FORMAT(1H ,'ISTART=',I3)
ISN 0350          PRINT 209                                                 0249
ISN 0351      209 FORMAT(1H ,'PERIGEE TO APOGEE PASS')
ISN 0352          GO TO 40                                                  0251
ISN 0353       76 IF (ISET1.NE.1) GO TO 77                                  0252
```

Figure D-2. MAIN Routine (4 of 13)

```
ISN 0355          PRINT 210                                              0253
ISN 0356          X3(1)=RAN1                                             0254
ISN 0357          Y3(1)=RAD1                                             0255
ISN 0358          X4(1)=RAN1                                             0256
ISN 0359          Y4(1)=RAD2                                             0257
ISN 0360          X5(1)=RAN1                                             0258
ISN 0361          Y5(1)=RAD3                                             0259
ISN 0362          ITME1=ITIME5                                           0260
ISN 0363          ITME2=ITIME6                                           0261
ISN 0364          I=1                                                    0263
ISN 0365          ISTART=4                                               0265
ISN 0366          ISET1=2                                                0266
ISN 0367          IF(NSSS.EQ.3) PRINT 211,ISTART
ISN 0369          GO TO 40                                               0270
ISN 0370       77 X7(1)=RAN1                                             0271
ISN 0371          PRINT 210                                              0276
ISN 0372      210 FORMAT(1H ,'APOGEE TO PERIGEE PASS')
ISN 0373      403 Y7(1)=RAD1                                             0278
ISN 0374          X8(1)=RAN1                                             0279
ISN 0375          Y8(1)=RAD2                                             0280
ISN 0376          X9(1)=RAN1                                             0281
ISN 0377          Y9(1)=RAD3                                             0282
ISN 0378          ITME1=ITIME5                                           0283
ISN 0379          ITME2=ITIME6                                           0284
ISN 0380          I=1                                                    0286
ISN 0381          I2=1                                                   0287
ISN 0382          ISTART=2                                               0288
ISN 0383          ISET1=5                                                0289
ISN 0384          IF(NSSS.EQ.0) PRINT 211,ISTART
ISN 0386          GO TO 40                                               0293
ISN 0387       70 IF (RAN1.GT.XRAN1) GO TO 500                           0294
ISN 0389          XRAN1=RAN1                                             0295
ISN 0390          IF (ISET.EQ.1) GO TO 71                                0296
ISN 0392          RDIF= (X7(I)-RAN1)                                     0297
ISN 0393          IF (RDIF.GE.RFREQ) GO TO 71
ISN 0395          GO TO 40                                               0299
ISN 0396       71 I=I+1                                                  0300
ISN 0397          X7(I)=RAN1                                             0301
ISN 0398          Y7(I)=RAD1                                             0302
ISN 0399          X8(I)=RAN1                                             0303
ISN 0400          Y8(I)=RAD2                                             0304
ISN 0401          X9(I)=RAN1                                             0305
ISN 0402          Y9(I)=RAD3                                             0306
ISN 0403          ISET=0                                                 0307
ISN 0404          IF(LARGE1.EQ.1) TOP1=1
ISN 0406          IF(LARGE2.EQ.1) TOP2=1
ISN 0408          IF(LARGE3.EQ.1) TOP3=1
ISN 0410          GO TO 40                                               0309
ISN 0411       80 IF (RAN1.LT.XRAN1) GO TO 600                           0310
ISN 0413          XRAN1=RAN1                                             0311
ISN 0414          IF (ISET.EQ.1) GO TO 81                                0312
ISN 0416          RDIF= (RAN1-X1(I))                                     0313
ISN 0417          IF (RDIF.GE.RFREQ) GO TO 81
ISN 0419          GO TO 40                                               0315
ISN 0420       81 I=I+1                                                  0316
ISN 0421          X1(I)=RAN1                                             0317
ISN 0422          Y1(I)=RAD1                                             0318
ISN 0423          X2(I)=RAN1                                             0319
ISN 0424          Y2(I)=RAD2                                             0320
ISN 0425          X6(I)=RAN1                                             0321
ISN 0426          Y6(I)=RAD3                                             0322
ISN 0427          ISET=0                                                 0323
ISN 0428          IF(LARGE1.EQ.1) TOP1=1
ISN 0430          IF(LARGE2.EQ.1) TOP2=1
ISN 0432          IF(LARGE3.EQ.1) TOP3=1
ISN 0434          GO TO 40                                               0324
ISN 0435       90 IF (RAN1.GT.XRAN1) GO TO 700                           0325
ISN 0437          XRAN1=RAN1                                             0326
ISN 0438          IF (ISET.EQ.1) GO TO 91                                0327
ISN 0440          RDIF=(X3(I)-RAN1)                                      0328
ISN 0441          IF (RDIF.GE.RFREQ) GO TO 91
ISN 0443          GO TO 40                                               0330
ISN 0444       91 I=I+1                                                  0331
ISN 0445          X3(I)=RAN1                                             0332
ISN 0446          Y3(I)=RAD1                                             0333
ISN 0447          X4(I)=RAN1                                             0334
```

Figure D-2. MAIN Routine (5 of 13)

```
ISN 0448            Y4(I)=RAD2                                                    0335
ISN 0449            XE(I)=RAN1                                                    0336
ISN 0450            YE(I)=RAD3                                                    0337
ISN 0451            ISET=0                                                        0338
ISN 0452            IF(LARGE1.EQ.1) TOP1=1
ISN 0454            IF(LARGE2.EQ.1) TOP2=1
ISN 0456            IF(LARGE3.EQ.1) TOP3=1
ISN 0458            GO TO 40                                                      0339
ISN 0459          1004 IEND=IT4/100                                               0340
ISN 0460            PRINT 1014
ISN 0461          1014 FORMAT (1H,7HAT 1004)
                  C      IFIRST=1                                                 0341
ISN 0462                 II=I                                                    0342
ISN 0463                 I=IB                                                    0343
ISN 0464                 IF(NSSE.EQ.1) GO TO 2004
ISN 0466                 LSTART=0                                                0346
ISN 0467                 ITGPH=1                                                 0347
ISN 0468                 IF (TIMEY.EQ.TIMLY) GO TO 31                            0348
ISN 0470                 CALL BSFTAP(A5)
ISN 0471                 GO TO 31                                                0350
ISN 0472           749 PRINT 4099
ISN 0473          4099 FORMAT (6H ITGPH)
ISN 0474          9889 READ(A5,890) CHC
ISN 0475                 IF(CHC.NE.STRT1)  GO TO 9889
ISN 0477                 IF (ITAPE.NE.1) GO TO 752
ISN 0479                 KJ=0                                                    0352
ISN 0480           750 CONTINUE
ISN 0481                 UPPER1=0
ISN 0482                 UPPER2=0
ISN 0483                 UPPER3=0
ISN 0484                 CALL ASREAD (ITIME5, ITIME6, RAD1, IEXP1, RAD2, IEXP2, RAD3,
                        1IEXP3, RAN1, IEXP4, I3EOF)
ISN 0485                 IF (I3ECF.EQ.1) GO TO 2004
ISN 0487                 RAD1=RAD1*10.0**IEXP1                                   0355
ISN 0488                 RAD2=RAD2*10.0**IEXP2                                   0356
ISN 0489                 RAD3=RAD3*10.0**IEXP3                                   0357
ISN 0490                 RAN1=(RAN1*10.0**IEXP4)/1000.0                          0358
ISN 0491                 IF(RAD1.LT.ERRLO1) RAD1=ERRLO1
ISN 0493                 IF(RAD2.LT.ERRLO2) RAD2=ERRLO2
ISN 0495                 IF(RAD3.LT.ERRLO3) RAD3=ERRLO3
ISN 0497                 IF(RAD1.GT.ERRHI1) UPPER1=1
ISN 0499                 IF(RAD1.GT.ERRHI1) RAD1=RAD1/10.
ISN 0501                 IF(RAD2.GT.ERRHI2) UPPER2=1
ISN 0503                 IF(RAD2.GT.ERRHI2) RAD2=RAD2/10.
ISN 0505                 IF(RAD3.GT.ERRHI3) UPPER3=1
ISN 0507                 IF(RAD3.GT.ERRHI3) RAD3=RAD3/10.
ISN 0509                 I=1
ISN 0510                 TIMOUT = 0.
ISN 0511                 IOUTIM(1) = ITIME5/10000
ISN 0512                 IOUTIM(2) =(ITIME5 - 10000*IOUTIM(1))/100
ISN 0513                 IOUTIM(3) = ITIME5 - (10000*IOUTIM(1) + 100*IOUTIM(2))
ISN 0514                 IOUTIM(4) = ITIME6/100
ISN 0515                 IOUTIM(5) = ITIME6 - 100*IOUTIM(4)
ISN 0516                 CALL TCONV0 (TIMOUT, IOUTIM, SEC)
ISN 0517                 TIMOUT = TIMOUT + T3DIFF
ISN 0518                 IF (TIMOUT.GE.TIMEND) GO TO 2004
ISN 0520                 IF (ITIME5.LT.IICAT) GO TO 750                          0367
ISN 0522                 IF (ITIME5.EQ.IICAT1) GO TO 2005                        0368
ISN 0524                 XTIME=FLOAT(ITIME6)                                     0369
ISN 0525                 XTIME=XTIME/100.0                                       0370
ISN 0526           751 XHRS(1)=XTIME                                             0371
ISN 0527                 ICAIE=ITIME5                                            0373
ISN 0528                 RANGE(1)=RAD1                                           0374
ISN 0529                 RANGE1(1)=RAD2                                          0375
ISN 0530                 RANGE2(1)=RAD3                                          0376
ISN 0531           752 CONTINUE
ISN 0532                 BIG1=0
ISN 0533                 BIG2=0
ISN 0534                 BIG3=0
ISN 0535                 CALL ASREAD (ITIME5, ITIME6, RAD1, IEXP1, RAD2, IEXP2, RAD3,
                        1IEXP3, RAN1, IEXP4, I3EOF)
ISN 0536                 IF (I3ECF.EQ.1) GO TO 2004
ISN 0538                 RAD1=RAD1*10.0**IEXP1                                   0379
ISN 0539                 RAD2=RAD2*10.0**IEXP2                                   0380
ISN 0540                 RAD3=RAD3*10.0**IEXP3                                   0381
ISN 0541                 RAN1=(RAN1*10.0**IEXP4)/1000.0                          0382
```

Figure D-2. MAIN Routine (6 of 13)

```
ISN 0542            IF(RAD1.LT.ERRLO1) RAD1=ERRLO1
ISN 0544            IF(RAD2.LT.ERRLO2) RAD2=ERRLO2
ISN 0546            IF(RAD3.LT.ERRLO3) RAD3=ERRLO3
ISN 0548            IF(RAD1.GT.ERRHI1) BIG1=1
ISN 0550            IF(RAD1.GT.ERRHI1) RAD1=RAD1/10.
ISN 0552            IF(RAD2.GT.ERRHI2) BIG2=1
ISN 0554            IF(RAD2.GT.ERRHI2) RAD2=RAD2/10.
ISN 0556            IF(RAD3.GT.ERRHI3) BIG3=1
ISN 0558            IF(RAD3.GT.ERRHI3) RAD3=RAD3/10.
ISN 0560            TIMOUT=0.
ISN 0561            IOUTIM(1) = ITIME5/10000
ISN 0562            IOUTIM(2) =(ITIME5 - 10000*IOUTIM(1))/100
ISN 0563            IOUTIM(3) = ITIME5 - (10000*IOUTIM(1) + 100*IOUTIM(2))
ISN 0564            IOUTIM(4) = ITIME6/100
ISN 0565            IOUTIM(5) = ITIME6 - 100*IOUTIM(4)
ISN 0566            CALL TCONV0 (TIMOUT, IOUTIM, SEC)
ISN 0567            TIMOUT = TIMOUT + T3DIFF
ISN 0568            IF (TIMOUT.GE.TIMEND.AND.ITAPE.EQ.0) GO TO 2004
ISN 0570            IF (ITIME6.EQ.0) GO TO 781                                    0387
ISN 0572            ITJ=(ITIME6/100)*100                                          0388
ISN 0573            IKL=ITIME6-ITJ                                                0389
ISN 0574            IF (IKL.EQ.0) GO TO 782                                       0390
ISN 0576       781  XCHECK=FLOAT(ITIME6)                                          0391
ISN 0577            XCHECK=XCHECK/100.0                                           0392
ISN 0578            IF (ITIME5.EQ.IDATE) GO TO 755                                0393
ISN 0580            GO TO 783                                                     0394
ISN 0581       755  HIKL=FLOAT(ITJ/100)
ISN 0582            XCHECK=FLOAT(IKL)/60.
ISN 0583            XCHECK=XCHECK+HIKL
ISN 0584            YCHECK=XCHECK-XHRS(I)
ISN 0585            IF(YCHECK.LT.TFREQ) GO TO 752
ISN 0587            I=I+1                                                         0397
ISN 0588            XHRS(I)=XCHECK                                                0398
ISN 0589            RANGE(I)=RAD1                                                 0399
ISN 0590            RANGE1(I)=RAD2                                                0400
ISN 0591            RANGE2(I)=RAD3                                                0401
ISN 0592            IF(BIG1.EQ.1) UPPER1=1
ISN 0594            IF(BIG2.EQ.1) UPPER2=1
ISN 0596            IF(BIG3.EQ.1) UPPER3=1
ISN 0598            GO TO 782                                                     0402
ISN 0599       782  IF(KJ.EQ.0) GO TO 785
ISN 0601            IF(ITIME6/100.LE.IHOUR2(KJ)) GO TO 781
ISN 0603       785  KJ=KJ+1
ISN 0604            IHOUR2(KJ)=ITIME6/100                                         0404
ISN 0605            RANGE7(KJ)=RAN1                                               0405
ISN 0606            ABSIC(KJ)=RAD1                                                0406
ISN 0607            ABSIC1(KJ)=RAD2                                               0407
ISN 0608            ABSIC2(KJ)=RAD3                                               0408
ISN 0609            GO TO 781                                                     0409
ISN 0610       783  IF (I.EQ.1) GO TO 750                                         0410
ISN 0612            IF (XCHECK.EQ.0.0) GO TO 808                                  0411
ISN 0614            I=I-1                                                         0412
ISN 0615            IST=0                                                         0413
ISN 0616            IST1=0                                                        0414
ISN 0617            MSKIP=1                                                       0415
ISN 0618            MTYPE=1
ISN 0619            CALL TITLES (MTYPE,MSKIP)                                     0419
ISN 0620            XIX=XNORMZ(AMODE,0.)
ISN 0621            IF (XHRS(1).NE.0.0.AND.IFIRST.EQ.1) IST=XHRS(1)               0421
ISN 0623            PRINT 337,IDATE,ITIME6
ISN 0624       337  FORMAT(1H ,'IDATE =',I6,2X,'ITIME6 =',I6)
ISN 0625            CALL LEGNDG(AMODE,642.,121.,12,12HHOURS OF DAY)
ISN 0626            IF(UPPER1.EQ.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0628            CALL SETSMG(AMODE,14,0.)
ISN 0629            CALL LINESG(AMODE,I+1,XHRS,RANGE)
ISN 0630            CALL SETSMG(AMODE,14,3.)
ISN 0631            JNDTE=0                                                       0430
ISN 0632            CALL ALTCK(KJ,JNDTE)                                          0431
ISN 0633            INDTE=4                                                       0432
ISN 0634            CALL DATAPT(IDATE,IST,ITIME5,IST1,XIX,INDTE)
ISN 0635            IF(NCOMP.EQ.1) GO TO 960
ISN 0637            MTYPE=2
ISN 0638            CALL TITLES (MTYPE,MSKIP)                                     0435
ISN 0639            CALL LEGNDG(AMODE,642.,121.,12,12HHOURS OF DAY)
```

Figure D-2. MAIN Routine (7 of 13)

```
ISN 0640          IF(UPPER2.EQ.1)
                 1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                 2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0642          CALL SETSMG(AMODE,14,0.)
ISN 0643          CALL LINESG(AMODE,I+1,XHRS,RANGE1)
ISN 0644          CALL SETSMG(AMODE,14,3.)
ISN 0645          JNDTE=1                                                    0443
ISN 0646          CALL ALTCK(KJ,JNDTE)                                       0444
ISN 0647          INDTE=3                                                    0445
ISN 0648          CALL DATAPT(IDATE,IST,ITIME5,IST1,XIX,INDTE)
ISN 0649          MTYPE=3
ISN 0650          CALL TITLES (MTYPE,MSKIP)                                  0448
ISN 0651          CALL LEGNDG(AMODE,642.,121.,12,12HHOURS OF DAY)
ISN 0652          IF(UPPER3.EQ.1)
                 1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                 2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0654          CALL SETSMG(AMODE,14,0.)
ISN 0655          CALL LINESG(AMODE,I+1,XHRS,RANGE2)
ISN 0656          CALL SETSMG(AMODE,14,3.)
ISN 0657          JNDTE=2                                                    0459
ISN 0658          CALL ALTCK(KJ,JNDTE)                                       0460
ISN 0659          INDTE=3                                                    0461
ISN 0660          CALL DATAPT(IDATE,IST,ITIME5,IST1,XIX,INDTE)
ISN 0661      960 CONTINUE
ISN 0662          KJ=0                                                       0463
ISN 0663          IFIRST=0                                                   0456
ISN 0664          MSKIP=0                                                    0457
ISN 0665          ITAPE=1                                                    0458
ISN 0666          IF (NOGO.EQ.1) GO TO 2004                                  0464
ISN 0668          IF (ITIME5.EQ.IT3) GO TO 757                               0465
ISN 0670          GO TO 750                                                  0466
ISN 0671      757 IF (IEND.EQ.ITIME6) GO TO 2004                             0467
ISN 0673          IF (ITIME6.EQ.IT4) GO TO 2004                              0468
ISN 0675          PRINT 107,ITIME6,IEND,IT4
ISN 0676          ITAPE=0                                                    0469
ISN 0677          ISAVE=1                                                    0470
ISN 0678          KK=1                                                       0471
ISN 0679          GO TO 750                                                  0472
ISN 0680      953 ITGPH=1                                                    0482
ISN 0681          IF (XCHECK.EQ.0.0) GO TO 808                               0483
ISN 0683          ISAVE=0                                                    0484
ISN 0684          ITAPE=1                                                    0485
ISN 0685          LSTART=1                                                   0486
ISN 0686          GO TO 753                                                  0487
ISN 0687      808 XCHECK=24.0                                                0488
ISN 0688          I=I+1                                                      0489
ISN 0689          XHRS(I)=XCHECK                                             0490
ISN 0690          RANGE(I)=RAD1                                              0491
ISN 0691          RANGE1(I)=RAD2                                             0492
ISN 0692          RANGE2(I)=RAD3                                             0493
ISN 0693          IF(BIG1.EQ.1) UPPER1=1
ISN 0695          IF(BIG2.EQ.1) UPPER2=1
ISN 0697          IF(BIG3.EQ.1) UPPER3=1
ISN 0699          IF (ISAVE.EQ.1) GO TO 953                                  0494
ISN 0701          GO TO 753                                                  0495
ISN 0702     2004 ITIME6=IT3                                                 0496
ISN 0703          ITIME9=IT4                                                 0497
ISN 0704          IF (ITIME5.EQ.IIDAT1) GO TO 2005                           0498
ISN 0706          IGOP1=0                                                    0499
ISN 0707          IF (TIMEY.EQ.TIMLY) GO TO 1007
ISN 0709          NOGO=0                                                     0502
ISN 0710          IF (TIMEY.EQ.TIMLY.AND.ITAPE.EQ.1) GO TO 1007              0503
ISN 0712          IB=I                                                       0504
ISN 0713          I=II                                                       0505
ISN 0714          ITGPH=0                                                    0506
ISN 0715          IF(I.LT.3) GO TO 4007                                      0507
ISN 0717          IF (ISTART.EQ.2) GO TO 1005                                0508
ISN 0719          IF (ISTART.EQ.3) GO TO 1006                                0509
ISN 0721          MSKIP=0                                                    0511
ISN 0722          MTYPE=1
ISN 0723          CALL TITLES(MTYPE,MSKIP)                                   0513
ISN 0724          CALL SETSMG(AMODE,14,0.)
ISN 0725          CALL LINESG(AMODE,I,X3,Y3)
ISN 0726          CALL SETSMG(AMODE,14,3.)
ISN 0727          DO 119 J=1,I                                               0520
ISN 0728          SAVE1(J)=Y3(J)                                             0521
```

Figure D-2. MAIN Routine (8 of 13)

```
ISN 0729            SAVE2(J)=Y4(J)                                          0522
ISN 0730            SAVE3(J)=Y5(J)                                          0523
ISN 0731            SAVE4(J)=X3(J)                                          0524
ISN 0732         119 CONTINUE
ISN 0733            X3(1)=X3(I)                                             0526
ISN 0734            Y3(1)=Y3(I)                                             0527
ISN 0735            X4(1)=X4(I)                                             0528
ISN 0736            X5(1)=X5(I)                                             0529
ISN 0737            Y4(1)=Y4(I)                                             0530
ISN 0738            Y5(1)=Y5(I)                                             0531
ISN 0739            I2=I-1                                                  0532
ISN 0740            IGOP=1                                                  0533
ISN 0741            GO TO 1007                                              0534
ISN 0742         1005 CONTINUE
ISN 0743            MSKIP=0                                                 0536
ISN 0744            MTYPE=1
ISN 0745            CALL TITLES (MTYPE,MSKIP)                               0538
ISN 0746            CALL SETSMG(AMODE,14,0.)
ISN 0747            CALL LINESG(AMODE,I,X7,Y7)
ISN 0748            CALL SETSMG(AMODE,14,3.)
ISN 0749            DO 122 J=1,I                                            0545
ISN 0750            SAVE1(J)=Y7(J)                                          0546
ISN 0751            SAVE2(J)=Y3(J)                                          0547
ISN 0752            SAVE3(J)=Y9(J)                                          0548
ISN 0753            SAVE4(J)=X7(J)                                          0549
ISN 0754         122 CONTINUE
ISN 0755            X7(1)=X7(I)                                             0551
ISN 0756            Y7(1)=Y7(I)                                             0552
ISN 0757            X8(1)=X8(I)                                             0553
ISN 0758            X9(1)=X9(I)                                             0554
ISN 0759            Y8(1)=Y8(I)                                             0555
ISN 0760            Y9(1)=Y9(I)                                             0556
ISN 0761            I2=I-1                                                  0557
ISN 0762            IGOP=1                                                  0558
ISN 0763            GO TO 1007                                              0559
ISN 0764         1006 CONTINUE
ISN 0765            MSKIP=2                                                 0561
ISN 0766            MTYPE=1
ISN 0767            CALL TITLES (MTYPE,MSKIP)                               0563
ISN 0768            CALL SETSMG(AMODE,14,0.)
ISN 0769            CALL LINESG(AMODE,I,X1,Y1)
ISN 0770            CALL SETSMG(AMODE,14,3.)
ISN 0771            DO 125 J=1,I                                            0570
ISN 0772            SAVE1(J)=Y1(J)                                          0571
ISN 0773            SAVE2(J)=Y2(J)                                          0572
ISN 0774            SAVE3(J)=Y6(J)                                          0573
ISN 0775            SAVE4(J)=X1(J)                                          0574
ISN 0776         125 CONTINUE
ISN 0777            X1(1)=X1(I)                                             0576
ISN 0778            Y1(1)=Y1(I)                                             0577
ISN 0779            X2(1)=X2(I)                                             0578
ISN 0780            X6(1)=X6(I)                                             0579
ISN 0781            Y2(1)=Y2(I)                                             0580
ISN 0782            Y6(1)=Y6(I)                                             0581
ISN 0783            I2=I-1                                                  0582
ISN 0784            IGOP=1                                                  0583
ISN 0785         1007 JINX=1                                                0584
ISN 0786            IF (TIMEY.EQ.TIMLY) GO TO 4008
ISN 0788         4007 I=0                                                   0585
ISN 0789            IF(IGOP.EQ.1) I=1
ISN 0791         4008 ISET=1
ISN 0792            IBLAP=0                                                 0587
ISN 0793            CALL TAPES(IBLAP)                                       0588
ISN 0794         127 CONTINUE
ISN 0795            IXIY=8
ISN 0796            GO TO 25                                                0595
ISN 0797         500 ITME3=ITIME5                                           0596
ISN 0798            ITME4=ITIME6                                            0597
ISN 0799            I=I-1
ISN 0800            IF(I.LE.1.AND.IGOP.NE.0) GO TO 597
ISN 0802            I=I-1
ISN 0803            IF(I.LT.6.AND.IGOP.EQ.0) GO TO 800                      0599
ISN 0805            IF(JINX.EQ.1) GO TO 555                                 0600
ISN 0807            MSKIP=0                                                 0601
ISN 0808            MTYPE=1
ISN 0809            CALL TITLES(MTYPE,MSKIP)                                0603
```

Figure D-2. MAIN Routine (9 of 13)

```
ISN 0810        565 XIX=XNORMZ(AMODE,X7(1))
ISN 0811            XIIX=XNORMZ(AMODE,X7(I))
ISN 0812            XIIX=XIIX-65.
ISN 0813            I=I-1                                                    0606
ISN 0814            CALL SETSMG(AMODE,14,0.)
ISN 0815            CALL LINESG(AMODE,I+1,X7,Y7)
ISN 0816            CALL SETSMG(AMODE,14,3.)
ISN 0817        567 JNDTE=C                                                  0612
ISN 0818            CALL TIMTCK (JK,JNDTE)                                   0613
ISN 0819            IF (IGOP.NE.C) GO TO 502                                 0614
ISN 0821            GO TO 504                                                0615
ISN 0822        502 XIX=XNORMZ(AMODE,SAVE4(1))
ISN 0823            IF(I.GT.1)GOTO504
ISN 0825            XIIX=XNORMZ(AMODE,SAVE4(I2+1))
ISN 0826            XIIX=XIIX-65.
ISN 0827        504 INDTE=C                                                  0617
ISN 0828            IF(TOP1.EQ.1.AND.I.GT.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0830            CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0831            CALL LEGNDG(AMODE,XIX,170.,8,8H* APOGEE)
ISN 0832            CALL LEGNDG(AMODE,XIIX,170.,9,9HPERIGEE *)
ISN 0833            IF(NCOMP.EQ.1) GO TO 515
ISN 0835            MSKIP=0                                                  0621
ISN 0836            MTYPE=2
ISN 0837            CALL TITLES (MTYPE,MSKIP)                                0623
ISN 0838            IF(I.LE.1.AND.IGOP.NE.0) GO TO 598
ISN 0840            CALL SETSMG(AMODE,14,0.)
ISN 0841            CALL LINESG(AMODE,I+1,X8,Y8)
ISN 0842            CALL SETSMG(AMODE,14,3.)
ISN 0843        598 JNDTE=1                                                  0630
ISN 0844            CALL TIMTCK (JK,JNDTE)                                   0631
ISN 0845            IF (IGOP.NE.0) GO TO 505                                 0632
ISN 0847            GO TO 507                                                0633
ISN 0848        505 CALL SETSMG(AMODE,14,0.)
ISN 0849            CALL LINESG(AMODE,I2+1,SAVE4,SAVE2)
ISN 0850            CALL SETSMG(AMODE,14,3.)
ISN 0851        507 INDTE=1                                                  0641
ISN 0852            IF(TOP2.EQ.1.AND.I.GT.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0854            CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0855            CALL LEGNDG(AMODE,XIX,170.,8,8H* APOGEE)
ISN 0856            CALL LEGNDG(AMODE,XIIX,170.,9,9HPERIGEE *)
ISN 0857            MSKIP=0                                                  0645
ISN 0858            MTYPE=3
ISN 0859            CALL TITLES (MTYPE,MSKIP)                                0647
ISN 0860            IF(I.LE.1.AND.IGOP.NE.0) GO TO 599
ISN 0862            CALL SETSMG(AMODE,14,0.)
ISN 0863            CALL LINESG(AMODE,I+1,X9,Y9)
ISN 0864            CALL SETSMG(AMODE,14,3.)
ISN 0865        599 JNDTE=2                                                  0654
ISN 0866            CALL TIMTCK (JK,JNDTE)                                   0655
ISN 0867            IF (IGOP.NE.C) GO TO 508                                 0656
ISN 0869            GO TO 510                                                0657
ISN 0870        508 CALL SETSMG(AMODE,14,0.)
ISN 0871            CALL LINESG(AMODE,I2+1,SAVE4,SAVE3)
ISN 0872            CALL SETSMG(AMODE,14,3.)
ISN 0873        510 INDTE=1                                                  0665
ISN 0874            IF(TOP3.EQ.1.AND.I.GT.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0876            CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0877            CALL LEGNDG(AMODE,XIX,170.,8,8H* APOGEE)
ISN 0878            CALL LEGNDG(AMODE,XIIX,170.,9,9HPERIGEE *)
ISN 0879        515 CONTINUE
ISN 0880            GO TO 600                                                0670
ISN 0881        600 ITME3=ITIME5                                             0671
ISN 0882            ITME4=ITIME6                                             0672
ISN 0883            I=I-1
ISN 0884            IF(I.LE.1.AND.IGOP.NE.0) GO TO 697
ISN 0886            I=I+1
ISN 0887            IF(I.LT.6.AND.IGOP.EQ.0) GO TO 800                       0674
ISN 0889            IF(JINX.EQ.1) GO TO 666                                  0675
ISN 0891            MSKIP=2                                                  0676
ISN 0892            MTYPE=1
```

Figure D-2. MAIN Routine (10 of 13)

```
ISN 0893          CALL TITLES (MTYPE,MSKIP)                                  C678
ISN 0894      666 XIX=XNORMZ(AMODE,X1(I))
ISN 0895          XIIX=XNORMZ(AMODE,X1(I))
ISN 0896          XIIX=XIIX-65.
ISN 0897          I=I-1                                                      0681
ISN 0898          CALL SETSMG(AMODE,14,0.)
ISN 0899          CALL LINESG(AMODE,I+1,X1,Y1)
ISN 0900          CALL SETSMG(AMODE,14,3.)
ISN 0901      697 JNDTE=0                                                    0687
ISN 0902          CALL TIMTCK (JK,JNDTE)                                     0688
ISN 0903          IF (IGOP.NE.0) GO TO 602                                   0689
ISN 0905          GO TO 604                                                  0690
ISN 0906      602 XIX=XNORMZ(AMODE,SAVE4(1))
ISN 0907          IF(I.GT.1)GOTO604
ISN 0909          XIIX=XNORMZ(AMODE,SAVE4(I2+1))
ISN 0910          XIIX=XIIX-65.
ISN 0911      604 JNDTE=0                                                    0692
ISN 0912          IF(TOP1.EQ.1.AND.I.GT.1)
                 1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                 2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0914          CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0915          CALL LEGNDG(AMODE,XIIX,170.,9,9HAPOGEE  *)
ISN 0916          CALL LEGNDG(AMODE,XIX,170.,9,9H* PERIGEE)
ISN 0917          IF(NCOMP.EQ.1) GO TO 615
ISN 0919          MSKIP=2                                                    C696
ISN 0920          MTYPE=2
ISN 0921          CALL TITLES (MTYPE,MSKIP)                                  0698
ISN 0922          IF(I.LE.1.AND.IGOP.NE.0) GO TO 698
ISN 0924          CALL SETSMG(AMODE,14,0.)
ISN 0925          CALL LINESG(AMODE,I+1,X2,Y2)
ISN 0926          CALL SETSMG(AMODE,14,3.)
ISN 0927      698 JNDTE=1                                                    0705
ISN 0928          CALL TIMTCK (JK,JNDTE)                                     0706
ISN 0929          IF (IGOP.NE.0) GO TO 605                                   0707
ISN 0931          GO TO 607                                                  0708
ISN 0932      605 CALL SETSMG(AMODE,14,0.)
ISN 0933          CALL LINESG(AMODE,I2+1,SAVE4,SAVE2)
ISN 0934          CALL SETSMG(AMODE,14,3.)
ISN 0935      607 INDTE=1                                                    0716
ISN 0936          IF(TOP2.EQ.1.AND.I.GT.1)
                 1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                 2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0938          CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0939          CALL LEGNDG(AMODE,XIIX,170.,9,9HAPOGEE  *)
ISN 0940          CALL LEGNDG(AMODE,XIX,170.,9,9H* PERIGEE)
ISN 0941          MSKIP=2                                                    0720
ISN 0942          MTYPE=3
ISN 0943          CALL TITLES (MTYPE,MSKIP)                                  0722
ISN 0944          IF(I.LE.1.AND.IGOP.NE.0) GO TO 699
ISN 0946          CALL SETSMG(AMODE,14,0.)
ISN 0947          CALL LINESG(AMODE,I+1,X6,Y6)
ISN 0948          CALL SETSMG(AMODE,14,3.)
ISN 0949      699 JNDTE=2                                                    0729
ISN 0950          CALL TIMTCK (JK,JNDTE)                                     0730
ISN 0951          IF (IGOP.NE.0) GO TO 608                                   0731
ISN 0953          GO TO 610                                                  0732
ISN 0954      608 CALL SETSMG(AMODE,14,0.)
ISN 0955          CALL LINESG(AMODE,I2+1,SAVE4,SAVE3)
ISN 0956          CALL SETSMG(AMODE,14,3.)
ISN 0957      610 INDTE=1                                                    0740
ISN 0958          IF(TOP3.EQ.1.AND.I.GT.1)
                 1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                 2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0960          CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0961          CALL LEGNDG(AMODE,XIX,170.,9,9H* PERIGEE)
ISN 0962          CALL LEGNDG(AMODE,XIIX,170.,9,9HAPOGEE  *)
ISN 0963      615 CONTINUE
ISN 0964          GO TO 800                                                  C745
ISN 0965      700 ITME3=ITIME5                                               C746
ISN 0966          ITME4=ITIME6                                               C747
ISN 0967          I=I-1
ISN 0968          IF(I.LE.1.AND.IGOP.NE.0) GO TO 797
ISN 0970          I=I+1
ISN 0971          IF(I.LT.6.AND.IGOP.EQ.0) GO TO 800                         C749
ISN 0973          IF(JINX.EQ.1) GO TO 777                                    0750
ISN 0975          MSKIP=0                                                    C751
```

Figure D-2. MAIN Routine (11 of 13)

```
ISN 0976            MTYPE=1
ISN 0977            CALL TITLES (MTYPE,MSKIP)                                  0753
ISN 0978        777 XIX=XNORMZ(AMODE,X3(1))
ISN 0979            XIIX=XNORMZ(AMODE,X3(1))
ISN 0980            XIIX=XIIX-65.
ISN 0981            I=I-1                                                      0756
ISN 0982            CALL SETSMG(AMODE,14,0.)
ISN 0983            CALL LINESG(AMODE,I+1,X3,Y3)
ISN 0984            CALL SETSMG(AMODE,14,3.)
ISN 0985        797 JNDTE=0                                                    0762
ISN 0986            CALL TIMTCK (JK,JNDTE)                                     0763
ISN 0987            IF (IGOP.NE.0) GO TO 702                                   0764
ISN 0989            GO TO 704                                                  0765
ISN 0990        702 XIX=XNORMZ(AMODE,SAVE4(1))
ISN 0991            IF(I.GT.1)GOTO704
ISN 0993            XIIX=XNORMZ(AMODE,SAVE4(I2+1))
ISN 0994            XIIX=XIIX-65.
ISN 0995        704 INDTE=0                                                    0767
ISN 0996            IF(TOP1.EQ.1.AND.I.GT.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 0998            CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 0999            CALL LEGNDG(AMODE,XIX,170.,3,8H* APOGEE)
ISN 1000            CALL LEGNDG(AMODE,XIIX,170.,9,9HPERIGEE *)
ISN 1001            IF(NCOMP.EQ.1) GO TO 715
ISN 1003            MSKIP=0                                                    0771
ISN 1004            MTYPE=2
ISN 1005            CALL TITLES (MTYPE,MSKIP)                                  0773
ISN 1006            IF(I.LE.1.AND.IGOP.NE.0) GO TO 798
ISN 1008            CALL SETSMG(AMODE,14,0.)
ISN 1009            CALL LINESG(AMODE,I+1,X4,Y4)
ISN 1010            CALL SETSMG(AMODE,14,3.)
ISN 1011        798 JNDTE=1                                                    0780
ISN 1012            CALL TIMTCK (JK,JNDTE)                                     0781
ISN 1013            IF (IGOP.NE.0) GO TO 705                                   0782
ISN 1015            GO TO 707                                                  0783
ISN 1016        705 CALL SETSMG(AMODE,14,0.)
ISN 1017            CALL LINESG(AMODE,I2+1,SAVE4,SAVE2)
ISN 1018            CALL SETSMG(AMODE,14,3.)
ISN 1019        707 INDTE=1                                                    0791
ISN 1020            IF(TOP2.EQ.1.AND.I.GT.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 1022            CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 1023            CALL LEGNDG(AMODE,XIX,170.,3,8H* APOGEE)
ISN 1024            CALL LEGNDG(AMODE,XIIX,170.,9,9HPERIGEE *)
ISN 1025            MSKIP=0                                                    0795
ISN 1026            MTYPE=3
ISN 1027            CALL TITLES (MTYPE,MSKIP)                                  0797
ISN 1028            IF(I.LE.1.AND.IGOP.NE.0) GO TO 799
ISN 1030            CALL SETSMG(AMODE,14,0.)
ISN 1031            CALL LINESG(AMODE,I+1,X5,Y5)
ISN 1032            CALL SETSMG(AMODE,14,3.)
ISN 1033        799 JNDTE=2                                                    0804
ISN 1034            CALL TIMTCK (JK,JNDTE)                                     0805
ISN 1035            IF (IGOP.NE.0) GO TO 709                                   0806
ISN 1037            GO TO 710                                                  0807
ISN 1038        708 CALL SETSMG(AMODE,14,0.)
ISN 1039            CALL LINESG(AMODE,I2+1,SAVE4,SAVE3)
ISN 1040            CALL SETSMG(AMODE,14,3.)
ISN 1041        710 INDTE=1                                                    0815
ISN 1042            IF(TOP3.EQ.1.AND.I.GT.1)
                   1CALL LEGNDG(AMODE,237.,812.,94,94H**** ONE OR MORE POINTS HAVE EXC
                   2EEDED UPPER Y LIMIT AND ARE DIVIDED BY 10 BEFORE PLOTTING ****)
ISN 1044            CALL DATAPT(ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
ISN 1045            CALL LEGNDG(AMODE,XIX,170.,3,8H* APOGEE)
ISN 1046            CALL LEGNDG(AMODE,XIIX,170.,9,9HPERIGEE *)
ISN 1047        715 CONTINUE
              C 800 BACKSPACE 5
ISN 1048        800 BACKSPACE A5
ISN 1049            JINX=0                                                     0821
ISN 1050            JK=0                                                       0822
ISN 1051            IGOP=0                                                     0823
ISN 1052            I=0                                                        0824
ISN 1053            REWIND 83
ISN 1054            ISTART=1                                                   0826
```

Figure D-2. MAIN Routine (12 of 13)

```
ISN 1055            IADD=0                                              0827
ISN 1056            GO TO 40                                            0828
ISN 1057         2005 CALL TITLES(1,6)
ISN 1058            CALL EXITG(AMODE)
                 C * BEGIN OCPL13 SEQUENCE
ISN 1059            STOP
ISN 1060            END                                                 0832
```

Figure D-2. MAIN Routine (13 of 13)

```
LEVEL  20.1 (AUG 71)                    OS/360  FORTRAN H

        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002           SUBROUTINE DATAPT (ITME1,ITME2,ITME3,ITME4,XIX,INDTE)
 ISN 0003           COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10
                   10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                   1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                          0009
 ISN 0004           COMMON ERRL01,ERRL02,ERRL03,ERRHI1,ERRHI2,ERRHI3
 ISN 0005           COMMON AMODE(200),CON,MANY,LOG
 ISN 0006           COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
 ISN 0007           DIMENSION MONTH(12),NONTH(12)                                    0838
 ISN 0008           DIMENSION XY(2000),DCOS(2000),RP(4000),BOXX(5),BOXY(5)
 ISN 0009           DATA SORTST/4H      /                                            0841
 ISN 0010           DATA B3XX/100.,1182.,1182.,100.,100./,BOXY/92.,52.,4.,4.,92./
 ISN 0011           INTEGER A5, A7, B3, B5
 ISN 0012           IF(NSS4.EQ.1) GO TO 111
 ISN 0014           MONTH(1)=131                                                     0847
 ISN 0015           MONTH(2)=228                                                     0848
 ISN 0016           MONTH(3)=331                                                     0849
 ISN 0017           MONTH(4)=430                                                     0850
 ISN 0018           MONTH(5)=531                                                     0851
 ISN 0019           MONTH(6)=630                                                     0852
 ISN 0020           MONTH(7)=731                                                     0853
 ISN 0021           MONTH(8)=831                                                     0854
 ISN 0022           MONTH(9)=930                                                     0855
 ISN 0023           MONTH(10)=1031                                                   0856
 ISN 0024           MONTH(11)=1130                                                   0857
 ISN 0025           MONTH(12)=1231                                                   0858
 ISN 0026           NONTH(1)=101                                                     0859
 ISN 0027           NONTH(2)=201                                                     0860
 ISN 0028           NONTH(3)=301                                                     0861
 ISN 0029           NONTH(4)=401                                                     0862
 ISN 0030           NONTH(5)=501                                                     0863
 ISN 0031           NONTH(6)=601                                                     0864
 ISN 0032           NONTH(7)=701                                                     0865
 ISN 0033           NONTH(8)=801                                                     0866
 ISN 0034           NONTH(9)=901                                                     0867
 ISN 0035           NONTH(10)=1001                                                   0868
 ISN 0036           NONTH(11)=1101                                                   0869
 ISN 0037           NONTH(12)=1201                                                   0870
 ISN 0038           YEAR=FLOAT(ITME1)                                                0871
 ISN 0039           IYEAR=YEAR/10000.0                                               0872
 ISN 0040           IYEAR=IYEAR*10000                                                0873
 ISN 0041           IF (MOD(IYEAR,4).EQ.0) MONTH(2)=MONTH(2)+1                       0874
 ISN 0043           DO 459 LL=1,12                                                   0875
 ISN 0044           MONTH(LL)=MONTH(LL)+IYEAR                                        0876
 ISN 0045           NONTH(LL)=NONTH(LL)+IYEAR                                        0877
 ISN 0046       459 CONTINUE                                                         0878
 ISN 0047           NONTH(1)=NONTH(1)+10000                                          0879
 ISN 0048           CALL LEGNOG(AMODE,197.,105.,17,17HDATA DISTRIBUTION)
 ISN 0049       511 ISTOP=0                                                          0881
 ISN 0050           M=0                                                              0882
 ISN 0051           KDIF=0                                                           0883
 ISN 0052           MDIF=0                                                           0884
 ISN 0053           LDIF=0                                                           0885
 ISN 0054           IF (INDTE.EQ.1) GO TO 522                                        0886
 ISN 0056           IF (INDTE.EQ.3) GO TO 522                                        0887
```

Figure D-3. Subroutine DATAPT (1 of 6)

```
ISN 0058          JJ=0                                                    0888
ISN 0059          IXY=0                                                   0889
ISN 0060          IRR=0                                                   0890
ISN 0061          LM=0                                                    0891
ISN 0062          L=0                                                     0892
ISN 0063          J=0                                                     0893
ISN 0064          K=0                                                     0894
ISN 0065        522 PRINT 121, ITME1,ITME2,ITME3,ITME4                    0898
ISN 0066        121 FORMAT (1H0,10X,14HPERIOD PLOTTED,10X,I6,1X,I4,5X,I6,1X,I4)   0899
ISN 0067          DATA9=FLOAT(ITME1)                                      0900
ISN 0068          WRITE(6,2) DATA9,ITME1
ISN 0069          DATA1=FLOAT(ITME4)                                      0901
ISN 0070          DATA1=DATA1/100.0                                       0902
ISN 0071          IDATA1=DATA1                                            0903
ISN 0072          DATA1=FLOAT(IDATA1)                                     0904
ISN 0073          IF(INDTE.EQ.0.OR.INDTE.EQ.1) DATA1=DATA1+1.0
ISN 0075          DATA2=FLOAT(ITME2)                                      0905
ISN 0076          DATA2=DATA2/100.0                                       0906
ISN 0077          IDATA2=DATA2                                            0907
ISN 0078          DATA2=FLOAT(IDATA2)                                     0908
ISN 0079          KDIF=ITME3-ITME1
ISN 0080          DO 567 I=1,11                                           0909
ISN 0081          IF (ITME1.EQ.MONTH(I).AND.ITME3.EQ.NONTH(I+1)) KDIF=1   0910
ISN 0083          IF (ITME1.EQ.MONTH(I).AND.(ITME3-NONTH(I+1)).EQ.1) KDIF=2   0911
ISN 0085          IF (ITME3.EQ.NONTH(I+1).AND.(MONTH(I)-ITME1).EQ.1) KDIF=2   0912
ISN 0087          IF(ITME3.EQ.NONTH(I+1).AND.(MONTH(I)-ITME1).EQ.2) KDIF=3
ISN 0089          IF(ITME3.EQ.(NONTH(I+1)+1).AND.(MONTH(I)-ITME1).EQ.1) KDIF=3
ISN 0091          IF(ITME3.EQ.(NONTH(I+1)+2).AND.ITME1.EQ.MONTH(I)) KDIF=3
ISN 0093          IF(ITME3.EQ.NONTH(I+1).AND.(MONTH(I)-ITME1).EQ.3) KDIF=4
ISN 0095          IF(ITME3.EQ.(NONTH(I+1)+1).AND.(MONTH(I)-ITME1).EQ.2) KDIF=4
ISN 0097          IF(ITME3.EQ.(NONTH(I+1)+2).AND.(MONTH(I)-ITME1).EQ.1) KDIF=4
ISN 0099          IF(ITME3.EQ.(NONTH(I+1)+3).AND.ITME1.EQ.MONTH(I)) KDIF=4
ISN 0101        567 CONTINUE                                              0913
ISN 0102          IF(ITME1.EQ.MONTH(12).AND.ITME3.EQ.NONTH(1)) KDIF=1
ISN 0104          IF(ITME1.EQ.MONTH(12).AND.(ITME3-NONTH(1)).EQ.1) KDIF=2
ISN 0106          IF(ITME3.EQ.NONTH(1).AND.(MONTH(12)-ITME1).EQ.1) KDIF=2
ISN 0108          IF(ITME3.EQ.NONTH(1).AND.(MONTH(12)-ITME1).EQ.2) KDIF=3
ISN 0110          IF(ITME3.EQ.(NONTH(1)+1).AND.(MONTH(12)-ITME1).EQ.1) KDIF=3
ISN 0112          IF(ITME3.EQ.(NONTH(1)+2).AND.ITME1.EQ.MONTH(12)) KDIF=3
ISN 0114          IF(ITME3.EQ.NONTH(1).AND.(MONTH(12)-ITME1).EQ.3) KDIF=4
ISN 0116          IF(ITME3.EQ.(NONTH(1)+1).AND.(MONTH(12)-ITME1).EQ.2) KDIF=4
ISN 0118          IF(ITME3.EQ.(NONTH(1)+2).AND.(MONTH(12)-ITME1).EQ.1) KDIF=4
ISN 0120          IF(ITME3.EQ.(NONTH(1)+3).AND.ITME1.EQ.MONTH(12)) KDIF=4
ISN 0122          DATA1=DATA1+24.*FLOAT(KDIF)
ISN 0123          CALL OBJCTG(AMODE,XIX,45.,1151.,90.)
ISN 0124          IF(NSSS.EQ.1) GO TO 405
ISN 0126          PRINT 123,XIX
ISN 0127        123 FORMAT(1H ,F5.0)
ISN 0128        405 CALL SETSMG(AMODE,24,0.)
ISN 0129          CALL SUBJEG(AMODE,DATA2,0.,DATA1,1.)
ISN 0130          CALL LEGNDG(AMODE,170.,30.,5,5HHOURS)
ISN 0131          CALL LEGNDG(AMODE,170.,9.,4,4HDATE)
ISN 0132          CALL LEGNDG(AMODE,170.,82.,2,2HXY)
ISN 0133          CALL LEGNDG(AMODE,170.,67.,2,2HLM)
ISN 0134          CALL LEGNDG(AMODE,170.,52.,2,2HRR)
ISN 0135          CALL LINESG(AMODE,5,BOXX,BOXY)
```

Figure D-3. Subroutine DATAPT (2 of 6)

```
ISN 0136          IF(NSSS.EQ.1) GO TO 800
ISN 0138          PRINT 123, XIX
ISN 0139        800 DATA4=DATA2                                          0949
ISN 0140          XDIF=DATA1-DATA2                                       0950
ISN 0141          IF(NSSS.EQ.1) GO TO 406
ISN 0143          PRINT 123, XIX
                C SUBTRACT END AND START HRS FOR TOTAL                   0954
ISN 0144        406 JDIFF=XDIF                                           0955
                C INTEGER DIFFERENCE OF HRS                              0956
ISN 0145          DATA5=DATA2                                            0957
ISN 0146          PRINT 222, JDIFF                                       0958
ISN 0147        222 FORMAT (1H0,I5)                                      0959
ISN 0148          IDAT2=DATA2
ISN 0149          CALL NUMBRG(AMODE,XNORMZ(AMODE,DATA5),30.,2,IDAT2)
                C POINT TO COUNT FROM FOR NEXT TIME LABELS               0965
ISN 0150          JDIFF=JDIFF+1                                          0966
ISN 0151          IF(MANY.EQ.1) JDIFF=JDIFF/4
ISN 0153          DO 700 I=1,JDIFF                                       0967
ISN 0154          DATA4=DATA4+1.0                                        0969
ISN 0155          DATA5=DATA5+1.0                                        0970
ISN 0156          IF(MANY.EQ.1) DATA4=DATA4+3.0
ISN 0158          IF(MANY.EQ.1) DATA5=DATA5+3.0
ISN 0160          IF (DATA4.GE.24.0) GO TO 224                           0971
ISN 0162          IF (DATA5.GE.DATA1) GO TO 594
ISN 0164        227 IDAT4=DATA4
ISN 0165          CALL NUMBRG(AMODE,XNORMZ(AMODE,DATA5),30.,2,IDAT4)
ISN 0166          GO TO 700                                              0974
ISN 0167        224 DATA4=DATA4-24.0                                     0975
ISN 0168          DAT10=DATA9+1.0                                        0976
ISN 0169          WRITE(6,2) DAT10,ITME1
ISN 0170          DO 458 LL=1,12                                         0977
ISN 0171          LTME4=DAT10                                            0978
ISN 0172          LTME=LTME4-MONTH(LL)                                   0979
ISN 0173          IF (LTME.EQ.1.AND.LL.EQ.12) DAT10=MONTH(1)             0980
ISN 0175          IF (LTME.EQ.1.AND.LL.NE.12) DAT10=MONTH(LL+1)          0981
ISN 0177        458 CONTINUE                                             0982
ISN 0178          DATA9=DAT10                                            0983
ISN 0179          XPOS=XNORMZ(AMODE,DATA5)
ISN 0180          XPOS=XPOS-13.
ISN 0181          IDAT10=DAT10
ISN 0182          CALL OBJCTG(AMODE,XIX,45.,1182.,90.)
ISN 0183          CALL NUMBRG(AMODE,XPOS,9.,6,IDAT10)
ISN 0184          CALL OBJCTG(AMODE,XIX,45.,1151.,90.)
ISN 0185          WRITE(6,2) DAT10,ITME1
ISN 0186        2 FORMAT (1H ,F9.2,I6)
ISN 0187          IF (DATA5.EQ.DATA1) GO TO 594                          0987
ISN 0189          GO TO 227                                              0988
ISN 0190        700 CONTINUE                                             0989
ISN 0191        594 IDAT4=DATA4
ISN 0192          XHREND=XNORMZ(AMODE,DATA5)
ISN 0193          CALL OBJCTG(AMODE,XIX,45.,1182.,90.)
ISN 0194          CALL NUMBRG(AMODE,XHREND,30.,2,IDAT4)
ISN 0195          CALL OBJCTG(AMODE,XIX,45.,1151.,90.)
ISN 0196          IF (INDTE.EQ.1) GO TO 305                              0991
ISN 0198          IF (ISTOP.EQ.1) GO TO 1                                0992
ISN 0200          IF (INDTE.EQ.3) GO TO 305                              0993
```

Figure D-3. Subroutine DATAPT (3 of 6)

```
ISN 0202        595 K=K+1                                                          0995
ISN 0203            IF (K.GE.1600) GO TO 450
ISN 0205        596 READ (83,302)  ENDTPE,ITIME8(K),ITIME9(K),ITYPE(K)
ISN 0206        302 FORMAT (1X, A4, 3X, I6, 1X, I4, 1X, I2)
ISN 0207        305 IF (MDIF.EQ.0) GO TO 612                                       0999
ISN 0209            IF (ENDTPE.EQ.SORTST) GO TO 911                                1000
ISN 0211            IF(ITIME8(K).LT.ITME1) GO TO 596                               1001
ISN 0213            IF (ITIME8(K).EQ.ITME1) GO TO 597                              1002
ISN 0215            GO TO 202                                                      1003
ISN 0216        597 IF (ITIME9(K).LT.ITME2) GO TO 596
ISN 0218        202 IF (K.EQ.1) GO TO 598                                          1005
ISN 0220            IF (ITIME8(K).EQ.ITIME8(K-1)) GO TO 203                        1006
ISN 0222            LM=0                                                           1007
ISN 0223            IRR=0                                                          1008
ISN 0224            IXY=0                                                          1009
ISN 0225            GO TO 598                                                      1010
ISN 0226        203 IF (ITIME9(K).EQ.ITIME9(K-1)) GO TO 110                        1011
ISN 0228            LM=0                                                           1012
ISN 0229            IRR=0                                                          1013
ISN 0230            IXY=0                                                          1014
ISN 0231            GO TO 598                                                      1015
ISN 0232        110 IF (ITYPE(K).EQ.ITYPE(K-1)) GO TO 595                          1016
ISN 0234            IF (ITYPE(K).EQ.1) GO TO 114                                   1017
ISN 0236            IF (ITYPE(K).EQ.9) GO TO 114                                   1018
ISN 0238            IF (ITYPE(K).EQ.2) GO TO 115                                   1019
ISN 0240            IF (ITYPE(K).EQ.3) GO TO 115                                   1020
ISN 0242            IF (IXY.EQ.1) GO TO 595                                        1021
ISN 0244            GO TO 598                                                      1022
ISN 0245        114 IF (IRR.EQ.1) GO TO 595                                        1023
ISN 0247            GO TO 598                                                      1024
ISN 0248        115 IF (LM.EQ.1) GO TO 595                                         1025
ISN 0250        598 IF (ITIME8(K).LT.ITME3) GO TO 600                              1026
ISN 0252            IF (ITIME8(K).GT.ITME3) GO TO 811                              1027
ISN 0254            IF (ITIME8(K).EQ.ITME3) GO TO 599                              1028
ISN 0256            GO TO 600                                                      1029
ISN 0257        599 IF (ITIME9(K).GT.ITME4) GO TO 811                              1030
ISN 0259        600 XTI=0.5                                                        1031
ISN 0260            LDIF=ITIME8(K)-ITME1                                           1032
ISN 0261            DO 568 III=1,11                                                1033
ISN 0262            IF (ITME1.EQ.MONTH(III).AND.ITIME8(K).EQ.NONTH(III+1)) LDIF=1  1034
ISN 0264            IF (ITME1.EQ.MONTH(III).AND.(ITIME8(K)-NONTH(III+1)).EQ.1) LDIF=2  1035
ISN 0266            IF ((MONTH(III)-ITME1).EQ.1.AND.ITIME8(K).EQ.NONTH(III+1)) LDIF=2  1036
ISN 0268            IF(ITIME8(K).EQ.NONTH(III+1).AND.(MONTH(III)-ITME1).EQ.2) LDIF=3
ISN 0270            IF(ITIME8(K).EQ.(NONTH(III+1)+1).AND.(MONTH(III)-ITME1).EQ.1)
                   1 LDIF=3
ISN 0272            IF(ITIME8(K).EQ.(NONTH(III+1)+2).AND.ITME1.EQ.MONTH(III)) LDIF=3
ISN 0274            IF(ITIME8(K).EQ.NONTH(III+1).AND.(MONTH(III)-ITME1).EQ.3) LDIF=4
ISN 0276            IF(ITIME8(K).EQ.(NONTH(III+1)+1).AND.(MONTH(III)-ITME1).EQ.2)
                   1 LDIF=4
ISN 0278            IF(ITIME8(K).EQ.(NONTH(III+1)+2).AND.(MONTH(III)-ITME1).EQ.1)
                   1 LDIF=4
ISN 0280            IF(ITIME8(K).EQ.(NONTH(III+1)+3).AND.ITME1.EQ.MONTH(III)) LDIF=4
ISN 0282        568 CONTINUE                                                       1037
ISN 0283            IF(ITME1.EQ.MONTH(12).AND.ITIME8(K).EQ.NONTH(1)) LDIF=1
ISN 0285            IF(ITME1.EQ.MONTH(12).AND.(ITIME8(K)-NONTH(1)).EQ.1) LDIF=2
ISN 0287            IF(ITIME8(K).EQ.NONTH(1).AND.(MONTH(12)-ITME1).EQ.1) LDIF=2
```

Figure D-3. Subroutine DATAPT (4 of 6)

```
ISN 0289          IF(ITIME8(K).EQ.NONTH(1).AND.(MONTH(12)-ITME1).EQ.2) LDIF=3
ISN 0291          IF(ITIME8(K).EQ.(NONTH(1)+1).AND.(MONTH(12)-ITME1).EQ.1) LDIF=3
ISN 0293          IF(ITIME8(K).EQ.(NONTH(1)+2).AND.ITME1.EQ.MONTH(12)) LDIF=3
ISN 0295          IF(ITIME8(K).EQ.NONTH(1).AND.(MONTH(12)-ITME1).EQ.3) LDIF=4
ISN 0297          IF(ITIME8(K).EQ.(NONTH(1)+1).AND.(MONTH(12)-ITME1).EQ.2) LDIF=4
ISN 0299          IF(ITIME8(K).EQ.(NONTH(1)+2).AND.(MONTH(12)-ITME1).EQ.1) LDIF=4
ISN 0301          IF(ITIME8(K).EQ.(NONTH(1)+3).AND.ITME1.EQ.MONTH(12)) LDIF=4
                C TO GET TOTAL NUMBER OF DAYS                                      1038
ISN 0303          ITIME9(K)=ITIME9(K)+2400*LDIF
ISN 0304          IHRS=ITIME9(K)/100
ISN 0305          MINUTS=ITIME9(K)-IHRS*100
ISN 0306          YTI=FLOAT(IHRS)+FLOAT(MINUTS)/60.
ISN 0307        889 IF (ITYPE(K).EQ.1) GO TO 601                                   1045
ISN 0309          IF (ITYPE(K).EQ.9) GO TO 601                                     1046
ISN 0311          GO TO 992                                                        1047
ISN 0312        601 JJ=JJ+1                                                        1048
ISN 0313          RR(JJ)=YTI                                                       1049
ISN 0314          IRR=1                                                            1050
ISN 0315        602 ITIME9(K)=ITIME9(K)-2400*LDIF
ISN 0316          GO TO 595                                                        1053
ISN 0317        612 CONTINUE
ISN 0318          MDIF=5                                                           1055
                C SHIFT FIRST DATE TO THE LEFT ON ALTITUDE PLOT TO ELIMINATE DATE OVERRUN
ISN 0319          XPOSS=XNORMZ(AMODE,DATA2)
ISN 0320          IF(NSS.EQ.1) XPOSS=XPOSS-38.
ISN 0322          CALL NUMBRG(AMODE,XPOSS,9.,6,ITME1)
ISN 0323          IF (INDTE.EQ.3) GO TO 811                                        1058
ISN 0325          IF (INDTE.EQ.1) GO TO 811                                        1059
ISN 0327          IF (DATA1.EQ.DATA2) GO TO 811                                    1060
ISN 0329          GO TO 596                                                        1061
ISN 0330        992 IF (ITYPE(K).EQ.2) GO TO 993                                   1062
ISN 0332          IF (ITYPE(K).EQ.3) GO TO 993                                     1063
ISN 0334          J=J+1                                                            1064
ISN 0335          XY(J)=YTI                                                        1065
ISN 0336          IXY=1                                                            1066
ISN 0337          GO TO 602                                                        1067
ISN 0338        993 L=L+1                                                          1068
ISN 0339          DCOS(L)=YTI                                                      1069
ISN 0340          LM=L                                                             1070
ISN 0341          GO TO 602                                                        1071
ISN 0342        811 IF (K.EQ.1) GO TO 812                                          1072
ISN 0344          PRINT 333,JJ,L,J
ISN 0345        333 FORMAT (1H ,10X,31HRANGE/RANGE RATE PASSES PLOTTED,2X,I6,5X,24HMIN 1074
                   1ITRACK PASSES PLOTTED,2X,I6,5X,17HXY PASSES PLOTTED,2X,I6)     1075
ISN 0346          GO TO 1                                                          1076
ISN 0347        812 CALL LEGNDG(AMODE,490.,48.,23,23HNO DATA FOR THIS PERIOD)
ISN 0348          PRINT 855                                                        1078
ISN 0349        855 FORMAT (1H ,10X,25HNO PASSES FOR THIS PERIOD)                  1079
ISN 0350          ISTOP=1                                                          1080
ISN 0351        615 IF (ISTOP.NE.1) GO TO 595                                      1081
ISN 0353          IF (J.EQ.0) GO TO 100                                            1082
ISN 0355          XTI=0.75                                                         1083
ISN 0356         11 M=M+1                                                          1084
ISN 0357          CALL SETSMG(AMODE,14,0.)
ISN 0358          CALL NUMBRG(AMODE,XY(M),XTI,-1,1H*)
ISN 0359          CALL SETSMG(AMODE,14,3.)
```

Figure D-3. Subroutine DATAPT (5 of 6)

```
ISN 0360          IF (M.EQ.JJ) GO TO 100                                    1086
ISN 0362          GO TO 11                                                  1087
ISN 0363      100 M=0                                                       1088
ISN 0364          IF (L.EQ.0) GO TO 13                                      1089
ISN 0366          XTI=0.5                                                   1090
ISN 0367       12 M=M+1                                                     1091
ISN 0368          CALL SETSMG(AMODE,14,0.)
ISN 0369          CALL NUMBRG(AMODE,DCOS(M),XTI,-1,1H*)
ISN 0370          CALL SETSMG(AMODE,14,3.)
ISN 0371          IF (M.EQ.L) GO TO 13                                      1093
ISN 0373          GO TO 12                                                  1094
ISN 0374       13 M=0                                                       1095
ISN 0375          IF (JJ.EQ.0) GO TO 111                                    1096
ISN 0377          XTI=0.25                                                  1097
ISN 0378       14 M=M+1                                                     1098
ISN 0379          CALL SETSMG(AMODE,14,0.)
ISN 0380          CALL NUMBRG(AMODE,RR(M),XTI,-1,1H*)
ISN 0381          CALL SETSMG(AMODE,14,3.)
ISN 0382          IF (M.EQ.JJ) GO TO 111                                    1100
ISN 0384          GO TO 14                                                  1101
                C * BEGIN OCPLT3 SEQUENCE
ISN 0385        911 PRINT 3400
ISN 0386       3400 FORMAT(60H REQUESTED TIME SPAN TO BE PLOTTED EXCEEDS OBSERVATION T
                   1IME )
ISN 0387          REWIND 83
ISN 0388          CALL EXITG(AMODE)
ISN 0389          STOP
ISN 0390        450 ITIME8(50)=ITIME8(K-1)                                  1173
ISN 0391          ITIME9(50)=ITIME9(K-1)                                    1174
ISN 0392          ITYPE(50)=ITYPE(K-1)                                      1175
ISN 0393          K=50                                                      1176
ISN 0394          GO TO 595                                                 1177
ISN 0395        111 REWIND 83
ISN 0396          RETURN                                                    1179
ISN 0397          END                                                       1180
```

Figure D-3. Subroutine DATAPT (6 of 6)

```
LEVEL 20.1 (AUG 71)                    OS/360  FORTRAN H

        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002            SUBROUTINE TIMTCK (JK,JNDTE)                          1182
 ISN 0003            COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),PANGE5(10
                    10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                    1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                0009
 ISN 0004            COMMON ERRL01,ERRL02,ERRL03,ERRHI1,ERRHI2,ERRHI3
 ISN 0005            COMMON AMODE(200),CON,MANY,LOG
 ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IX,IY
 ISN 0007            INTEGER A5, A7, B3, B5
 ISN 0008            IF(NSS5.EQ.1) GO TO 407
 ISN 0010            PRINT 200,JK                                          1187
 ISN 0011        200 FORMAT (1H ,11HDO INDEX IS,I6)                        1188
 ISN 0012        407 CALL LEGNDG(AMODE,237.,900.,70,70HNUMBERS ON CURVE INDICATE UNIVER
                    1SAL TIME IN HOURS ALONG THE TRAJECTORY)
 ISN 0013            DO 10 I=1,JK                                          1191
 ISN 0014            IF(JNDTE.EQ.0.AND.LOG.EQ.0) YIY=YNORMZ(AMODE,ERROR(I))
 ISN 0016            IF(JNDTE.EQ.0.AND.LOG.EQ.1) YIY=YNORMZ(AMODE,ALOG10(ERROR(I)))
 ISN 0018            IF(JNDTE.EQ.1.AND.LOG.EQ.0) YIY=YNORMZ(AMODE,ERROR1(I))
 ISN 0020            IF(JNDTE.EQ.1.AND.LOG.EQ.1) YIY=YNORMZ(AMODE,ALOG10(ERROR1(I)))
 ISN 0022            IF(JNDTE.EQ.2.AND.LOG.EQ.0) YIY=YNORMZ(AMODE,ERROR2(I))
 ISN 0024            IF(JNDTE.EQ.2.AND.LOG.EQ.1) YIY=YNORMZ(AMODE,ALOG10(ERROR2(I)))
 ISN 0026            XIX=XNORMZ(AMODE,RANGE5(I))
 ISN 0027            IF(NSS5.EQ.1) GO TO 408
 ISN 0029            PRINT 100,XIX,YIY
 ISN 0030        100 FORMAT(1H ,2F6.0)
 ISN 0031        408 CONTINUE
 ISN 0032            XIX=XIX-3.
 ISN 0033            YIY=YIY+15.
 ISN 0034            IF(NSS5.EQ.1) GO TO 409
 ISN 0036            PRINT 101,MHOURS(I)
 ISN 0037        101 FORMAT(1H ,I3)
 ISN 0038        409 CALL NUMBRG(AMODE,XIX,YIY,2,MHOURS(I))
 ISN 0039         10 CONTINUE                                              1209
 ISN 0040            RETURN                                                1210
 ISN 0041            END                                                   1211
```

Figure D-4. Subroutine TIMTCK

```
LEVEL 20.1 (AUG 71)                    OS/360  FORTRAN H

        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
ISN 0002            SUBROUTINE ALTCK(KJ,JNOTE)                                  1213
ISN 0003            COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10
                   10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                   1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                     0009
ISN 0004            COMMON ERRLO1,ERRLO2,ERRLO3,ERRHI1,ERRHI2,ERRHI3
ISN 0005            COMMON AMODE(200),CON,MANY,LOG
ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,AZ,B3,B5,IXIY
ISN 0007            INTEGER A5, A7, B3, B5
ISN 0008            CALL LEGNDG(AMODE,237.,900.,91,91HNUMBERS ON CURVE INDICATE RADIAL
                   1 DISTANCE FROM CENTER OF EARTH ALONG THE TRAJECTORY KM*1000)
ISN 0009            DO 10 I=1,KJ                                                1219
ISN 0010            IF(JNOTE.EQ.0.AND.LOG.EQ.0) YIY=YNORMZ(AMODE,ABSIC(I))
ISN 0012            IF(JNOTE.EQ.0.AND.LOG.EQ.1) YIY=YNORMZ(AMODE,ALOG10(ABSIC(I)))
ISN 0014            IF(JNOTE.EQ.1.AND.LOG.EQ.0) YIY=YNORMZ(AMODE,ABSIC1(I))
ISN 0016            IF(JNOTE.EQ.1.AND.LOG.EQ.1) YIY=YNORMZ(AMODE,ALOG10(ABSIC1(I)))
ISN 0018            IF(JNOTE.EQ.2.AND.LOG.EQ.0) YIY=YNORMZ(AMODE,ABSIC2(I))
ISN 0020            IF(JNOTE.EQ.2.AND.LOG.EQ.1) YIY=YNORMZ(AMODE,ALOG10(ABSIC2(I)))
ISN 0022            HOUR2=FLOAT(IHOUR2(I))                                      1223
ISN 0023            XIX=XNORMZ(AMODE,HOUR2)
ISN 0024            IF(NSS5.EQ.1) GO TO 410
ISN 0026            PRINT 100,XIX,YIY
ISN 0027        100 FORMAT(1H ,F6.0,F6.0)
ISN 0028        410 CONTINUE
ISN 0029            XIX=XIX-12.
ISN 0030            YIY=YIY+15.
ISN 0031            IF(NSS5.EQ.1) GO TO 411
ISN 0033            PRINT 101,RANGE7(I)                                         1234
ISN 0034        101 FORMAT (1H ,F10.4)                                          1235
ISN 0035        411 IRAN7=RANGE7(I)
ISN 0036            CALL NUMBRG(AMODE,XIX,YIY,3,IRAN7)
ISN 0037         10 CONTINUE                                                    1237
ISN 0038            RETURN                                                      1238
ISN 0039            END                                                         1239
```

Figure D-5. Subroutine ALTCK

```
LEVEL 20.1 (AUG 71)                    OS/360  FORTRAN H

         COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002            SUBROUTINE TITLES (MTYPE,MSKIP)                          1241
 ISN 0003            COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10
                    10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                    1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                   0009
 ISN 0004            COMMON ERRLO1,ERRLO2,ERRLO3,ERRHI1,ERRHI2,ERRHI3
 ISN 0005            COMMON AMODE(200),CON,MANY,LOG
 ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
 ISN 0007            DATA INCRD,JSYJUT/5,6/
 ISN 0008            DATA IYDARK/1/,YLABEL/1./
 ISN 0009            INTEGER A5, A7, B3, B5
 ISN 0010            REAL*8 SNAME
 ISN 0011            CALL OBJCTG(AMODE,204.,145.,1161.,953.)
 ISN 0012            CALL PAGEG(AMODE,0,1,1)
 ISN 0013            IF (MSKIP.EQ.6) GO TO 2001                               1250
 ISN 0015         1  IF (MSKIP.EQ.5) GO TO 50                                 1251
 ISN 0017            GO TO (35,45,55),MTYPE
 ISN 0018         35 YB=YB1
 ISN 0019            YT=YT1
 ISN 0020            YGRID=YGRID1
 ISN 0021            IF(LOG.EQ.0) IYDARK=YLAB1/YGRID1
 ISN 0023            IF(LOG.EQ.0) YLABEL=YLAB1
 ISN 0025            FMTY=FMTY1
 ISN 0026            GO TO 58
 ISN 0027         45 YB=YB2
 ISN 0028            YT=YT2
 ISN 0029            YGRID=YGRID2
 ISN 0030            IF(LOG.EQ.0) IYDARK=YLAB2/YGRID2
 ISN 0032            IF(LOG.EQ.0) YLABEL=YLAB2
 ISN 0034            FMTY=FMTY2
 ISN 0035            GO TO 58
 ISN 0036         55 YB=YB3
 ISN 0037            YT=YT3
 ISN 0038            YGRID=YGRID3
 ISN 0039            IF(LOG.EQ.0) IYDARK=YLAB3/YGRID3
 ISN 0041            IF(LOG.EQ.0) YLABEL=YLAB3
 ISN 0043            FMTY=FMTY3
 ISN 0044         58 CONTINUE
 ISN 0045            IF (MSKIP.EQ.0) GO TO 60                                 1255
 ISN 0047            IF (MSKIP.EQ.2) GO TO 80                                 1256
 ISN 0049            CALL SUBJEG(AMODE,0.,YB,24.,YT)
 ISN 0050            IF(LOG.EQ.1) CALL SETSMG(AMODE,24,1.)
 ISN 0052            CALL SETSMG(AMODE,14,0.)
 ISN 0053            CALL GRIDG(AMODE,.5,YGRID,2,IYDARK)
 ISN 0054            CALL SETSMG(AMODE,14,3.)
 ISN 0055            CALL LABELG(AMODE,0,1.,0,2)
 ISN 0056            GO TO 90                                                 1259
 ISN 0057         60 CALL SUBJEG(AMODE,XR,YB,XL,YT)
 ISN 0058            IF(LOG.EQ.1) CALL SETSMG(AMODE,24,1.)
 ISN 0060            CALL SETSMG(AMODE,14,0.)
 ISN 0061            CALL GRIDG(AMODE,-XGRID,YGRID,IXDARK,IYDARK)
 ISN 0062            CALL SETSMG(AMODE,14,3.)
 ISN 0063            CALL LABELG(AMODE,0,-XLABEL,0,FMTX)
 ISN 0064            GO TO 90                                                 1263
 ISN 0065         80 CALL SUBJEG(AMODE,XL,YB,XR,YT)
```

Figure D-6. Subroutine TITLES (1 of 3)

```
ISN 0066            IF(LOG.EQ.1) CALL SETSMG(AMODE,24,1.)
ISN 0068            CALL SETSMG(AMODE,14,0.)
ISN 0069            CALL GRIDG(AMODE,XGRID,YGRID,IXDARK,IYDARK)
ISN 0070            CALL SETSMG(AMODE,14,3.)
ISN 0071            CALL LABELG(AMODE,0,XLABEL,0,FMTX)
ISN 0072         90 CALL LABELG(AMODE,1,YLABEL,0,FMTY)
ISN 0073            GO TO 200
ISN 0074         50 READ(INCRD,100) CON,SNAME,ISAT,IRUN,LOG,MANY
ISN 0075        100 FORMAT(A1,1X,A8,1X,I5,1X,I6,1X,I1,1X,I1)
ISN 0076            WRITE(JSYOUT,9100) CON,SNAME,ISAT,IRUN
ISN 0077       9100 FORMAT(1H ,6X,A1,2X,A8,1X,I5,2X,I6)
ISN 0078            READ(INCRD,101) XL,XR,YB1,YB2,YB3,YT1,YT2,YT3
ISN 0079        101 FORMAT(8F10.0)
ISN 0080            WRITE(JSYOUT,300) XL,XR,YB1,YB2,YB3,YT1,YT2,YT3
ISN 0081        300 FORMAT(1H ,8F10.3)
ISN 0082            READ(INCRD,102) XGRID,XLABEL,FMTX
ISN 0083        102 FORMAT(2F10.0,F3.1)
ISN 0084            IF(XGRID.NE.0.) IXDARK=XLABEL/XGRID
ISN 0086            READ(INCRD,104) YGRID1,YGRID2,YGRID3,YLAB1,YLAB2,YLAB3,
                   1 FMTY1,FMTY2,FMTY3
ISN 0087        104 FORMAT(6F10.0,3(F3.1,1X))
ISN 0088            READ(INCRD,105) ERRLO1,ERRLO2,ERRLO3,ERRHI1,ERRHI2,ERRHI3
ISN 0089        105 FORMAT(6F10.0)
ISN 0090            READ 103,IIDAT,IIDAT1                                    1330
ISN 0091            PRINT 9103,IIDAT,IIDAT1
ISN 0092       9103 FORMAT(6X,2(5X,I6))
ISN 0093            READ 133,IH                                              1331
ISN 0094        133 FORMAT(I4)                                               1332
ISN 0095        103 FORMAT (I6,1X,I6)                                        1333
ISN 0096            CALL SETSMG(AMODE,14,3.)
ISN 0097            CALL SETSMG(AMODE,100,3.)
ISN 0098            CALL SETSMG(AMODE,104,-.75)
ISN 0099       2001 CONTINUE
ISN 0100            CALL SETSMG(AMODE,45,1.5)
ISN 0101            CALL LEGNDG(AMODE,562.,800.,14,14HPERIOD COVERED)
ISN 0102            CALL SETSMG(AMODE,45.,75)
ISN 0103            CALL NUMBRG(AMODE,622.,700.,6,IIDAT)
ISN 0104            CALL NUMBRG(AMODE,692.,700.,6,IIDAT1)
ISN 0105        200 CALL NUMBRG(AMODE,937.,1000.,6,IRUN)
ISN 0106            CALL NUMBRG(AMODE,913.,980.,5,ISAT)
ISN 0107            IF (MSKIP.EQ.5.OR.MSKIP.EQ.6) GO TO 30                   1364
ISN 0109            IF(MTYPE.EQ.2) GO TO 20
ISN 0111            IF(MTYPE.EQ.3) GO TO 25
ISN 0113            CALL SETSMG(AMODE,50,270.)
ISN 0114            CALL LEGNDG(AMODE,142.,900.,19,19HRADIAL COMPONENT KM)
ISN 0115            CALL SETSMG(AMODE,50,0.)
ISN 0116            GO TO 30                                                 1368
ISN 0117         20 CALL SETSMG(AMODE,50,270.)
ISN 0118            CALL LEGNDG(AMODE,142.,900.,40,
                   1 40HCOMP IN ORB. PLANE NORMAL TO PAD COMP KM)
ISN 0119            CALL SETSMG(AMODE,50,0.)
ISN 0120            GO TO 30                                                 1371
ISN 0121         25 CALL SETSMG(AMODE,50,270.)
ISN 0122            CALL LEGNDG(AMODE,142.,900.,29,29HCOMP NORMAL TO ORBIT PLANE KM)
ISN 0123            CALL SETSMG(AMODE,50,0.)
ISN 0124         30 CALL SETSMG(AMODE,45,1.5)
```

Figure D-6. Subroutine TITLES (2 of 3)

```
ISN 0125          CALL LEGNDG(AMODE,244.,980.,32,32HORBITAL UNCERTAINTY ESTIMATE FOR
                 1)
ISN 0126          CALL SETSMG(AMODE,45.,75)
ISN 0127          CALL LEGNDG(AMODE,262.,1000.,83,83HMISSION AND TRAJECTORY ANALYSIS
                 1 DIVISION, GODDARD SPACE FLIGHT CENTER       RUN DATE)
ISN 0128          CALL LEGNDG(AMODE,849.,980.,16,16H       (         ))
ISN 0129          CALL SETSMG(AMODE,45,1.5)
ISN 0130          CALL LEGNDG(AMODE,777.,980.,8,SNAME)
ISN 0131          CALL SETSMG(AMODE,45.,75)
ISN 0132          IF(MSKIP.EQ.1.OR.MSKIP.EQ.5.OR.MSKIP.EQ.6) GO TO 40
ISN 0134          CALL LEGNDG(AMODE,412.,121.,54,
                 1 54HRADIAL DISTANCE FROM CENTER OF EARTH * 1000 KILOMETERS)
ISN 0135       40 RETURN                                                        1399
ISN 0136          END                                                           1400
```

Figure D-6. Subroutine TITLES (3 of 3)

```
LEVEL 20.1 (AUG 71)                          OS/360  FORTRAN H

        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002            SUBROUTINE TAPES(IBLAP)                                  1407
 ISN 0003            COMMON ITIME3(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10
                    10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                    1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                   0009
 ISN 0004            COMMON ERRL01,ERRL02,ERRL03,ERRHI1,ERRHI2,ERRHI3
 ISN 0005            COMMON AMODE(200),CON,MANY,LOG
                   C * BEGIN OCPLT3 SEQUENCE
 ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
                   C * END OCPLT3 SEQUENCE
 ISN 0007            REAL * 8 TAPE,SORTST
 ISN 0008            DIMENSION TAPE(25),IFILE(25)                             1408
 ISN 0009            DATA SORTST/8H        /
                   C * BEGIN OCPLT3 SEQUENCE
 ISN 0010            INTEGER A5, A7, B3, B5
                   C * END OCPLT3 SEQUENCE
 ISN 0011            IF (IBLAP.EQ.0) GO TO 60                                 1410
 ISN 0013            IF (IBLAP.EQ.1) GO TO 80                                 1411
 ISN 0015            DO 10 I=1,25                                             1412
 ISN 0016            READ 190, TAPE(I),IFILE(I)                               1413
 ISN 0017            PRINT 9190,TAPE(I),IFILE(I)
 ISN 0018          9190 FORMAT(7X,A6,5X,I2)
 ISN 0019           190 FORMAT (A6,1X,I2)
 ISN 0020            IF (TAPE(I).EQ.SORTST) GO TO 20                          1415
 ISN 0022           10 CONTINUE                                               1416
 ISN 0023           20 DO 30 J=I,25                                           1417
 ISN 0024            READ 190, TAPE(J),IFILE(J)                               1418
 ISN 0025            PRINT 9190 ,TAPE(J),IFILE(J)
 ISN 0026            IF (TAPE(J).EQ.SORTST) GO TO 40                          1419
 ISN 0028           30 CONTINUE                                               1420
 ISN 0029           40 J=J-1                                                  1421
 ISN 0030            ICOP=1                                                   1422
 ISN 0031            IDC2=1                                                   1423
 ISN 0032            IVC=1                                                    1424
 ISN 0033            IDC=I                                                    1425
 ISN 0034            GO TO 200                                                1426
 ISN 0035           60 ICOP=ICOP+1                                            1427
 ISN 0036            IF(ICOP.GT.IFILE(IVC)) GO TO 600                         1428
 ISN 0038            GO TO 200                                                1429
 ISN 0039          600 IVC=IVC+1                                              1430
 ISN 0040            IF(IVC.EQ.I) GO TO 199                                   1431
 ISN 0042            ICOP=1                                                   1432
                   C * BEGIN OCPLT3 SEQUENCE
                   C * ADVANCE A5 TO EOF
 ISN 0043            BACKSPACE A5
 ISN 0044          3540 READ (A5,104,END=3550)
 ISN 0045           104  FORMAT(7X,A4)
 ISN 0046            GO TO 3540
 ISN 0047          3550 CONTINUE
                   C * END OCPLT3 SEQUENCE
 ISN 0048            PRINT 250,TAPE(IVC)                                      1433
 ISN 0049           250 FORMAT(1H1,26HOPERATOR PLEASE MOUNT TAPE,2X,A6,2X,20HON A-5 AND HI  1434
                    1T START)                                                1435
                   C      PAUSE
 ISN 0050            GO TO 200                                                1437
```

Figure D-7. Subroutine TAPES (1 of 2)

```
ISN 0051          80 IDC2=IDC2+1                                                1438
ISN 0052             IF (IDC2.GT.IFILE(IDC)) GO TO 70                           1439
ISN 0054             GO TO 200                                                  1440
ISN 0055          70 IDC=IDC+1                                                  1441
ISN 0056             IF(IDC.GT.J) GO TO 199                                     1442
ISN 0058             IDC2=1                                                     1443
ISN 0059             PRINT 251,TAPE(IDC)                                        1444
ISN 0060         251 FORMAT(1H1,26HOPERATOR PLEASE MOUNT TAPE,2X,A6,2X,20HON 8-5 AND HI 1445
                    1T START)                                                   1446
                 C      PAUSE
ISN 0061             GO TO 200                                                  1448
ISN 0062         199 PRINT 201                                                  1449
ISN 0063         201 FORMAT(1H1,62HALL REQUESTED TAPES HAVE BEEN PROCESSED - EXECUTION 1450
                    1TERMINATED)                                                1451
ISN 0064             CALL EXITG(AMODE)
ISN 0065             GO TO 300                                                  1453
ISN 0066         200 RETURN                                                     1454
ISN 0067         300 STOP                                                       1455
ISN 0068             END                                                        1456
```

Figure D-7. Subroutine TAPES (2 of 2)

```
LEVEL 20.1 (AUG 71)                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
  ISN 0002            SUBROUTINE BSFTAP(NF)
                C     *OCPLTJ SUBROUTINE
                C     *THE PURPOSE OF THIS SUBROUTINE IS TO BACKSPACE TO THE BEGINNING
                C     *OF A COMPARE TAPE SEGMENT
  ISN 0003            COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10
                     10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                     1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                          0009
  ISN 0004            COMMON ERRL01,ERRL02,ERRL03,ERRHI1,ERRHI2,ERRHI3
  ISN 0005            COMMON AMODE(200),CON,MANY,LOG
  ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
  ISN 0007            DATA CHCK1/1H6/
  ISN 0008            DATA CHCK2/1H7/
  ISN 0009            INTEGER A5, A7, B3, B5
  ISN 0010       3040 DO 3050 I = 1, 34
  ISN 0011       3050 BACKSPACE NF
  ISN 0012            READ (NF, 3080) A3COMP
  ISN 0013       3080 FORMAT (1X, A1)
  ISN 0014            PRINT 4000, A3COMP
  ISN 0015       4000 FORMAT (8H A3COMP=,A1)
  ISN 0016            IF (A3COMP.EQ.CHCK1.OR.A3COMP.EQ.CHCK2) GO TO 3040
  ISN 0018            DO 3140 I = 1, 8
  ISN 0019       3140 BACKSPACE NF
  ISN 0020            READ (NF, 3080) A3COMP
  ISN 0021            IF (A3COMP.EQ.CHCK1.OR.A3COMP.EQ.CHCK2) GO TO 3040
  ISN 0023            DO 3150 I = 1, 15
  ISN 0024       3150 BACKSPACE NF
  ISN 0025            RETURN
  ISN 0026            END
```

Figure D-8. Subroutine BSFTAP

```
LEVEL 20.1 (AUG 71)                          OS/360  FORTRAN H

        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002            SUBROUTINE TCONV0(TIMDUT,IOUTIM,SEC)                    00020
                C                                                           00030
                C                                                           00040
                C                                                           00050
                C   PURPOSE                                                 00060
                C       THIS MODULE IS DESIGNED TO CONVERT CALENDAR TIME TO INTERNAL  00070
                C       DOD UNITS (CENTIDAY) AND VICE VERSA                 00080
                C                                                           00090
                C                                                           00100
                C                                                           00110
                C       JYEAR   ALWAYS EQUAL TO 1957                        00120
                C       MONTH   ALWAYS EQUAL TO 9                           00130
                C       DAY     ALWAYS EQUAL TO 18                          00140
                C       NBRDAY  ARRAY CONTAINING THE NUMBER OF DAYS PREVIOUS TO THE ITH  00150
                C               MONTH                                       00160
                C       TIMDUT  NUMBER OF DUT'S FROM 9/18/57 TO THE CALENDAR TIME  00170
                C       IOUTIM  ARRAY CONTAINING THE YEAR,MONTH,DAY,HOUR AND MINUTE OF  00180
                C               CALENDAR TIME                               00190
                C       J       USED FOR LEAP YEARS                         00200
                C       M       CONTAINS THE LAST TWO DIGITS OF THE YEAR    00210
                C       SEC     SECONDS OF CALENDAR TIME (LESS THAN A MINUTE)  00220
                C       K       NUMBER OF DAYS FROM 9/18/57 TO JAN 1 OF THE CALENDAR YEAR  00230
                C       IDREF   NUMBER OF DAYS FROM 9/18/57 TO THE CALENDAR DAY  00240
                C       TIMSEC  NUMBER OF DAYS FROM 9/18/57 TO CALENDAR TIME  00250
                C       CSEC    NUMBER OF SECONDS IN THE CALENDAR DAY       00260
                C       L       SET TO 0 IF NOT LEAP YEAR  SET TO 1 IF LEAP YEAR  00270
                C                                                           00280
                C                                                           00290
 ISN 0003           REAL *8 TIMDUT,CSEC,TIMSEC                              00300
 ISN 0004           DIMENSION IOUTIM(5), NBRDAY(12)                         00310
 ISN 0005           DATA NBRDAY          /0,31,59,90,120,151,181,212,243,273,304,334/  00320
                   4  ,JYEAR/57/,MONTH/9/,JDAY/18/,JDREF/0/                 00330
 ISN 0006           IF(TIMDUT .GT. 0.0) GO TO 10                            00340
                C                                                           00350
                C                                                           00360
                C ***********************************************************************00370
                C *                                                         00380
                C * COMPUTES NUMBER OF CENTIDAYS BETWEEN THE REFERENCE DATE AND A  00390
                C * REQUESTED DATE                                          00400
                C *                                                         00410
                C ***********************************************************************00420
                C                                                           00430
                C                                                           00440
 ISN 0008           M = MOD(IOUTIM(1), 1900) - 1                            00450
 ISN 0009           ISUM = M*10000+IOUTIM(2)*100+IOUTIM(3)                  00460
 ISN 0010           IF (ISUM.GE. 560918) GO TO 444                          00470
 ISN 0012           TIMDUT=-100                                             00480
 ISN 0013           RETURN                                                  00490
 ISN 0014    444    CONTINUE                                                00500
 ISN 0015           K=104                                                   00510
 ISN 0016           IF(M.EQ.56) K=-261                                      00520
                C  COMPUTES NUMBER OF DAYS FROM REFERENCE DATE TO BEGINNING OF YEAR  00530
 ISN 0018           IF(M.EQ.56 .OR. M.EQ.57) GO TO 567                      00540
 ISN 0020           DO 1 I= 58,M                                            00550
```

Figure D-9. Subroutine TCONV0 (1 of 3)

```
ISN 0021            K=K+365                                                    00560
ISN 0022            IF (MOD(I,4) .EQ. 0) K = K+1                               00570
ISN 0024      1     CONTINUE                                                   00580
              C DETERMINES NUMBER OF DAYS FROM THE BEGINNING OF REFERENCE YEAR TO THE   00590
              C BEGINNING OF YEAR FOR DATE REQUESTED                           00600
ISN 0025      567   J=0                                                        00610
ISN 0026            IF ((MOD(IOUTIM(1),4) .EQ. 0) .AND. (IOUTIM(2) .GT. 2)) J = 1   00620
              C ADDS ANOTHER DAY TO COUNT IF THE REQUESTED DATE  IS A LEAP YEAR AND MONTH00630
              C IS GREATER THAN FEBRUARY                                       00640
ISN 0028            I = IOUTIM(2)                                              00650
ISN 0029            IDREF=K+NBRDAY(I)+IOUTIM(3)+J                              00660
              C COMPUTES TOTAL NUMBER OF DAYS FORM REFERENCE DATE TO REQUESTED DATE   00670
ISN 0030            TIMSEC=(IDREF-JDREF)*86400 +IOUTIM(4)*3600 +IOUTIM(5)*60   00680
ISN 0031            TIMSEC=TIMSEC + SEC                                        00690
              C COMPUTES TOTAL NUMBER OF SECONDS FROM REFERENCE DATE TO REQUESTED TIME   00700
ISN 0032            TIMDUT=TIMSEC/864.0                                        00710
              C DETERMINES NUMBER OF CENTIDAYS BETWEEN THE TWO DATES           00720
ISN 0033            RETURN                                                     00730
              C                                                                00740
              C                                                                00750
              C ***************************************************************00760
              C *                                                              00770
              C * COMPUTES THE CALENDER DATE GIVEN THE NUMBER OF CENTIDAYS FROM THE      00780
              C * REFERENCE DATE                                               00790
              C *                                                              00800
              C ***************************************************************00810
              C                                                                00820
              C                                                                00830
ISN 0034      10    CONTINUE                                                   00840
ISN 0035            CSEC = (DMOD(TIMDUT+0.6D-7,1D2))*8640D0                    00850
              C DETERMINES NUMBER OF SECONDS LESS THAN A DAY                   00860
ISN 0036            SEC=DMOD(CSEC,6D1 )                                        00870
ISN 0037            IOUTIM(5)=DMOD(CSEC,36D2  )/60.0                           00880
ISN 0038            IOUTIM(4)=CSEC / 3600.0                                    00890
              C THE ABOVE THREE STATEMENTS DETERMINE,RESPECTIVELY,THE NUMBER OF SECONDS.  00900
              C MINUTES AND HOURS  OF THE REQUESTED DATE                       00910
ISN 0039            TIMDT=TIMDUT+.5787D-7                                      00920
ISN 0040            K=NBRDAY(MONTH)+JDAY+IFIX(TIMDT /100.)                     00930
              C DETERMINES NUMBER OF DAYS FROM THE BEGINNING OF THE YEAR OF THE REFERENCE00940
              C DATE                                                           00950
ISN 0041            IOUTIM(1)=JYEAR                                            00960
ISN 0042      11    L=0                                                        00970
ISN 0043            IF(MOD(IOUTIM(1),4) .EQ. 0) L=1                            00980
ISN 0045            IF (K .LE.(365 + L)) GO TO 12                              00990
ISN 9047            IOUTIM(1)=IOUTIM(1) +1                                     01000
ISN 0048            K=K-365-L                                                  01010
ISN 0049            GO TO 11                                                   01020
              C THE ABOVE SEGMENT CALCULATES THE NUMBER OF YEARS FROM THE PREVIOUSLY   01030
              C CALCULATED NUMBER OF DAYS                                      01040
ISN 0050      12    J=0                                                        01050
ISN 0051            DO 13 I=2,12                                               01060
ISN 0052            IF (I .GE.3) J=1                                           01070
ISN 0054            IF (K .LE. (NBRDAY(I) + J+L)) GO TO 14                     01080
ISN 0056      13    CONTINUE                                                   01090
ISN 0057            I=13                                                       01100
ISN 0058      14    IOUTIM(2) = I-1                                            01110
```

Figure D-9. Subroutine TCONV0 (2 of 3)

```
                C DETERMINES THE MONTH WITHIN THAT YEAR                    01120
ISN 0059              IF (I.EQ.3) J=0                                      01130
ISN 0061              IOUTIM(3) = K- NBRDAY (I-1) -(J*L)                   01140
                C DETERMINES THE NUMBER OF DAYS WITHIN THAT MONTH          01150
ISN 0062              RETURN                                               01160
ISN 0063              END                                                  01170
```

Figure D-9. Subroutine TCONV0 (3 of 3)

```
LEVEL 20.1 (AUG 71)                          OS/360  FORTRAN H

        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002            SUBROUTINE A5READ (ITIME5, ITIME6, RAD1, IEXP1, RAD2, IEXP2,
                    1RAD3, IEXP3, RAN1, IEXP4, I3EOF)
                    C
                    C     THE PURPOSE OF THIS SUBROUTINE IS TO PASS VALID A5 VALUES FROM
                    C      THE VECTOR COMPARISON TAPE TO THE CALLING PROGRAM
                    C
 ISN 0003            COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE6(10
                    10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                    1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                          0009
 ISN 0004            COMMON ERRLO1,ERRLO2,ERRLO3,ERRHI1,ERRHI2,ERRHI3
 ISN 0005            COMMON AMODE(200),CON,MANY,LOG
 ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
 ISN 0007            DATA CHCK1/1H6/
 ISN 0008            DATA CHCK2/1H7/
 ISN 0009            DATA STT/4HYYMM/
 ISN 0010            INTEGER A5, A7, B3, B5
 ISN 0011            I3EOF=0
 ISN 0012         3000 CONTINUE
 ISN 0013            IXIY=IXIY+1
 ISN 0014            IF (IXIY.GT.33) GO TO 2001
 ISN 0016         3001 READ (A5, 3010,ERR=3001,
                     1                END=3120) CHECK, ITIME5, ITIME6, RAN1, IEXP4,
                     2RAD1, IEXP1, RAD2, IEXP2, RAD3, IEXP3
 ISN 0017         3010 FORMAT (1X, A1, I5, 1X, I4, 7X, F8.6, 1X, I3, 15X, F8.6, 1X, I3,
                     12X, F8.6, 1X, I3, 2X, F8.6, 1X, I3)
 ISN 0018            IF (CHECK.NE.CHCK1) GO TO 3100
 ISN 0020            ITIME5 = 6*100000+ITIME5
 ISN 0021            GO TO 3130
 ISN 0022         3100 IF (CHECK.NE.CHCK2) GO TO 3000
 ISN 0024            ITIME5 = 7*100000+ITIME5
 ISN 0025            GO TO 3130
 ISN 0026         2001 IXIY=8
 ISN 0027          889  READ(A5,890,END=3129) CHC
 ISN 0028          890 FORMAT (1X,A4)
 ISN 0029            IF (CHC.NE.STT) GO TO 889
 ISN 0031            GO TO 3000
 ISN 0032         3120 PRINT 3125
 ISN 0033         3125 FORMAT (40H END OF FILE ENCOUNTERED ON COMPARE TAPE)
 ISN 0034            I3EOF=1
 ISN 0035            RETURN
 ISN 0036         3129 PRINT 3124
 ISN 0037         3124 FORMAT(2X,'END OF FILE ENCOUNTERED BY READ 889 IN A5READ')
 ISN 0038            I3EOF=1
 ISN 0039         3130 CONTINUE
 ISN 0040            RETURN
 ISN 0041            END
```

Figure D-10. Subroutine A5READ

```
LEVEL 20.1 (AUG 71)                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
  ISN 0002            SUBROUTINE B5READ (I3YMD,I3HM, I3TYP)
                      C
                      C   THE PURPOSE OF THIS SUBROUTINE IS TO SUPPLY PROPER CALENDAR
                      C    DATE INFORMATION FROM THE WORKING FILE TO THE MAIN PROGRAM
                      C
  ISN 0003            COMMON ITIME8(9999),ITIME9(9999),ITYPE(9999),MHOURS(100),RANGE5(10
                     10),ERROR(50),ERROR1(50),ERROR2(50),RANGE7(30),IHOUR2(30),ABSIC(30)
                     1,ABSIC1(30),ABSIC2(30),IIDAT,IIDAT1,IH                          0009
  ISN 0004            COMMON ERRLO1,ERRLO2,ERRLO3,ERRHI1,ERRHI2,ERRHI3
  ISN 0005            COMMON AMODE(200),CON,MANY,LOG
  ISN 0006            COMMON NSS1,NSS2,NSS3,NSS4,NSS5,NSS6,A5,A7,B3,B5,IXIY
  ISN 0007            DIMENSION IOUTIM(5)
  ISN 0008            REAL*8 TIMDUT
  ISN 0009            INTEGER*2 I3TYPB
  ISN 0010            INTEGER A5, A7, B3, B5
  ISN 0011            READ (B5) A, I3TYPB, B, C, TIMDUT
  ISN 0012            I3TYP = I3TYPB
  ISN 0013            CALL TCONV0 (TIMDUT, IOUTIM, SEC)
  ISN 0014            I3YMD = 100*(100*IOUTIM(1)+IOUTIM(2))+IOUTIM(3)
  ISN 0015            I3HM = 100*IOUTIM(4)+IOUTIM(5)
  ISN 0016            RETURN
  ISN 0017            END
```

Figure D-11. Subroutine B5READ

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End

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