PROGRAM STRUCTURE

Following is a list of subroutines used by VGRANL. Subroutines that are called by a given routine are grouped together and indented. Occasionally, functions that are computed in line are listed as though they are a subroutine with a blank name.

Thus, some idea can be gotten of the flow of a routine by reading through the subroutine list.

VGRANL
Main program for Voyager plasma analysis.

RUNBEG
Reads in control information for analysis. GSFC uses same input format for FT02F001. See :hdref refid=FT02. RUNBEG has the block data for the MIT only control variables.

VGRANL loops reading time cards (see :hdref refid=FT01.) and in an inner loop reading and processing the requested data.

NXTMOD
Reads in the Plasma data.

Actual module determines the media used.

NXTSUM
Reads off a SUMMARY tape. BAT7 must also be included when loading NXTSUM.

NXTEDR
Reads in an EDR tape. BAT7 must also be included when loading NXTEDR.

NXTSPL
Reads in a SPECTRAL tape

NXTFOR
Reads in a SUMMARY tape using Fortran I/O

NXTMAG
Reads a SUMMARY tape. Returns Magnetic field data only. BAT7 must also be included when loading NXTMAG. Integration time is determined by SETBFL. See:

```
//GO.SUMMARYT DD UNIT=T1600,LABEL=(,BLP),VOL=SER=PT0000
```

(end of NXTMAG)

**SELECT**

Selects which modes are to be processed. Normally dummied except for production off SUMMARY tapes when SELSUM is used.

(end of SELECT)

**CORRCT**

Corrects data for known incorrect data transmissions. Only incorrect integration times are corrected as of now.

(end of CORRCT)

**PLSEDM**

Computes or reads rotation matrix for transforming results from spacecraft to RTN.

Merged SEDR. SEDR from JPL is T800.

```
//GO.SEDRIN DD UNIT=T6250,LABEL=(,BLP),DCB=(RECFM=VBS,LRECL=7290, // BLKSIZE=7294,DEN=4),VOL=SER=PT0000
```

(end of PLSEDM)

**ANSPRT**

Prints out a formatted copy of the answer array. ANSMAG is needed if NXTMAG is used.

(end of ANSPRT)

**SETBFL**

Sets the integration time when NXTMAG is used. Otherwise not used.

(end of SETBFL)

**PLSANL**

The main MIT plasma analysis subroutine. PLSANL is also used at GSFC.

**PLSBEG**

Initializes the analysis variables that are used both at MIT and GSFC, i.e. those that are used by routines called from PLSANL. PLSBEG also has the block data subroutine for these variables. (Called only once)

(end of PLSBEG)

**$DATE**

Prints out list of PLSMA LIBRARY routines loaded.

(end of $DATE)

**KNTCUR**
Converts the digital counts to current values in femtoamps. Also finds the peaks in the distribution function in each cup. May do some filtering and/or other checking in finding the peaks. Module name will indicate this.

CAVE
Averages currents together from several spectra.

FILT
Filters the data for one spectrum to try and decrease the effects of noise. Also important in peak selection.

GETFLD
Puts the magnetic field in the answer array. Measured field can be overwritten by card input. See :hdref refid=FT03..

(in PLSANL) The next part is just a big switch to determine the type of processing that is to be done based on the value of the status word.

MODCAL
Modulator voltage calibration.

IDCANL
IDC analysis.

CURCAL
Current calibration.

STDANL
Normal plasma data

ELANAL
Electron analysis.

PRANAL
Proton (positive ion) analysis.

MOMENT
Calculates values of moments around peaks.
PARPW
Calculates parallel and perpendicular temperatures. (Module name is PARPER)
(end of PARPW) 4

PARPQ
Calculates parallel and perpendicular heat fluxes. (Module name is PARPER)
(end of PARPQ) 4

SCRTNB
PLSEDM must be called first to provide the rotation matrix.
(end of SCRTNB) 4

SCRTNV
PLSEDM must be called first to provide the rotation matrix.
(end of SCRTNV) 4

(in pranal) Computes transparency corrections for each cup.

ORDER
Fit routine. Orders arrays.
(end of ORDER) 4

MJSFIT

FNCDRV
Calculates derivatives.
(end of FNCDRV) 5

MJSINV
Inverts matrix.
(end of MJSINV) 5
(end of MJSFIT) 4
(end of PRANAL) 3
(end of STDANL) 2

BKGDCR
(end of BKGDCR) 2

(in STDANL) Analysis is completed, now to output the results.

VOYPRT
Prints out the digital values of the currents
(end of VOYPRT) 2
ANSPRT
Prints out a formatted copy of the answer array. Note that this is after the analysis whereas the call from VGRANL gives it before the analysis.
(end of ANSPRT)

DOCALT
Write out a spectral, or calibration tape.
(end of DOCALT)

OUTMOD
Most output is controlled through this subroutine.

SCRTNB
B field can be rotated to RTN from OUTMOD
(end of SCRTNB)

SCRTNV
Velocities can be rotated to RTN from OUTMOD
(end of SCRTNV)

ODDPLT
Plot out samples of the ‘oddplots’. Time jumps are checked. If they exist, data may be jumped.

PERDIF
Computes percentage difference in mon and fit densities along with its histogram.
(end of PERDIF)

STEP
Computes average velocity, and velocity width for each modulator step.
(end of STEP)

SPLOT
Plots out measured and computed currents.
(end of SPLOT)

JC
Computes the currents given the fit parameters.
(end of JC)

KNTCUR
Converts digital current to femptoamps
(end of KNTCUR)
CURPLT
Plots out the currents.

DOCN
A dummy routine to allow the user to make his own formatted tape.

DOCP
Copy data into special array

ALTCP
Alternate processing for docp. Dummy routine.

DOHA
Write out Hourly Average tape.

DODP
Make a Day Plot

VGRLOG
Print out a log of the data.

FLUSH
Also prints out histograms of size of good spectra.

PRTSC
Actually writes out the line with the start and stop time.

SPECBD
Saves up the data on the bad spectrum.

HPRNT
**DOCALT**
Writes out Calibration(Spectral) Tape.

**SELPRT**
Print out a summary of the data that was SELECTed out.