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 0
Main program for Voyager plasma analysis.

RUNBEG 1
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.
(end of RUNBEG) 1

VGRANL loops reading time cards (see :hdref refid=ft01.) and in an inner loop reading and processing the requested data.

NXTMOD 1
Reads in the Plasma data.
(end of NXTMOD) 1

Actual module determines the media used.

NXTSUM 1
Reads off a SUMMARY tape. BAT7 must also be included when loading NXTSUM.
//GO.SUMMARYT DD UNIT=T1600,LABEL=(,BLP),
// VOL=SER=PT0000
(end of NXTSUM) 1

NXTEDR 1
Reads in an EDR tape. BAT7 must also be included when loading NXTEDR.
//GO.PLSEDRIN DD UNIT=T800,LABEL=(,BLP),
// DCB=(RECFM=VBS,LRECL=4224,BLKSIZE=18260),
// VOL=SER=PT0000
(end of NXTEDR) 1

NXTSPL 1
Reads in a SPECTRAL tape
//GO.FT18F001 DD DISP=OLD,
// DSN=CSR.$380300.V2SPL.Y00.D000.DATA
(end of NXTSPL) 1

NXTFOR 1
Reads in a SUMMARY tape using Fortran I/O
//GO.FT12F001 DD UNIT=T1600,LABEL=(,BLP),DISP=OLD,
// DCB=(RECFM=VBS,LRECL=4224,BLKSIZE=18260),
// VOL=SER=PT0000
(end of NXTFOR) 1

NXTMAG 1

Reads a SUMMARY tape. Returns Magnetic field data only. BAT7 must also be included when loading NXTMAG. Integration time is determined by SETBFL. See :hdref refid=ft01..

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

(end of NXTMAG) 1

SELECT 1

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

(end of SELECT) 1

CORRCT 1

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

(end of CORRCT) 1

PLSEDM 1

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) 1

ANSPRT 1

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

(end of ANSPRT) 1

SETBFL 1

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

(end of SETBFL) 1

PLSANL 1

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

PLSBEG 2

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) 2

$DATE 2

Prints out list of PLSMA LIBRARY routines loaded.

(end of $DATE) 2

KNTCUR 2

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.

(end of KNTCUR) 2

CAVE 2

Averages currents together from several spectra.

(end of CAVE) 2

FILT 2

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

(end of FILT) 2

GETFLD 2

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

(end of GETFLD) 2

(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 2

Modulator voltage calibration.

(end of MODCAL) 2

IDCANL 2

IDC analysis.

(end of IDCANL) 2

CURCAL 2

Current calibration.

(end of CURCAL) 2

STDANL 2

Normal plasma data

ELANAL 3

Electron analysis.

(end of ELANAL) 3

PRANAL 3

Proton (positive ion) analysis.

MOMENT 4

Calculates values of moments around peaks.

(end of MOMENT) 4

PARPW 4
Calculates parallel and perpendicular temperatures. (Module name is PARPER)

(end of PARPW) 4

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

(end of PARPQ) 4

SCRTNB 4
PLSEDM must be called first to provide the rotation matrix.

(end of SCRTNB) 4

SCRTNV 4
PLSEDM must be called first to provide the rotation matrix.

(end of SCRTNV) 4

(in pranal) Computes transparency corrections for each cup.

ORDER 4
Fit routine. Orders arrays.

(end of ORDER) 4

MJSFIT 4

FNCDRV 5
Calculates derivatives.

(end of FNCDRV) 5

MJSINV 5
Inverts matrix.

(end of MJSINV) 5

(end of MJSFIT) 4

(end of PRANAL) 3

(end of STDANL) 2

BKGDCR 2
Plasma modulator off. :hp3.DUMMY ROUTINE:ehp3.

(end of BKGDCR) 2

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

VOYPRT 2
Prints out the digital values of the currents

(end of VOYPRT) 2

ANSPRT 2
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) 2

(end of PLSANL) 1

DOCALT 1
Write out a spectral, or calibration tape.

(end of DOCALT) 1

OUTMOD 1
Most output is controlled through this subroutine.

SCRTNB 2
B field can be rotated to RTN from OUTMOD

(end of SCRTNB) 2

SCRTNV 2
Velocities can be rotated to RTN from OUTMOD

(end of SCRTNV) 2

ODDPLT 2
Plot out samples of the 'oddplots'.
Time jumps are checked. If they exist, data may be jumped.

PERDIF 3
Computes percentage difference in mon and fit densities alon with its histogram.

(end of PERDIF) 3

STEP 3
Computes average velocity, and velocity width for each modulator step.

(end of STEP) 3

SPLOT 3
Plots out measured and computed currents.

(end of SPLOT) 3

JC 3
Computes the currents given the fit parameters.

(end of JC) 3

KNTCUR 3
Converts digital current to femptoamps

(end of KNTCUR) 3

CURPLT 3
Plots out the currents.

(end of CURPLT) 3

(end of ODDPLT) 2

DOCN 2
A dummy routine to allow the user to make his own formatted tape.

(end of DOCN) 2

DOCP 2
Copy data into special array

ALTCP 3
Alternate processing for docp. Dummy routine.

(end of ALTCP) 3

(end of DOCP) 2

DOHA 2
Write out Hourly Average tape.

(end of DOHA) 2

DODP 2
Make a Day Plot

(end of DODP) 2

(end of OUTMOD) 1

VGRLOG 1
Print out a log of the data.

FLUSH 2
Also prints out histograms of size of good spectra.

(end of FLUSH) 2

PRTSC 2
Actually writes out the line with the start and stop time.

(end of PRTSC) 2

SPECBD 2
Saves up the data on the bad spectrum.

(end of SPECBD) 2

HPRNT 2

(end of HPRNT) 2

(end of VGRLOG) 1

DOCALT 1
Writes out Calibration(Spectral) Tape.

(end of DOCALT) 1

SELPRT 1
Print out a summary of the data that was SELECTed out.

(end of SELPRT) 1

(end of VGRANL) 0