Searching the UVSP database, and a list of experiments showing mass motions.

William Thompson
Applied Research Corporation
8201 Corporate Drive
Landover, MD

Since the Solar Maximum Mission (SMM) satellite was launched in February of 1980, a large database has been built up of experiments using the Ultraviolet Spectrometer and Polarimeter (UVSP) instrument. Access to this database can be gained through the SMM Vax 750 computer at Goddard Space Flight Center. One useful way to do this is with a program called USEARCH. This program allows one to make a listing of different types of UVSP experiments. As an example, one could make a list of all Dopplergram experiments made during the month of April in 1980. It is evident that this program is useful to those who would wish to make use of UVSP data, but who don't know what data is available. Therefore it was decided to include a short description of how to make use of the USEARCH program in these proceedings. Also described here, but not included due to space limitations, is a list of all UVSP experiments showing mass motions in prominences and filaments. This list was made with the aid of the USEARCH program.

There are at the time of this writing four telephone numbers that will connect to the Vax. These are (301)-344-5596, 7951, 7952 and 7074. Each is connected to a Hayes modem capable of operating at rates of either 300 or 1200 baud. The baud rate is set automatically by entering a carriage return after connecting with the modem. (Be careful, entering any other character has the potential of setting an incorrect baud rate.) At that point one should get the "Username:" prompt, followed by the "Password:" prompt. If all four of the modem lines are in use at once, however, the user will be automatically logged off with an apology and a suggestion to try again later. If users have trouble logging on they can try calling me at (301)-344-8619, Art Poland at (301)-344-6991, or Joe Gurman at (301)-344-7599.

Unfortunately, the Goddard Space Flight Center telephone system is undergoing a change in the near future, and all the telephone numbers will be different than they are now. For most telephone numbers the change will be limited to the digits 344 changing to 286 (e.g. (301)-344-8619 will become (301)-286-8619), but the situation is more complicated in regard to computer modems. The details of this changeover are not precisely clear to us yet.

After logging on, you should get a dollar sign ($) prompt. At that point, you can type in the command USEARCH. From that point on, the USEARCH program will ask a series of questions designed to tailor the output to your requirements. Sample sessions are shown in figures 1 and 2. Figure 2 shows the process using the extended search mode, while figure 1 shows the process without it. The first question in either case concerns where the output will be sent. If the letter "D" (either upper or lower case) is entered, then the output will be saved as a disk file. Otherwise it will be sent directly to a printer. The printer formats ("V" or "L") differ only in the number of lines per page (61 for "V" or 53 for "L"). Normally a blank space is inserted between experiments made

during different orbits, but this can be inhibited to save space. If a question is not answered, then the default ("NO" unless otherwise specified) is assumed.

The program next asks for the range of the search. This can be expressed either in experiment numbers, or in terms of day-of-year (DOY) for a given year. The values must be seperated by commas. The range 1,32000 would include all the data up to the failure of the UVSP wavelength drive. All questions after that can be ignored except for those which are of particular interest to the user. If no answer is given, then that option has no effect on the output. Among the possible options used to tailor the output is entering the first several letters of the experiment definition name. One can request a certain file type, either "PB" for playback or "FD" for final data, or one can request both types. This only pertains to experiment numbers after 16800. The different experiment type numbers are shown in table 1 which is reproduced from Henze (1979). The radial distance from the center of the sun's disk is measured in units normalized to unity at the solar limb. The selection of "NOAA Active Region No. or Code" is only moderately useful. For instance, selecting code 6 ("Limb") only selects out those experiments which have been marked as limb experiments, not all those taken at the limb. The remainder of the questions should be self explanatory.

The output provided by the USEARCH program gives the following information about each experiment [Gurman, 1986]: the experiment number, the date, start time (UT), and day-of-year of the observation, the duration in minutes, the spacecraft roll in degrees clockwise from north, the NOAA active region number or code, the radius vector of the center of the UVSP field of view in units of the solar radius, the position angle of the center of the UVSP raster pattern measured counterclockwise (eastward) from north, the x and y coordinates of the center of the UVSP raster pattern in arc seconds, the x and y step sizes in arc seconds, the x and y extents of the raster pattern in arc seconds, the slit set number [Woodgate *et al.*, 1980], the detector(s) used, the approximate wavelength in Angstroms of the first detector listed, the wavelength drive step size in motor steps (about 5 mA second order), the number of wavelengths sampled, the polarimeter position (A, B or OUT), the number of polarimeter positions, the loop order (explained below), the wavelength drive calibration shift, the number of repetitions of the outmost active loop started, the detector gating time in seconds, the reformatting status (P for playback, F for final data, B for both), the number of logical records in the data file, the experiment type [Henze, 1979], and the experiment definition name.

The nesting or loop order for the instrument mechanisms are given as a four letter code. X and Y refer to rastering in the X (south to north) and Y (west to east) directions, P to the rotation of the polarimeter, and W to the stepping of the wavelength drive. The innermost loop is given first, and then in order outward. For instance, if the order were WXYP then the instrument would step through wavelength at each X and Y position before stepping to the next pixel position, while if the order were XYWP then the instrument would step through every X and Y position at each wavelength position before stepping to the next wavelength position. All mechanisms are listed even if some or all are unused. The unused mechanisms are listed last, and the default order is XYPW.

The USEARCH program was used to make a list of all observations taken UVSP instrument showing mass motions in solar prominences and filaments. This list pointed to some several thousand experiments in total. These data were then

analyzed to determine when significant changes in pointing were done, so as to reduce the list to a more manageable size. Once this was done, the list of pointings was compared to the H-alpha synoptic charts published in the Solar--Geophysical Data prompt reports. Although this sort of comparison is crude, as conditions on the sun will change over the period of one Carrington rotation, it is still possible to get some idea of the probability of finding a filament in many of the particular pointing sets. However, it was not judged possible to accurately determine if a limb observation would show a prominence based on the synoptic charts.

The data are organized into three tables in a seperate document [Thompson, 1986]. The first table presents the data for all UVSP dopplergram experiments. Table 2 presents the raster through the line (RTL) experiments and table 3 presents the profile matrix (PM) experiments. The RTL experiments differ from the PM experiments in that in the latter a scan through wavelength is made at each pixel position before moving to the next pixel, while in the RTL mode a complete image is made in each wavelength before moving to the next wavelength. Included in the tables is a numerical code for each pointing set which represents the judged probability of finding a filament in the field of view, where 0 represents "probably not", 1 represents "possibly", 2 represents "probably", and 3 represents a limb observation. Only the first two tables were distributed at the meeting. Contact me for a copy of this document.

REFERENCES

Gurman, J., UVSP catalog description. (1986), unpublished.

Henze, W., The Ultraviolet Spectrometer and Polarimeter experiment on the Solar Maximum Mission: A general description. (1979), unpublished.

Solar-Geophysical Data, 428-490 Part I, April 1980 to June 1985, U. S. Department of Commerce (Boulder, Colorado, U.S.A. 80303)

Thompson, W.T., A comprehensive list of UVSP experiments showing mass motion. (1986), unpublished.

Woodgate, B.E. *et al.*, The Ultraviolet Spectrometer and Polarimeter on the Solar Maximum Mission. (1980), Solar Physics 65, 73.

Table 1. UVSP experiment types. (Reproduced from Henze, 1979).

NUMBER	NAME	EXPLANATION
1	SPECTROHELIOGRAM	Raster
2	DOPPLERGRAM	Raster with velocity slits, periodic recentering of lines, and wavelength offsets to calibrate
3	POLARGRAM	Raster using polarimeter
4	MAGNETOGRAM	Raster with velocity slits and polarimeter, periodic recentering of lines, and wavelength offsets to calibrate.
5	I-MAX	Performs raster and finds position of maximum intensity.
6	I-MIN	Performs raster and finds position of minimum intensity.
7	FLASH WATCH	Repeats rasters until maximum intensity exceeds threshold.
8	RED-MAX	Performs Dopplergram raster and finds position of maximum redshift of line (maximum velocity away from spacecraft).
9	BLUE-MAX	Performs Dopplergram raster and finds position of maximum blue shift of line (maximum velocity toward spacecraft).
10	SPECTROGRAM	Spectral scan.
11	LAMBDA-MAX(GLOBAL)*	Performs spectral scan and finds wavelength at which intensity is maximum.
12	LAMBDA-MAX(LOCAL)*	
13	LAMBDA-MIN(GLOBAL)*	Performs spectral scan and finds wavelength at which intensity is minimum.
14	LAMBDA-MIN(LOCAL)*	
15	SPECIAL	Anything, parameter block completely specified by experimenter.
16	PROFILE MATRIX	Raster of spectrograms over a single line profile with raster step changes after complete profile is observed.
17	MULTI-LINE PROFILE MATRIX	Raster of spectrograms over several line profiles; after all line profiles are scanned at one position, then raster step changes.
18	RASTER THROUGH THE LINE	Set of rasters at different wavelengths in line profile; after raster is completed at one wavelength, then wavelength drive steps to new wavelength.
19	POLARIZED PROFILE MATRIX	Same as No. 16 except using polarimeter.
20	POLARIZED MULTI-LINE PROFILE MATRIX	Same as No. 17 except using polarimeter.
21	POLARIZED RASTER THROUGH THE LINE	Same as No. 18 except using polarimeter.

*if global, then the wavelength is stored in a wavelength register and the previous value is destroyed. If local, then the previous value in the wavelength register is not destroyed.

Figure 1. USEARCH sample session without the extended search menu.

```
$ usearch
 CATALOG SEARCH AND PRINTOUT:
For DISK FILE instead of spooling, enter D                d
Printer format [V for Versatec or Printronix,
                L for LaserGrafix;  default = V]
Inhibit space between orbits in output? [Y,N]
Extended search menu? [Y,N]

Answer any of the following:  (Defaults are ALL possibilities
     except for experiment nos. or DOYs.)

Experiment Nos.:  First,Last
Enter DOY limits & Year [DOY1,DOY2,YR]
Must specify experiment number or DOY range.  Try again.

Experiment Nos.:  First,Last                              1,100
Experiment Name, or part of    [e.g.,C4CON]

Hope you made no mistakes!    Do you want to try again?  [Y/N]
More?  [Y/N]

 Output to Disk File  PRNTR.LIS --     97 EXPS.
$
```

Figure 2. USEARCH sample session with the extended search menu.

```
$ usearch
 CATALOG SEARCH AND PRINTOUT:
For DISK FILE instead of spooling, enter D                d
Printer format [V for Versatec or Printronix,
                L for LaserGrafix;  default = V]
Inhibit space between orbits in output? [Y,N]
Extended search menu? [Y,N]                               y

Answer any of the following:  (Defaults are ALL possibilities
     except for experiment nos. or DOYs.)

Experiment Nos.:  First,Last                              1,100
Experiment Name, or part of    [e.g.,C4CON]
File type (exps. after 16800): 1=PB, 2=FD, 3=both
Wavelength limits in Angstroms (Integers)
Slit No.
Detector No.  (more than one entry will
    search for a combination of detectors)
Experiment Type No.
Polarimeter  A, B, or 0 for OUT
Lower, upper limits on radial distance from sun center
Image size in pixels  [NX,NY]
Resolution desired in arcsec/pixel  [DX,DY]
Lower limit on Duration in minutes
NOAA Active Region No. or Code:
 (1=Sun Center, 2=Coalignment, 3=Star, 4=Coronal Hole,
 5=Filament, 6=Limb, 7=Bright Point, 8=Prominence,
 9=Door Closed, 10=Night, 11=N or S Pole,
 12=Plage, 13=Quiet Sun, 14=Sun Center with Tracking)
Spectra only (including PM's and RL's)?  [Y/N]

Hope you made no mistakes!    Do you want to try again?  [Y/N]
More?  [Y/N]

 Output to Disk File  PRNTR.LIS --     97 EXPS.
$
```