

# IUE Image Processing News

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November 13, 1991

## 1. The Status of IUESIPS

As our IUE users are probably aware, the IUE Project has been working hard on creating the "IUE Final Archive". This archive will utilize new processing and extraction techniques, improved calibrations, and enhanced data bases to provide a significantly improved archive of IUE data. In addition, the data will be stored in FITS format onto optical disks.

Most work on improving the processing of IUE data has gone into the new system, so few changes are being made into the current software known as IUESIPS. Of course, we will continue to update calibrations and fix major errors, if any are found. There are several known small errors and limitations to the current system that are not being corrected, so that efforts can be devoted to the timely development of the final archive system. Some such items are noted below.

The IUE Image Processing Center (IPC) will continue to use IUESIPS for some time. The new image processing system, known as NEWSIPS, will be used initially to reprocess all the archival low dispersion data. We hope to start this in January. Once that is completed, about a year from now, we will start processing all new low dispersion data with NEWSIPS.

For a time, we will be processing new images obtained with the satellite with NEWSIPS for low dispersion and IUESIPS for high dispersion. Once the NEWSIPS high dispersion software and calibrations are ready, they will be used to reprocess archival images and, at some point, new images. So in about two years or so, we expect to be processing all images with NEWSIPS; IUESIPS will be completely phased out.

For more information on IUESIPS, NEWSIPS, or the phase over, please contact Image Processing Resident Astronomer Tom Meylan (301-794-1471, IUEGTC::MEYLAN) or IPC Manager Cathy Imhoff (301-794-1470, IUEGTC::IMHOFF).

## 2. Updated Wavelength Calibration

A new wavelength calibration based on all platinum lamp data taken through June 1991 has been created. This is described in an article by Matt Garhart in this newsletter. It is anticipated that the new calibration will be implemented into

IUESIPS in the near future.

### 3. No More CalComps

CalComp plots of IUE data were once a standard data product sent to all IUE Guest Observers. Their usefulness has declined, so for the past several years CalComp plots have been available only on special request. Since none have been requested for some time, these data products have been dropped and are no longer available.

### 4. A Problem with the Velocity Correction for Satellite Motion

Processing of high dispersion data includes a heliocentric velocity correction, incorporating corrections for earth and spacecraft motion to the wavelength scale. The program that performs this correction is VELSAT, which for many years has utilized a "hard-coded" set of spacecraft orbital parameters from 1979. Unfortunately these out-of-date parameters have made the correction for spacecraft motion incorrect.

Tests of the module VELSAT have recently been completed to determine the accuracy of the current spacecraft velocity corrections. The orbital elements are known to drift with time due to tidal interactions with the Sun and the Moon, and are also altered as a result of  $\Delta V$  maneuvers.

It has been determined that the hard-coded 1979 elements produce a "random" correction, adding an uncertainty of  $\pm 3 - 4 \text{ km s}^{-1}$  in the final velocity determined for the spacecraft. Reasonably accurate corrections can be obtained for spacecraft motion if one uses orbital elements within a month from the time of observation, excluding any intervening  $\Delta V$  maneuvers. Orbital elements are determined for the spacecraft every two weeks, so in principle the velocity corrections for any image could be made using an element set no more than 7 days from an image observation date for archival images and 14 days for new images.

The current scheme for calculating spacecraft motion will not be changed in IUESIPS. However, the list of orbital elements and  $\Delta V$ s since launch has been compiled and is being maintained for use in determining the spacecraft motion in the final archive processing system.

If you are interested in obtaining the best possible velocity scale for your high dispersion images, you may wish to correct your data. The spacecraft velocity correction ("IUE Velocity") applied to the data is listed in the processing portion of the image header (see Figure 1; also Figure 9-3 in Turnrose and Thompson 1984, or Figure 7 in Grady and Taylor 1989). The IUE orbital elements are published in IUE Newsletter articles (see Fireman 1991 and references therein). A routine to

compute the correction, called IUEVEL, is now available at the RDAF.

## 5. Fixing Partial Read Images

The IUE Observatory has experimented with performing "partial reads" of the camera. For such an image, a rectangle enclosing the low dispersion spectrum is read down instead of the entire 768 x 768 image (this is described in Turnrose and Thompson 1984, pg. 3-7). In principle this could save some observing time, but the long-term impact on the camera is unknown. Thus this has not become a standard procedure in use at GSFC. A partial read image is embedded into a 768 by 768 array before processing and archiving.

A discrepancy has been uncovered between the documented and actual line and sample locations for partial read images. It appears that this has been present for some time, perhaps since partial reads were first performed. The effect of this discrepancy is that the partial image may be embedded into a 768 x 768 array incorrectly. The quality of the processed data would be affected, since the incorrect ITF would be applied to each pixel, and the data may appear noisier than usual.

The discrepancy occurs between the commanded initial line and sample addresses (ILA and ISA) sent to the spacecraft and what the cameras actually do. This arises because the addresses required by the cameras contain 10 bits, but the commands being sent to the spacecraft are only 8 bits. The camera sets the two least significant bits to 1's. Thus, depending on the exact values that have been commanded, the actual ILA and ISA may be from 0 to 3, greater than the original values. The commanded and actual ILA and ISA for each camera are given in Table 1. Documentation up to this point has given only the commanded values which, as we have noted, are off by a couple of pixels.

Table 1: Commanded and Actual Initial Line and Sample Addresses

Camera	Commanded		Actual		Act - Comm	
	ISA	ILA	ISA	ILA	ISA	ILA
LWP	865	797	867	799	2	2
LWR	773	823	775	823	2	0
SWP	863	860	863	863	0	3
SWR	721	761	723	763	2	2

NASA has taken a few partial read images, most of them under the calibration program PHCAL. The Image Processing Center is currently retrieving these images

and checking them for this error. Images which have been embedded into the full image incorrectly are re-embedded and reprocessed.

VILSPA has taken a few hundred partial read images on various science programs, so such images may be encountered in the IUE archives. You can check for partial read images by looking for the message READ followed by WEIRD in the image header round robin (see Figure 3; see also VanSteenberg 1989 for an excellent description of the round robin). Depending on when the image was processed, there may be a note in the processing portion of the image header that lists a program called INSERT (Figure 3). You can check that the parameters are correct or not by comparing them to those given in Table 2 (in this example, the image was embedded using the original, incorrect values).

The problem can be fixed by reprocessing, *but be sure to let us know that the image was a partial read image that must be fixed.*

Table 2: Original and Corrected IUESIPS Partial Read Parameters

Camera	Original		Corrected		Number of Lines	Number of Samples
	StLine	StSamp	StLine	StSamp		
LWP	99	31	97	29	528	576
LWR	73	123	73	121	528	624
SWP	36	33	33	33	528	528
SWR	135	175	133	173	480	576

We note that the Telescope Operations group has changed the spacecraft commanding software so that the commanded ILA and ISA values now agree with the actual values.

## 6. Reprocessing Requests: Why and How

Numerous improvements have been made in the IUE Spectral Image Processing System and calibrations over the years. The current IUE archive is rather heterogeneous since the handling of the data depends on when the data were processed. Thus it is frequently desirable to reprocess older images with the current IUESIPS system. Reprocessed data are not only treated with software which reflects the best current understanding of the instrumental effects contained in the data, but also provides to the investigator the most uniform data set possible. Below is a list of major IUESIPS software changes and implementation dates, which you can consult to see if your data sets might benefit from reprocessing. Please check the IUE Merged Log for the most recent processing date for your images.

- SWP ITF error - produces incorrect fluxes, especially for low backgrounds and underexposed spectra (note that the high dispersion data were reprocessed but some affected low dispersion data are still in the archives) - corrected for data processed after 7 July 1979 at GSFC and 7 Aug 1979 at VILSPA.
- "New software" for low dispersion data - improved geometric sampling, doubled spectral extraction frequency - implemented 4 Nov 1980 GSFC and 10 Mar 1981 VILSPA.
- Improved wavelength calibrations for high dispersion - corrects for time and temperature effects - implemented 19 May 1981 GSFC and 11 Mar 1982 VILSPA.
- "New software" for high dispersion data - improved geometric sampling, doubled spectral extraction frequency, better extraction of orders - implemented 10 Nov 1981 GSFC and 11 Mar 1982 VILSPA.
- Extended line-by-line file for low dispersion - improved spatial resolution perpendicular to dispersion (see Munoz Peiro 1985) - implemented 1 Oct 1985 at GSFC and VILSPA.
- New LWP calibration - improved linearity, fluxes, and signal to noise - implemented 22 Dec 1987 at GSFC and VILSPA.
- Absolutely calibrated record for high dispersion - includes absolute fluxes for the first time (see Cassatella et al. 1990 and Martin 1990) - implemented 22 Dec 1987 at VILSPA and 30 Aug 1990 at GSFC.

Reprocessing can be requested in a number of ways. The standard way is to submit the list of required images on a request form (which can be found in NASA IUE Newsletter No. 39, page 43) to Dr. Donald K. West, Code 684, NASA Goddard Space Flight Center, Greenbelt, MD, 20771. A letter with the images clearly listed will suffice. Requests can also be submitted via e-mail to the Image Processing RA Tom Meylan. He will forward the list to Dr. West for approval prior to reprocessing. E-mail requests can be sent to Tom at IUEGTC::MEYLAN on SPAN.

Reprocessing will be performed using the original specifications (point source, trailed, or extended extraction, automatic or manual shift) given on the script unless the researcher requests otherwise.

Typically, reprocessing will not be done for images which have been processed since the implementation of the software listed above. Such requests will be forwarded to the National Space Science Data Center (NSSDC), where the data will be retrieved and sent to the requestor.

## 7. Special Requests

The Image Processing Center routinely handles a number of special requests. Many of these can be made when the data are obtained with the IUE satellite by consulting with the Resident Astronomer on duty and filling out the appropriate forms. Others require special approval by the IUE Operations Scientist, Dr. Don West. Following is a brief list of special requests that GOs may make.

*Please note that any special requests should be made at or before the time that the data are obtained with the satellite, so that the request is in hand when the data are processed. IUE images are usually processed within 24 hours of when they are transmitted to the ground. Late requests cause extra work and will be delayed as a result.*

- Priority processing - routinely granted if needed for quick RDAF use or so the GO can take their tapes home with them.
- RDAF access - a flag is set during processing so that the files can be transferred electronically to the RDAF.
- Duplicate data products - routinely granted for a collaborative exposure (started at VILSPA, read down at GSFC), to be sent to the VILSPA collaborator.
- Raw image photowrite - a film copy of the raw image, made by the IUE Hardcopy Facility.
- Tape density - 800 and 6250 bpi are available (default is 1600 bpi).
- Special processing - use of special techniques or calibrations, or processing data two ways (both high and low dispersion, for instance) - please contact Image Processing RA Tom Meylan.

## 8. Errors in the Label and the Label Appendage

The image header, which accompanies each IUE image, provides useful documentation of how the observation was obtained and the data processed (see Turnrose and Thompson, 1984, page 9-1). But IUE researchers know that there can be errors in the image header. This may occur due to computer crashes, software bugs, operator error, and other problems. When the data are processed by IUESIPS, the original header is untouched as much as possible to preserve the information. However some corrections are needed so that the data can be processed correctly.

In the past, the image processing operators have overwritten certain critical values in the header for processing. These parameters are the camera and image number listed in line 1 of the header, the read day and time in line 10, the program ID in line 36, and the object coordinates in line 37. Starting on November 10, 1988, at GSFC, corrections to the header have been made in a label appendage instead of overwriting the information in the original header. (An exception is the camera and image number information in line 1. Since this is the fundamental identifier of the image, it must still be corrected when necessary.)

VILSPA uses a label appendage consisting of three lines of information. Since it is primarily used in creating their observing log data base, it is generated for all images processed at VILSPA. This label appendage has been in use at VILSPA since May 15, 1983.

At GSFC, an additional appendage line (the "fourth line" of the appendage) is now used to list the corrected values for the camera, image number, program ID, coordinates, UVC voltage, and exposure time, plus a flag for wavelength calibration images. The GSFC appendage is always generated but not all of the values are filled in. If corrections are required, they are placed in the appendage instead of overwriting the original label values. (Not a bit confusing, is it?)

An example of a GSFC appendage is given in Figure 2. Note that all four lines of the appendage are used, but only specific values are filled in for the first three lines (the "VILSPA" part) of the appendage. An example of the VILSPA appendage is given in Figure 3. In this case, the standard VILSPA three-line appendage is listed, followed by the partial read processing message, then followed by the NASA four-line appendage (i.e. this is a VILSPA image which was reprocessed at GSFC).

The formats of the VILSPA appendage lines are given in Table 3, while GSFC's appendage line format is given in Table 4. Fields which have been reserved but not currently in use are listed in parentheses, with a note that blanks or zeroes are entered. Decimal points are implied; a format listing of NN NN indicates that the four bytes should be read as NN.NN. All times are UT.

Note that the comments typed in by the Telescope Operator in lines 3 through 9 of the image header are not corrected. The round robin entries, which are generated automatically by the command computer, are also left untouched. Instead, every effort is made to correct the values in the IUE Merged Log.

It is prudent for any researcher to check the Merged Log and header information (TO comments, round robin, and appendage) for discrepancies. If you have difficulty assessing an image with contradictory information, please contact the IPC Manager,

Cathy Imhoff, for assistance (phone 301-794-1470, IUEGTC::IMHOFF).

We note that a major effort involved in the creation of the IUE final archive is to create an enhanced and corrected data base of observing log information. This new data base is described by Levay (1990). The data base is being created by comparison of data base, header, and script information for each image and should provide the definitive catalog of IUE observations.



Table 3: Format of the VILSPA Processing Appendage

Line	Byte	Description and Format
1	1-6	Observation date (YYMMDD)
1	7-8	Observation hour (from expo start time)
1	9	Camera number (LWP = 1, LWR = 2, SWP = 3)
1	10-14	Image sequence number (NNNNN)
1	15-16	Apertures (L, S, LS, SL)
1	17	Dispersion (H or L)
1	18	Large aperture status (O or C)
1	19	Exposure mode (T, M, or blank)
1	20	Reprocessing number (N)
1	21-26	Processing date (YYMMDD)
1	27-32	Release date (YYMMDD)
1	33-38	Expo start time (small aper) (HHMMSS)
1	39-44	Expo duration (small aper) (MMMMSS)
1	45-50	Expo start time (large aper) (HHMMSS)
1	51-56	Expo duration (large aper) (MMMMSS)
1	57-59	Expo classification code - em, cont, bck (NNN)
1	60	Observing station (G or V)
1	61	(Released) blank
1	62	(Expo duration 0.1 sec (small aper)) blank
1	63	(Expo duration 0.1 sec (large aper)) blank
1	64	(Spare) blank

Line	Byte	Description and Format
2	1-5	Program ID (NNNNN)
2	6	Processing station (G or V)
2	7-16	Object ID
2	17-26	(Homogeneous object ID) blanks
2	27-28	Object type (NN)
2	29-35	Right ascension (HHMMSST)
2	36-41	Declination (DDMMSS)
2	42	Sign of declination (+, -, or blank)
2	43-47	THDA at expo time (NNN.N)
2	48-52	FES counts (NNNNN)
2	53-54	FES track mode (FU, FO, SU, SO, BO)
2	55	Camera number (same as line 1, byte 9)
2	56-58	(Spares) blanks
2	59	(UVC voltage (N)) blank
2	60-63	Magnitude (NN NN)
2	64	Sign of magnitude (+, -, or blank)

Line	Byte	Description and Format
3	1-14	Observer's name
3	15-20	(Archive tape ID) blank
3	21-26	(File start, file end) zeroes
3	27-32	(Sending date to VILSPA) zeroes
3	33-48	Archive comments
3	49-51	(No. of dearchivings) blanks
3	52-63	(Spares) blanks
3	64	(NASA update, add, or delete) blank

Table 4: Format of the GSFC Fourth Line of the Appendage

Line	Byte	Description and Format
4	1-5	Expo duration (small aper, seconds) (SSSSS)
4	6-16	Expo end time (small aper) (YYDDDHHMMSS)
4	17-21	Expo duration (large aper, seconds) (SSSSS)
4	22-32	Expo end time (large aper) (YYDDDHHMMSS)
4	33-43	Expo read time (YYDDHHMMSS)
4	44-48	Expo time in seconds (NNNNN)
4	49-51	THDA at read time (NN N)
4	52-54	UVC (negative kilovolts) (N NN)
4	55	Dispersion (L, H, B, N)
4	56	WAVECAL flag (W or blank)
4	57-64	(Spares) blanks

Figure 1: Spacecraft Velocity Correction in the Image Header

```

7162* 5*IUESOC * * 1 1 3612048 1 2 013029862 * 1 C
SWP 29862, HD 207757, 180 MIN EXPO, HI DISP, LG APERTURE * * * * * * * 2 C
                                                                3 C
                                                                4 C
                                                                5 C
  
```

(lines 6 - 100 omitted for clarity)

```

***** SCHEME NAME: T3HLAC ***** C
PCF C/** DATA REC. 11 1 1 1 768 8448 5 3 6.1 5.0 2536 .00000 1PC
      0      1684      3374      6873      9091      10586 1PC
      14371      17745      21524      25105      28500 1PC
      11.000      11.000      11.000      11.000      11.000      11.000 1PC
      11.000      11.000      11.000      11.000      11.000 1PC
TUBE 3 SEC EHT 6.1 ITT EHT 5.0 WAVELENGTH 2536 DIFFUSER 0 1PC
      C      MODE : FACTOR .178E 00 1PC
*PHOTOM 09:13Z DEC 15,'86 HC
***** DATA FROM LARGE APERTURE ***** C
*SPECHI 09:13Z DEC 15,'86 HC
MEAN RESEAU (GMT= 78.085-79.334 NO. FF= 18 SIGS= .134 SIGL= .138 PX) C
MEAN DC (GMT= 78.255-84.071 NO. WLC= 109 SIGS= .194 SIGL= .199 PX) C
B 1= -.719029118361D 04 B 2= -.118088148540D 00 B 3= .122190460579D-05C
B 4= -.616481339450D-01 B 5= .395292033513D 00 B 6= .466504000485D-06C
B 7= -.146667898932D-06 B 8= .000000000000D 00 B 9= .000000000000D 00C
A 1= .508468374079D 03 A 2= -.171244122517D 00 A 3= .127037173381D-05C
A 4= .240003700983D 00 A 5= -.450183187876D 00 A 6= -.171000192492D-05C
A 7= -.122934374286D-06 A 8= .000000000000D 00 A 9= .000000000000D 00C
THDA FOR RESEAU MOTION = 11.51 C
THDA FOR SPECTRUM MOTION = 11.84 C
THERMAL SHIFTS: LINE = 1.631 SAMPLE = 1.270 C
REGISTRATION SHIFTS: LINE = -.445 SAMPLE = .567 AUTO C
***** EXTRACTED SPECTRUM FOR POINT SOURCE ***** C
*SORTHI 09:13Z DEC 15,'86 C
RIPPLE CONSTANTS: K= 138827.0-27.430*M +.1659*M**2 A= .856 C
OBSERVATION DATE(GMT): YR=86 DAY=346 HR=21 MIN=48, (JD): 2446777.4083 C
TARGET COORD, (1950): RT. ASC.=21 48 36.1 DECL.= 12 23 26 C
IUE VELOCITY (KM/S): VX= 1.4 VY= 2.0 VZ= -.9 C
EARTH VELOCITY (KM/S): VX=-29.9 VY= 4.4 VZ= 1.9 C
NET VELOCITY CORRECTION TO HELIOCENTRIC COORD.=-26.6 C
*VBLK* 10:10 DEC 15,'86 L
  
```

Figure 2: Example of GSFC Four-Line Appendage

```

      895 89500072048  1 1 011114953  #101      1 C
8408* 7*IUESOC * * * 9300* * * * * * * * * * 2 C
LWP 14953, SN 1989B, 155 MIN EXPO, LO DISP, LARGE APERTURE 3 C
                                                    4 C
                                                    5 C

```

(lines 6 - 100 omitted for clarity)

```

89 2 104114953L                                015500  G      1APC
STKRKGO*SN 1989B                               1117373131645+00122      2APC
  SONNEBÖRN                                     3APC
      9300 89 3204493089 3204524417370125000L      4APC
PCF C/** DATA REC. 12 1  1  1 768 9216 5 1  6.1  4.5 2536  .00000 1PC
      0      2723      5429      8145      10955      13640  1PC
      16336      19235      23198      27397      33186      38389  1PC
      17.000      17.000      17.000      17.000      17.000      17.000  1PC
      17.000      17.000      17.000      17.000      17.000      17.000  1PC
TUBE  1 SEC EHT  6.1 ITT EHT  5.0 WAVELENGTH 2536 DIFFUSER 0      1PC
  C      MODE : FACTOR  0.283E+00      1PC
*PHOPERPHOCOR  08:45Z FEB 01,'89      HC
***** SCHEME NAME:  T1LLMC *****      C
*ESL PERFLUXEXT  08:45Z FEB 01,'89      HC
OBSERVATION DATE(GMT): YR=89 DAY= 32 HR= 3 MIN=32, (JD): 2447558.6472  C
TARGET COORD (1950) : RT. ASC.=11 17 37.3 DECL.= 13 16 45      C
OPTIONS :HT= 9, HBACK= 5, DISTANCE= 11.0, OMEGA= 83.0      C
MEAN RESEAU (GMT= 84.011-84.166 NO. FF= 73 SIGS= .184 SIGL= .208 PX) C
MEAN DC (GMT= 80.168-87.222 NO. WLC= 125 SIGS= .260 SIGL= .410 PX) C
B 1=-0.252730517821D+03 B 2= 0.246481783752D+00 B 3= 0.00000000000D+00C
A 1= 0.106695028675D+04 A 2=-0.286800112370D+00 A 3= 0.00000000000D+00C
THDA FOR RESEAU MOTION = 12.51      C
DN FOR RESEAU MOTION = 63 ( 61, 56, 63, 64)      C
THDA FOR SPECTRUM MOTION = 12.18      C
THERMAL SHIFTS:  LINE = 1.143  SAMPLE = 0.289      C
REGISTRATION SHIFTS:  LINE = 0.000  SAMPLE = 0.000  MANUAL      C
*ESL MERGESPECT  08:45Z FEB 01,'89      HC
***MERGED SPECTRA- GROSS, BACKGROUND, NET, & ABS. CALIB. NET      C
***** DATA FROM LARGE APERTURE *****      C
*GOT_FMTOUTTAPE/GOT_MASKCON 08:45Z FEB 01,'89      HL

```

Figure 3: Example of Partial Read and VILSPA Three-Line Appendage

```

0001000100072048 1 1 023133897 +109 1 C
99* 6*10JUL-1 * * * 36* * * * * * * * * * 2 C
BD+28 4211,SWP33897,LRES,LAP,OM26S,22:12:58 3 C
880710,SPREP,MAXG,LOREAD,PHCAL,GILMOZZI 4 C
16,190,FO,11.2 5 C
PREAD 6 C
7 C
8 C
9 C
88192225843* 10 * 218 * *225928 SCAN READLO SS 1 G3 44 * 10 C
221137 FES CTS 190 0 0 1024 *225942 X 60 Y 76 G1 82 HT 105 * 11 C
221201 TARGET IN SWLA *225947 WEIRD 863 860 528 528 * 12 C
221260 EXPOBC 3 0 26 MAXG NOL *225941 * 13 C
221345 FIN 3 T 35 S 97 U 109 *225946 * 14 C
221453 TARGET FROM SWLA *203924 FIN 1 T 14 S 97 U 108 * 15 C
221605 TARGET IN LWLA *204018 TARGET FROM LWLA * 16 C
221701 EXPOBC 1 0 50 MAXG NOL *204440 S/C MANEUVERING * 17 C
221801 FIN 1 T 49 S 97 U 108 *204801 TLM,LWPROM * 18 C
221835 TARGET FROM LWLA *205052 READ 1 IMAGE 13611 * 19 C
222007 TLM,LWPROM *205131 SCAN READLO SS 1 G3 47 * 20 C
222031 READPREP 1 IMAGE 13612 *205146 X 53 Y 71 G1 97 HT 106 * 21 C
222102 SCAN READLO SS 1 G3 47 *205150 WEIRD 865 797 576 528 * 22 C
222116 X 53 Y 71 G1 97 HT 106 *210239 SPREP 1 * 23 C
224447 TLM,FES2ROM *211724 TLM,FES2ROM * 24 C
224709 FES CTS 189 0 0 1024 *212625 FESIMAGE 0 0 113 * 25 C
224740 TARGET IN LWLA *213629 FESIMAGE 0 0 113 * 26 C
224848 EXPOBC 1 2 0 MAXG NOL *214044 TLM,SWPROM * 27 C
225049 FIN 1 T 119 S 97 U 108 *214110 READPREP 3 IMAGE 33896 * 28 C
225124 TARGET FROM LWLA *214142 SCAN READLO SS 1 G3 44 * 29 C
225614 S/C MANEUVERING *214158 X 60 Y 76 G1 82 HT 105 * 30 C
225660 TLM,SWPROM *220539 STOP 3 EMERGENCY * 31 C
225851 READ 3 IMAGE 33897 *220745 TLM,FES2ROM * 32 C

```

(lines 33 - 100 omitted for clarity)

88071022333897L LO 08807118902010000000000221258000026500V 1APC  
 PHCALVBD+28 4211 162148560283734 11.200190F03 1083 2APC  
 GILMOZZI 000000000000 3APC  
 \*INSERT 14:41Z JUL 11,'88 HC  
 \*\*\*\*\* PARTIAL READ: LINES = 528, SAMPLES = 528 \*\*\*\*\* C  
 \*\*\*\*\* POSITIONED AT: LINE = 36, SAMPLE = 33 \*\*\*\*\* C  
 \*\*\*\*\* RAW IMAGE \*\*\*\*\* C  
 \*ARCHIVE 14:41Z JUL 11,'88 HC  
 88123122333897L 000036 V 1APC  
 PHCALGH\* 3360 2148560283734+00115 2APC  
 VILSPA 3APC  
 88366 36 881922213458819222584380025112001L 4APC  
 PCF C/\*\* DATA REC. 12 1 1 1 768 9216 5 3 6.1 5.0 2536 .00000 1PC  
 0 1695 3498 5363 6766 8563 1PC  
 11484 14021 17531 20784 24393 29658 1PC  
 11.000 11.000 11.000 11.000 11.000 11.000 1PC  
 11.000 11.000 11.000 11.000 11.000 11.000 1PC  
 TUBE 3 SEC EHT 6.1 ITT EHT 5.0 WAVELENGTH 2536 DIFFUSER 0 1PC  
 C MODE : FACTOR 0.178E+00 1PC  
 \*PHOPERPHOCOR 15:07Z SEP 06,'90 HC  
 \*\*\*\*\* SCHEME NAME: T3LLMC \*\*\*\*\* C  
 \*ESL PERFLUXEXT 15:07Z SEP 06,'90 HC  
 OBSERVATION DATE(GMT): YR=88 DAY=192 HR=22 MIN=13, (JD): 2447353.4257 C  
 TARGET COORD (1950) : RT. ASC.=21 48 56.0 DECL.= 28 37 34 C  
 OPTIONS :HT= 9, HBACK= 5, DISTANCE= 11.0, OMEGA= 81.0 C  
 MEAN RESEAU (GMT= 78.085-79.334 NO. FF= 18 SIGS= .134 SIGL= .138 PX) C  
 MEAN DC (GMT= 78.274-87.222 NO. WLC= 181 SIGS= .270 SIGL= .260 PX) C  
 B 1=-0.280055912646D+03 B 2= 0.376147773808D+00 B 3= 0.00000000000D+00C  
 A 1= 0.970316480047D+03 A 2=-0.466607964246D+00 A 3= 0.00000000000D+00C  
 THDA FOR RESEAU MOTION = 11.18 C  
 THDA FOR SPECTRUM MOTION = 11.51 C  
 THERMAL SHIFTS: LINE = 0.257 SAMPLE = 1.491 C  
 REGISTRATION SHIFTS: LINE = 2.444 SAMPLE = 1.972 MANUAL C  
 \*ESL MERGESPECT 15:07Z SEP 06,'90 HC  
 \*\*\*MERGED SPECTRA- GROSS, BACKGROUND, NET, & ABS. CALIB. NET C  
 \*\*\*\*\* DATA FROM LARGE APERTURE \*\*\*\*\* C  
 \*GOT\_FMTOUTTAPE/GOT\_MASKCON 15:07Z SEP 06,'90 HL

## References

- Cassatella, A., Ponz, D., Selvelli, P. L., and Vogel, M. 1990, *NASA IUE Newsletter*, No. 41, pg. 155.
- Fireman, G. F. 1991, *NASA IUE Newsletter*, No. 45, pg. 13.
- Garhart, M. P. 1991, this newsletter.
- Grady, C. A., and Taylor, M. A. 1989, *NASA IUE Newsletter*, No. 39, pg. 1.
- Levay, K. 1990, *NASA IUE Newsletter*, No. 42, pg. 40.
- Martin, T. 1990, *NASA IUE Newsletter*, No. 41, pg. 147.
- Munoz Peiro, J.R. 1985, *NASA IUE Newsletter*, No. 27, pg. 27.
- Turnrose, B. E., and Thompson, R. W. 1984, *IUE Image Processing Information Manual*, Version 2.0, CSC/TM-84/6058.
- VanSteenberg, M. E. 1989, *NASA IUE Newsletter*, No. 40, pg. 37.