

Techniques of Reduction of IUE Data: Time History of IUESIPS Configurations - 1996 Supplement

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1 Introduction

This article contains the last updates to the "Techniques of Reduction of IUE Data: Time History of IUESIPS Configurations", as previously published in NASA IUE Newsletters No. 25 and No. 28. The "Time History" entries describe the modifications made to the IUE Spectral Image Processing System (IUESIPS) which affect the IUESIPS data products received by Guest Observers. This supplement covers IUESIPS modifications for the calendar years 1985 through 1995. Note that the changes described below do not pertain to data products produced by the New Spectral Image Processing System (i.e., NEWSIPS), which is being used to create the IUE Final Archive.

A summary of the configuration entries listed below was originally published in IUE Newsletter No. 50 (p. 22-26) by Martz & Imhoff. The numbering of these entries basically follows the summary by Martz & Imhoff with the following exceptions:

- A new configuration entry was added after number 129 regarding a shift in the location of the scheme name in the header label.
- Previous configuration entry 146 (incorrect calculation of upper wavelength limits in high dispersion) was combined with entry 147 since it is believed that the first error did not affect any processed data until after the second error occurred.
- Previous configuration entry 149 (incorrect numbering of records in MELO and ELBL files) was deleted since it is believed that the error was corrected before any images were processed.
- Previous configuration entry 154 (now entry 153) was modified to encompass more recent software changes.
- The last entry (new configuration entry 155) regarding the implementation of updated dispersion relations is new.

Although not described as configuration entries, production of two standard IUESIPS output products ended during this time period. Photowrite images were no longer available after May 9th, 1991, and Calcomp plots were not produced after November, 1991 (after several years of being

offered as a special request). Also not mentioned in the entries is the fact that the default tape density for standard GO tapes changed from 800 bpi to 1600 bpi (although both 800 bpi and 6250 bpi tapes were still available as options).

A useful summary and description of the final IUESIPS record zero entries by Imhoff & Meylan can be found in IUE Newsletter No. 50, p. 14-21. Additional information on the general status of IUESIPS processing over the years can be found in numerous IUE Newsletter articles, particularly those in the series titled "IUE Image Processing News" and an earlier series titled "IUE Data Reduction".

Users should be warned that the information contained in this article may not be 100% accurate. Many of the modifications described were made several years ago and most of the staff members responsible for the coding changes are no longer associated with the IUE project. In some cases, the authors made a "best guess" at the entries, particularly for the end dates and fraction of images affected.

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Configuration No.	Title
125.	Julian Date not recorded in header label or Record Zero.
126.	Label appendage does not show original exposure time value if that value was zero (exposure time not originally recorded).
127.	Truncated LWP ripple constants listed in header label.
128.	Declination values between 0 and -1 lack negative sign as listed in record zero and image processing history portion of label.
129.	Lost of spatial information in low dispersion line-by-line spectral file.
130.	Location of scheme name (as it appears in the header label) shifted by one character.
131.	Background slit height and distance incorrectly stored in record zero.
132.	Low dispersion bright spot flagging limited to 192 entries.
133.	Unnecessary extrapolation of ITF DN values possible.
134.	"Data from Small Aperture" message missing from header labels.
135.	No heliocentric time correction applied to Julian Date.
136.	Label appendage program stores exposure time incorrectly.
137.	Incorrect ripple correction algorithm used.
138.	Incorrect dates used for determining earliest valid label information.
139.	No THDA and DN correction for reseau motion.
140.	Incorrect high dispersion bright spot flagging.
141.	Incorrect test for " $x > 2.61$ " in ripple correction.
142.	Preliminary LWP ITF and absolute calibration used.
143.	Images processed on Sigma-9 rather than VAX 8350.
144.	Use of July 1878 - March 1984 mean dispersion constants and temperature and time corrections.
145.	Label appendage missing fourth line.
146.	Reversion of geometric correction to previous processing version.
147.	Data missing from LWR high dispersion orders 101-103.
148.	Correction of ping detection threshold for VAX IUESIPS.
149.	Less accurate ripple correction used for the SWP camera.
150.	Processing appendages missing or incomplete on image labels.
151.	No absolute calibration applied to high dispersion extracted spectra.
152.	Reversal of background slit offsets in ESH_XBACKFLX.
153.	Less accurate THDA temperatures used.
154.	Incorrect observation date calculation for VAX IUESIPS.
155.	Use of July 1878 - October 1987 mean dispersion constants and temperature and time corrections.

TITLE: Label appendage does not show original exposure time value if that value was zero (exposure time not originally recorded).

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All

Media: Tape, Labelprint

Dates: Begin 19 Oct. 1983 End 19:31 24 Apr. 1985 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: < 1 %

Estimated number of images affected: 10

PERTINENT DOCUMENTATION: GSFC PPMR 379; Configuration No. 110.

DESCRIPTION: In order to avoid obscuring the historical record while permitting corrections to be made to essential fields in the header label, an interim procedure was adopted which places the original erroneous values into an appendage at the end of the raw image header while correcting the values in the header label. During the affected period, however, the software did not include the exposure time if its erroneous value were zero. A zero exposure time value was used to indicate that there was no exposure time value listed in the original header.

MEANS OF IDENTIFYING AFFECTED DATA:

- No exposure time entry in raw image header appendage.
- Note: processed data was not affected.

TITLE: Truncated LWP ripple constants listed in header label.

DATA AFFECTED:

Camera: LWP **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape, Labelprint

Dates: Begin 15:50 17 Dec. 1984 End 12:40 29 Aug. 1985 (GSFC)
 Begin 13:00 10 June 1985 End 12:05 24 Apr. 1986 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 3000

PERTINENT DOCUMENTATION: GSFC PPMRs 383, 377.

DESCRIPTION: LWP high dispersion images processed during this period have labels which list the ripple constants with less precision than those used to correct the data. The formatting commands in the program POSTHI which were used to write the LWP ripple constants into the processing history portion of the image header label truncated the second term of the expression for "K". Only the labels were incorrect. The full precision of the coefficients was used from the implementation of PPMR 377 onward.

Affected labels have the following expression in the "RIPPLE CONSTANTS" line:

$$K = 230701.0 + 5.57 * M + .0000 * M ** 2.$$

The proper relation is

$$K = 230701.0 + 5.573 * M + .0000 * M ** 2.$$

MEANS OF IDENTIFYING AFFECTED DATA:

- Note: processed data not affected.
- Expression in the "RIPPLE CONSTANTS" line written as:

$$K = 230701.0 + 5.57 * M + .0000 * M ** 2.$$

TITLE: Declination values between 0 and -1 lack negative sign as listed in record zero and image processing history portion of label.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** Extracted Spectra

Media: Tape, Labelprint

Dates: Begin 4 Nov. 1980(low) End 00:00 01 Oct. 1985(low)(GSFC)
 10 Nov. 1981(high:LWR,SWP) 12:40 29 Aug. 1985(high)
 7 Jan. 1982(high:LWP)
 Begin 17 Apr. 1978 End 13:00 10 June 1985 (VILSPA)

Estimated fraction of processed images affected: < 1 %

Estimated number of images affected: 100

PERTINENT DOCUMENTATION: GSFC PPMR 381.

DESCRIPTION: The IUESIPS programs POSTHI and SPECLO (including its derivative ESPECL) as originally written did not make special allowance for targets with declinations in the range of -1 to 0. Since the degrees, minutes, and seconds are stored and output as separate variables, only the degree field retains the negative sign as extracted from line 37 of the image header. The software regards a negative zero as simply zero; consequently, no negative sign was written to the processing history portion of the header label nor to the declination field in data record zero if the target was in the aforementioned band. On the end dates, new versions of POSTHI and ESPECL were implemented which include the negative sign for such targets.

The declination fields in line 37 of the raw image indicate that the targets' declinations are in the proper range, but the declinations in the processing history portion of the extracted spectral file labels list them as positive (0 to 1).

MEANS OF IDENTIFYING AFFECTED DATA:

- No negative signs written to processing history portion of header label or

declination field in data record zero.

- Note: processing data is not affected.

TITLE: Lost of spatial information in low dispersion line-by-line spectral file.

DATA AFFECTED:

Camera: All **Dispersion:** Low **Processing:** Extracted Spectra

Media: Tape, Calcomp

Dates: Begin 3 Apr. 1978 End 00:00 01 Oct. 1985 (GSFC)
 Begin 17 Apr. 1978 End 01 Oct. 1985 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 22,000

PERTINENT DOCUMENTATION: GSFC PPMR 375; NASA IUE Newsletter No. 27, Aug 1985, p26-49.

DESCRIPTION: Adjacent "pseudo-orders" extracted by the low dispersion software were averaged in pairs to create the 55 pseudo-order line-by-line spectral (LBLS) data file. Studies by VILSPA personnel have shown that this averaging reduces the spatial resolution in a non-trivial way. At the end of the indicated period, program SPECLO was replaced by a derivative program, called ESPECL. The new program retains all 110 pseudo-orders for output to a file referred to as the "extended line-by-line" (ELBL). NASA IUE Newsletter No. 27 contains articles which describe the new software in detail.

As described in IUE Newsletter No. 27, studies indicated that the above changes produced slight changes (i.e., roughly 0.5 percent) in the extracted fluxes stored in the merged extracted spectral files.

MEANS OF IDENTIFYING AFFECTED DATA:

- A note at the end of header label specifies the file type as LBLS or ESSR.
- The size of the LBLS file is 166 records whereas the ELBL size is 331 records.

TITLE: Location of scheme name (as it appears in the header label) shifted by one character.

DATA AFFECTED:

Camera: All **Dispersion:** Low **Processing:** All but raw image

Media: Tape, Labelprint

Dates: Begin 30 June 1984 End 00:00 01 Oct. 1985 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 80 %

Estimated number of images affected: 3000

PERTINENT DOCUMENTATION: GSFC PPMRs 380, 373.

DESCRIPTION: A typographical error in the master scheme generator caused the scheme name (e.g. T1LSMC) as written in the header label to be shifted one space to the left. This error affected only single aperture low dispersion images. The shift can cause problems with software which extracts the scheme name from the header for analysis purposes. The spacing was corrected on the end date shown.

MEANS OF IDENTIFYING AFFECTED DATA:

- Scheme name is shifted one space to the left in the header label.
- Note: processed data not affected.

TITLE: Background slit height and distance incorrectly stored in record zero.

DATA AFFECTED:

Camera: All **Dispersion:** Low **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 3 Nov. 1980 End 00:00 1 Oct. 1985 (GSFC)
 Begin 10 Mar. 1981 End 1 Oct. 1985 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 22,000

PERTINENT DOCUMENTATION: IUE Image Processing Information Manual 2.0, p.8-19; GSFC PPMR 378.

DESCRIPTION: The background slit height and background distance from the dispersion recorded in record zero items 60 and 61, respectively, had been given in units of diagonal pixels. In the IUE Image Processing Information Manual it is indicated that these data are in units of pixels times 100. The changes implemented bring the record zero entries into conformity with the documentation. The data values stored in the extracted files were not affected.

MEANS OF IDENTIFYING AFFECTED DATA:

- Record zero items 60 and 61 given in units of diagonal pixels, typically values of 5 to 11.
- Note: spectral data was not affected .

TITLE: Low dispersion bright spot flagging limited to 192 entries.

DATA AFFECTED:

Camera: All **Dispersion:** Low **Processing:** All but Raw Image

Media: Tape

Dates: Begin 1 Oct. 1985 End 14:33 15 Nov. 1985 (GSFC)
 Begin 19 Oct. 1982 End 12:05 24 Apr. 1986 (VILSPA)

Estimated fraction of processed images affected: 1 %

Estimated number of images affected: 10

PERTINENT DOCUMENTATION: GSFC PPMR 387.

DESCRIPTION: In the rare case where the number of detected bright spots on a low dispersion image exceeds 192, ESPECL encounters a large number of read errors, and will not be able to flag all the bright spots. Apparently the BLIST file is closed after 192 bright spots are detected, so when ESPECL goes to read the file when there are more than 192 bright spots, read errors occur. The CALL CLOSE statement has now been moved to allow more than 192 bright spots to be flagged.

MEANS OF IDENTIFYING AFFECTED DATA:

- None, except epsilon arrays with 192 bright spot flags may be suspicious.

TITLE: Unnecessary extrapolation of ITF DN values possible.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All but Raw Image

Media: Tape, Photowrite

Dates: Begin 4 Nov. 1980(low) End 20:00 30 Jan. 1986 (GSFC)
 10 Nov. 1981(high:LWR,SWP)
 7 Jan. 1982(high:LWP)
 Begin 10 Mar. 1981 End 12:05 24 Apr. 1986 (VILSPA)

Estimated fraction of processed images affected: 10 %

Estimated number of images affected: 4500

PERTINENT DOCUMENTATION: GSFC PPMR 389.

DESCRIPTION: In some cases, PHOTOM appeared to perform unnecessary extrapolations from ITF DN values. Once an extrapolation had been made for one of the four ITF pixels used to transform the ITF values to raw image space, extrapolations would be performed for the remainder of the four ITF pixel values. PHOTOM was modified to extrapolate ITF values only when required.

MEANS OF IDENTIFYING AFFECTED DATA:

- None, except images with high DN values are more likely to have this problem.

TITLE: "Data from Small Aperture" message missing from header labels.

DATA AFFECTED:

Camera: All **Dispersion:** Low **Processing:** Extracted Spectra

Media: Tape, Labelprint

Dates: Begin 1 Oct. 1985 End 16:15 31 Jan. 1986 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 20 %

Estimated number of images affected: 200

PERTINENT DOCUMENTATION: GSFC PPMR 391.

DESCRIPTION: The history portion of header labels from small aperture extracted spectral files from double aperture images does not contain the line "Data From Small Aperture". This line was originally added to the history portion of the label to help distinguish small and large aperture spectral files. The VIPS master scheme generator was modified to restore this message.

MEANS OF IDENTIFYING AFFECTED DATA:

- "Data From Small Aperture" line missing in processing history portion of header labels.
- Spectral data was not affected.

TITLE: No heliocentric time correction applied to Julian Date.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** Extracted Spectra

Media: Tape, Labelprint

Dates: Begin 3 Apr. 1978 End 20:08 17 Mar. 1986 (GSFC)
 Begin 17 Apr. 1978 End 10:00 06 June 1986 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 72,000

PERTINENT DOCUMENTATION: GSFC PPMR 390; IUE Newsletter No. 31, p. 81, Sept. 1986.

DESCRIPTION: The Julian date contained in record zero is specified in the IUE satellites reference frame rather than a heliocentric reference frame. Programs POSTHI and ESPECL were subsequently modified to use subroutine TMCOR to calculate heliocentric time corrections to the Julian Date of observation and to output the corrections to entry 40 of record 0.

MEANS OF IDENTIFYING AFFECTED DATA:

- No heliocentric time corrections to Julian Date of observation in entry 40 of record 0.
- Spectral data was not affected.

TITLE: Label appendage program stores exposure time incorrectly.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All but Raw Image

Media: Tape, Labelprint

Dates: Begin Feb. 1983 End 17:58 08 May 1986 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 1 %

Estimated number of images affected: 200

PERTINENT DOCUMENTATION: GSFC PPMRs 398, 379

DESCRIPTION: When the program LABCOR stored the RA and DEC values in an appendage, the exposure time was written as EXPT=0 if no exposure time was entered as a parameter. LABCOR was changed to prevent the writing of EXPT to the appendage if only RA and DEC were intended. LABCOR was also modified to allow the TIME value of zero to be written to indicate a missing TIME entry.

MEANS OF IDENTIFYING AFFECTED DATA:

- EXPT=0 written in label appendage.

TITLE: Incorrect ripple correction algorithm used.

DATA AFFECTED:

Camera: All **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 27 Aug. 1982 End 13:32 20 May 1987 (GSFC)
 Begin 19 Oct. 1982 End 07:35 12 Aug. 1987 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 15,000

PERTINENT DOCUMENTATION: IUE Image Processing Manual 2.0, p.1-9; GSFC PPMRs 400, 308; IUE Newsletter No. 19, July 1982; Configuration No. 93; IUE Newsletter No. 33, p. 71-74, Sept. 1987.

DESCRIPTION: The ripple correction was incorrectly implemented and documented in the IUE Image Processing Manual Version 2.0. To follow the derivation in Ake (1981,1982), the denominator in the variable "x" should be the wavelength of the flux point being corrected, not the blaze wavelength (i.e., k divided by m). The subroutine RIPPLE was modified to correct the problem. The error in the ripple corrected fluxes was generally small but could be as much as 5% at the ends of the orders.

MEANS OF IDENTIFYING AFFECTED DATA:

- All high dispersion images processed between the end dates shown were affected.

TITLE: Incorrect dates used for determining earliest valid label information.

DATA AFFECTED:

Camera: All **Dispersion:** Low **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 1 Oct. 1985 End 14:24 29 May 1987 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: $\ll 1\%$

Estimated number of images affected: <10

PERTINENT DOCUMENTATION: GSFC PPMR 402.

DESCRIPTION: Header label information contained in the earliest IUE images is generally considered to be not valid. The actual cutoff dates depend on the time when upgrades to the IUE OCC software were installed both at Godard and at VILSPA. These dates are coded into programs TCCAL, POSTHI and ESPECL in terms of image sequence numbers. During the end dates shown, the numbers coded in the Goddard version of ESPECL referred to the VILSPA image numbers rather than Goddard image numbers. Since the VILSPA numbers were generally higher than the Goddard image numbers, valid label information may have been ignored for a few early images needing reprocessing. ESPECL has now been modified. The changes are as follows:

	Previous Values					Current Values			
	LWP	LWR	SWP	SWR		LWP	LWR	SWP	SWR
Obs. date	1181	4530	5262	1156	Obs. date	1179	4222	4906	1154
THDA	1181	4530	5262	1156	THDA	1179	4015	4625	1154
RA,DEC	1199	6680	7667	1157	RA,DEC	1194	6385	7397	1157

MEANS OF IDENTIFYING AFFECTED DATA:

- Only Goddard-processed images with image numbers less than the previous values but greater than the current values that were reprocessed between the end dates shown would be affected.

TITLE: No THDA and DN correction for reseau motion.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All but Raw Image

Media: Tape, Photowrite

Dates:	Begin	3 Mar. 1981(low)	End 14:00 13 Oct. 1987	(GSFC)
		19 May 1981(high)		
	Begin	N/A	End N/A	(VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 36,000

PERTINENT DOCUMENTATION: GSFC PPMRs 406, 407, 408, 409, and 418; Configuration No. 146.

DESCRIPTION: On the end date shown, TCCAL was modified to apply both a THDA and a second-order DN correction for reseau motion for the LWP, LWR and SWP cameras. Prior to this date, mean reseau positions were used for LWP and LWR cameras, and THDA-corrected mean positions were used for SWP.

Note that as described in Configuration 146, the IUE Three Agencies decided to remove the above corrections from production processing and replace them with the previously implemented mean reseau positions.

MEANS OF IDENTIFYING AFFECTED DATA:

- The image processing history portion of the header label describes the parameters used.

TITLE: Incorrect high dispersion bright spot flagging.

DATA AFFECTED:

Camera: All **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 10 Nov. 1981(LWR,SWP) End 14:00 13 Oct. 1987 (GSFC)
 7 Jan. 1982(LWP)
 Begin 11 Mar. 1982 End 21 Dec. 1987 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 27,000

PERTINENT DOCUMENTATION: GSFC PPMR 410.

DESCRIPTION: Bright spots were not properly flagged in high dispersion spectra. The problem was apparently caused by a misspelled parameter in subroutine GET of the application program SPECHI. The result was that the wrong pixels may have been flagged.

TITLE: Incorrect test for " $x > 2.61$ " in ripple correction.

DATA AFFECTED:

Camera: All **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 11 May 1978 End 13:38 01 Dec. 1987 (GSFC)
 Begin 12 Jan. 1978 End 22:00 22 May 1990 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 47,000

PERTINENT DOCUMENTATION: GSFC PPMR 405; SOCAR 119; IUE Newsletter No. 33, p. 71-74, Sept. 1987.

DESCRIPTION: The test for $x > 2.61$ was applied before x was multiplied by the term alpha in the subroutine RIPPLE. The test should be applied after x is multiplied by alpha to result in the proper truncation limit as defined in SOCAR 119. Since alpha is typically between 0.85 and 0.90, the result was that the ripple correction was not applied at wavelengths as far from the blaze wavelength as was intended.

TITLE: Preliminary LWP ITF and absolute calibration used.

DATA AFFECTED:

Camera: LWP **Dispersion:** Both **Processing:** All but Raw Image

Media: Tape, Photowrite

Dates: Begin 3 Nov. 1981 End 16:29 22 Dec. 1987 (GSFC)
 Begin 10 Mar. 1981 End 18:14 21 Dec. 1987 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 15,000

PERTINENT DOCUMENTATION: GSFC PPMRs 411, 412; NASA IUE Newsletter No. 35, p. 55, 205, 225.

DESCRIPTION: During the end dates shown, a preliminary LWP ITF file and inverse sensitivity function were used in production processing. The new LWP ITF was created using more images per ITF level and was found to produce improved signal-to-noise characteristics.

MEANS OF IDENTIFYING AFFECTED DATA:

- All LWP images processed before the end dates shown used the preliminary ITF file.

TITLE: Images processed on a Xerox Sigma-9 rather than a DEC VAX computer.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All

Media: Tape, Labelprint, Photowrite

Dates:	Begin	3 Apr. 1978	End	16 Feb. 1988	(GSFC)
	Begin	17 Apr. 1978	End	15 Mar. 1993	(VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 70,000

PERTINENT DOCUMENTATION: NASA IUE Newsletter No. 35, p. 108

DESCRIPTION: On the end-dates shown, processing of IUE data was moved from a Xerox Sigma-9 computer to a Digital Equipment Corporation VAX 8350 computer. The IUESIPS programs were converted from Fortran-IV to Fortran-77 and were executed within the Munich Image Data Analysis System (MIDAS) command language. Most of the program names were changed.

As described in the Newsletter article listed above, compatibility testing verified that although precision differences in the two computer systems produced small differences in the calculated values, the differences were not scientifically significant. Differences in individual data points were less than 0.5%.

MEANS OF IDENTIFYING AFFECTED DATA:

- The image processing portion of the header label will list the new program names instead of the old ones (i.e., PHOTOM, ESPECL, POSTLO and ARCHIVE are replaced with PHOPERPHOCOR, ESL_PERFLUXEXT, ESL_MERGEDSPECT, and GOT_FMTOUTTAPE).

TITLE: Use of July 1878 - March 1984 mean dispersion constants and temperature and time corrections.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** Extracted Spectra

Media: Tape, Photowrite

Dates: Begin 20 June 1984 End 23:00 01 Apr. 1988 (GSFC)
 Begin 17 Oct. 1984 End 14 Sep. 1988 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 35,000

PERTINENT DOCUMENTATION: GSFC PPMR 413; NASA IUE Newsletter No. 35, p. 108; Configurations 119, 120 (lwp).

DESCRIPTION: The July 1978 -March 1984 mean dispersion constants and temperature and time corrections were replaced on the end dates with a new set based on images obtained between July 1978 and October 1987. The time correction for the previous set was found to be out of date and resulted in low dispersion wavelength errors of up to 2-3 angstroms.

As of the end dates shown, new dispersion constant files were installed for all 3 cameras. The new temperature and time corrections more closely match the biweekly wavecal data. Tests with one SWP image show that the new dispersion relations remove the reported wavelength error. The new dispersion constants and correction coefficients are listed in IUE Newsletter 35.

MEANS OF IDENTIFYING AFFECTED DATA:

- The "MEAN DC" line in the image processing history portion of the extracted spectral file header label indicates the date range of the implemented dispersion relations. The new dispersion relations should show dates as listed in table 1 of the paper published in IUE Newsletter 35.

TITLE: Label appendage missing fourth line.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All

Media: Tape, Labelprint

Dates:	Begin	19 Oct. 1983	End	09 Nov. 1988	(GSFC)
	Begin	N/A	End	N/A	(VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 30,000

PERTINENT DOCUMENTATION: GSFC PPMR 416.

DESCRIPTION: A 4th line in the label appendage was created after the end date shown to contain corrected label information regarding the exposure end times and a flag indicating a wavelength calibration image. Incorrect label entries were being modified within the label itself. The label processing software was later modified to extract the needed information from the appendage. In this manner, corrections could be made without destroying the original label information.

MEANS OF IDENTIFYING AFFECTED DATA:

- Label appendage consists of 3 (rather than 4) lines.
- Note: processed data was not affected.

TITLE: Reversion of geometric correction to previous processing version.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All

Media: Tape, Photowrite

Dates:	Begin	13 Oct. 1987	End	22 Dec. 1988	(GSFC)
	Begin	N/A	End	N/A	(VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 7300

PERTINENT DOCUMENTATION: IUE Image Processing Information Manual 2.0, p.6-5; GSFC PPMRs 406-409, 418, Configuration No. 139.

DESCRIPTION: The version of TCCAL used at Goddard during the end dates shown which generated a reseau displacement file based on a THDA and 2nd-order DN correction to mean reseau positions was inadvertently implemented without the approval of the IUE Three-Agencies. As a result, the current version was replaced with the previous version which uses mean reseau positions as described in the IUE Image Processing Information Manual, Version 2.0.

MEANS OF IDENTIFYING AFFECTED DATA:

- Image Processing history portion of header label lists the DN values used to apply the DN correction to the mean reseau positions as implemented in the program TCCAL during the end dates shown.

TITLE: Data missing from LWR high dispersion orders 101-103.

DATA AFFECTED:

Camera: LWR **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 25 Feb. 1988 End 00:00 02 Feb. 1989 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 600

PERTINENT DOCUMENTATION: GSFC PPMRs 434, 435.

DESCRIPTION: An error was discovered in the Sigma-9 version of SPECHI involving the calculated upper wavelength limits used for extracting data from high dispersion images. The error however did not affect the extracted data since the hard-coded wavelength limits seemed to have compensated for the error. In most cases, the extracted wavelength region was determined by the edge of the target ring rather than the hard-coded wavelength limits. When the error was finally corrected however (i.e., during the VAX conversion at Goddard), it resulted in some data being truncated from LWR orders 101-103. The wavelength bounds for the LWR high dispersion extraction were subsequently modified as shown:

Order	Previous Cutoff	Current Cutoff
101	2308	2313
102	2280	2290
103	2263	2268

TITLE: Correction of ping detection threshold for VAX IUESIPS.

DATA AFFECTED:

Camera: LWR **Dispersion:** Low **Processing:** All but Raw Image

Media: Tape

Dates: Begin 16 Feb. 1988 End 00:30 24 Mar. 1989 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 780

PERTINENT DOCUMENTATION: GSFC PPMR 444.

DESCRIPTION: An error was discovered in the ping detection threshold used in the VAX version of the microphonics flagging software. The error was found to result in one less line being flagged when compared to the Sigma-9 version. The VAX software was subsequently corrected.

TITLE: Less accurate ripple correction used for the SWP camera.

DATA AFFECTED:

Camera: SWP **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 27 Aug. 1982 End 08 June 1989 (GSFC)
 Begin 15 Jan. 1988 End 22:00 22 May 1990 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 12,000

PERTINENT DOCUMENTATION: GSFC PPMR 423, NASA IUE Newsletter No. 37, p. 102; Configuration Nos. 137, 141.

DESCRIPTION: The Grady and Garhart (1988) parameterization of the ripple parameter K resulted in decreased order-to-order residuals compared to the previous implemented values of Ake (1982). The new parameterization (for the SWP camera only) implemented on the end dates shown is as follows:

$$K=137730.0 - 3.0644019*m + 0.0335206184*m**2$$

where m = order number.

TITLE: Processing appendages missing or incomplete on image labels.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** All but Raw Image

Media: Tape, Labelprint

Dates: Begin 16 Feb. 1988 End 22:50 07 Nov. 1989 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 11,000

PERTINENT DOCUMENTATION: GSFC PPMR 480; NASA IUE Newsletter No. 46, p6-15, Nov. 1991; Configuration No. 145.

DESCRIPTIONS: Header labels have been discovered to have missing or corrupted processing appendages. The problem has been corrected and the appendages are now complete.

MEANS OF IDENTIFYING AFFECTED DATA:

- Labels have missing or corrupted appendages.

TITLE: No absolute calibration applied to high dispersion extracted spectra.

DATA AFFECTED:

Camera: All **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 3 Apr. 1978 End 21:00 29 Aug. 1990 (GSFC)
 Begin 17 Apr. 1978 End 18:14 21 Dec. 1987 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 53,000

PERTINENT DOCUMENTATION: GSFC PPMR 450; NASA IUE Newsletter 41, p. 147 and p. 155; NASA IUE Newsletter No. 42, p. 91; ESA IUE Newsletter 31, p. 25.

DESCRIPTION: High dispersion spectral files produced during the above time period included gross, background, net, and ripple-corrected net fluxes for each extracted spectral order. An absolutely-calibrated net flux vector was added on the end-dates shown. A detailed description of the absolute calibration as approved by the IUE Three Agencies, and changes in the MEHI file format, are described in NASA IUE Newsletter 41.

MEANS OF IDENTIFYING AFFECTED DATA:

- Prior to the above end dates, MEHI files had one less record for each extracted spectral order. SWP MEHI files therefore had 361 rather than 421 records and LWP/LWR files had 325 rather than 379 records.

TITLE: Reversal of background slit offsets in ESH_XBACKFLX.

DATA AFFECTED:

Camera: All **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: **Begin** 10 Nov. 1981(LWR,SWP) **End** 00:30 9 Sep. 1991 (GSFC)
 7 Jan. 1982(LWP)

Begin 11 Mar. 1982 **End** 22:00 22 May 1990 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 40,000

PERTINENT DOCUMENTATION: GSFC PPMRs 430, 524, 526.

DESCRIPTION: The position of the background extraction slit is determined by SPECHI using offsets measured from the centers of the spectral orders. The offset distances to either side of the order are usually unequal. Apparently, the derived offsets were reversed resulting in possible systematic background extraction errors. This has been a long-standing error. Subroutine ESH_XBACKFLX was modified and the error corrected.

TITLE: Less accurate THDA temperatures used.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 03 Apr. 1978 End 14:47 25 Feb. 1994 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: < 1 %

Estimated number of images affected: 50

PERTINENT DOCUMENTATION: GSFC PPMRs 552, 550, 556, 564.

DESCRIPTION: The mean dispersion relations and the SWP geometrical correction are adjusted for small variations in the camera head amplifier temperature (i.e. THDA). These temperatures are normally extracted from the header label. For early images (i.e. prior to 1979), and history replay images which lack temperature information, the image processing software would default to mean THDA values. After the end date shown, software was implemented to allow the correct values to be manually entered.

MEANS OF IDENTIFYING AFFECTED DATA:

- A warning is printed in the processing history portion of the label when the software defaults to mean THDA values.

TITLE: Incorrect observation date calculation for VAX IUESIPS.

DATA AFFECTED:

Camera: All **Dispersion:** High **Processing:** Extracted Spectra

Media: Tape

Dates: Begin 10 Nov. 1988 End 15:19 14 Jan. 1993 (GSFC)
 Begin N/A End N/A (VILSPA)

Estimated fraction of processed images affected: 1 %

Estimated number of images affected: 30

PERTINENT DOCUMENTATION: GSFC PPMR 554; NASA IUE Newsletter No.46, p6-15, Nov. 1991.

DESCRIPTION: An error was discovered in the calculation of the observation date. The midpoint of observation was derived by subtracting half the exposure time from the observation end time. The processing software however was reading the exposure time stored in the label appendage as if it were right-justified instead of left-justified. The magnitude of the error would depend on the actual exposure time value. This error could also affect the heliocentric velocity correction applied to the wavelengths. The VAX software was subsequently corrected.

MEANS OF IDENTIFYING AFFECTED DATA:

- Only images with exposure times listed in line 4 of the label appendage and obtained between the end dates shown are affected. See the article in IUE Newsletter 46 for a description of the label appendage format.

TITLE: Use of July 1878 - October 1987 mean dispersion constants and temperature and time corrections.

DATA AFFECTED:

Camera: All **Dispersion:** Both **Processing:** Extracted Spectra

Media: Tape, Photowrite

Dates: Begin 01 Apr. 1988 End 18:58 10 June 1993 (GSFC)
 Begin 14 Sep. 1988 End 10 June 1993 (VILSPA)

Estimated fraction of processed images affected: 100 %

Estimated number of images affected: 40,000

PERTINENT DOCUMENTATION: GSFC PPMRs 558, 525, 507; NASA IUE Newsletter No. 51, p. 1-24, 43; Configuration No. 144.

DESCRIPTION: The July 1978 - October 1987 mean dispersion constants and temperature and time corrections were replaced on the end dates with a new set based on images obtained between July 1978 and April 1993. The time correction for the previous set was found to be out of date and resulted in low dispersion wavelength errors of 1.5 angstroms and high dispersion errors of 5.5 km/sec for LWR, and 16 km/sec for SWP, for spectra obtained in 1993. LWP errors were not calculated since a time correction was never implemented for this camera.

As of the end dates shown, new dispersion constant files were installed for all 3 cameras. The new temperature and time corrections more closely match the biweekly wavecal data. The new dispersion constants and correction coefficients are listed in IUE Newsletter 35. Tests indicated significant improvement in low dispersion wavelengths (on the order of 0.2 angstroms), but larger than expected errors in high dispersion. See Newsletter No. 51 for more information.

MEANS OF IDENTIFYING AFFECTED DATA:

- The "MEAN DC" line in the image processing history portion of the extracted spectral file header label indicated the date range of the implemented disper-

sion relations. The new dispersion relations should show dates as listed in table 1 of the paper published in Newsletter 51.