

CHRONOLOGY OF MODIFICATIONS TO IUESIPS OUTPUT PRODUCTS

The following table lists the most important of the modifications to the IUESIPS data reduction system which have had an effect on the output products delivered to the Guest Observer (G.O.). The changes made are listed in strict chronological order for GSFC and approximate chronological order for VILSPA. The table covers the period 5 April 1978 to 31 March 1981 and gives the effective dates at GSFC and VILSPA of each modification, along with a brief explanation of its nature. Those modifications that are not applicable to, or were not made at, an installation are indicated by a dash in the date column. A date entry may be left blank for any of the following three reasons:

- (i) the change has not been made, but may be made in the future;
- (ii) the modification concerns reduction of calibration images, which are not processed by VILSPA;
- (iii) for some changes prior to January 1979 the effective implementation date at VILSPA is not known.

Modifications made only at VILSPA are grouped together at the end of the table.

This table replaces an earlier version published in ESA IUE Newsletter No. 9 (January 1981) and NASA IUE Newsletter No. 12 (January 1981). The ground stations have agreed that it will in future be updated at six month intervals with closing dates of March 31 and September 30 in each year. The updates will be published in the Newsletters. Because of several minor errors and omissions in the earlier version, a corrected version is presented here in its entirety.

A considerably more detailed history of IUESIPS changes has been prepared as a separate document entitled "Techniques of Reduction of IUE Data: Time History of IUESIPS Configurations" It is anticipated that that document will be distributed in suitable form in the future.

D.F. Alderman

B.E. Turnrose

K.J.E. Northover

25 August 1981

Chronology of Modification to IUESIPS

Output Products (1 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
05 Apr 78 - 17 Apr 78	● Eliminate auto-scaling of net ripple-corrected CalComp plot (set $F_{MAX}=10^5$).
20 Apr 78 - 17 Apr 78	● Extend SWP low dispersion extraction to $\lambda=2000 \text{ \AA}$.
20 Apr 78 - 14 Jun 78	● Correct problem of corrupted data at ends of smoothed background spectra.
25 Apr 78 - 17 Apr 78	● Change F_{MAX} to 2×10^5 for net ripple-corrected plot.
26 Apr 78 - 14 Jun 78	● Correct problem in integer-scaling routine ITOE which caused certain large fluxes to be negative on tape due to rounding error.
04 May 78 - 14 Jun 78	● Add processing dates to CalComp plots.
08 May 78 - 14 Jun 78	● Eliminate "CUTMERGE" step from high dispersion processing.
10 May 78 - 14 Jun 78	● Eliminate plot of unsmoothed background in high dispersion.
11 May 78 - 14 Jun 78	● Limit ripple correction at ends of orders to factor of 15.8 in SWP and 17.2 in LWR.

Chronology of Modification to IUESIPS

Output Products (2 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
15 May 78 - 14 Jun 78	● Determine dispersion relations via new "WAVECAL2" (uses fractional pixel locations).
18 May 78 - 14 Jun 78	● Correct 1-pixel error in "OSCRIBE" overlay program.
22 May 78 - 14 Jun 78	● Use new averaged ITFs (contains SWP errors; see 7 July 1979).
22 May 78 - 14 Jun 78	● Use "EXTLOW" for low dispersion extraction instead of "COMPARE".
22 May 78 - 14 Jun 78	● Accomplish registration by shifting dispersion constants instead of image.
22 May 78 - 14 Jun 78	● Correct 2-pixel error in reseau flagging.
22 May 78 - 14 Jun 78	● Flag "saturated pixels" (DN=255) in plots, and change to plotting without lifting pen.
01 Jun 78 - 01 Feb 79	● Improve reseau flagging in smoothed spectra.
09 Jun 78 - 01 Feb 79	● Use reseaux measured on low dispersion image for both low and high dispersion wavelength calibrations (SWP).

Chronology of Modification to IUESIPS

Output Products (3 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
16 Jun 78 - 25 Jan 79	● Delete 55-line image segment from photowrites (low dispersion).
20 Jun 78 - 25 Jan 79	● Produce one doubly-oscribed photowrite image for the double-aperture case, instead of 2 singly-oscribed images.
20 Jun 78 - 25 Jan 79	● Change LWR high dispersion oscribe overlay to pass through order 83 (Mg 2795, 2803).
01 Jul 78 - 01 Feb 79	● Use reseaux measured on low dispersion image for both low and high dispersion wavelength calibrations (LWR).
06 Jul 78 - 25 Jan 79	● Create all oscribes on "GEOM'D" images (not photometrically corrected images).
07 Jul 78 - 14 Jun 78	● Change LWR ripple parameters to $K=231,150$ $A=0.09$ instead of $K=231,300$ $A=0.08$. This changes the limiting ripple correction factor to 16.4.
01 Aug 78 - 14 Jun 78	● Create "extended source" reduction capability in low dispersion ($HT=15$, $DIST=11$).
04 Aug 78 -	● Change IUEPLOT to streamline x-axis and plot key to symbols used.

Chronology of Modification to IUESIPS

Output Products (4 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
08 Aug 78 - 01 Feb 79	<ul style="list-style-type: none"> ● Correct bug in "ETOEM" to transmit image number to extracted spectrum files.
30 Aug 78 (low)	<ul style="list-style-type: none"> ● Change standard LWR pixel offsets to transfer dispersion relations from small-to-large aperture as follows: $\Delta S = -17.5$ samples } replaces { $\Delta S = -21.1$ samples $\Delta L = +19.5$ lines } { $\Delta L = +25.1$ lines
01 Feb 79	
31 Aug 78 (high)	
17 Aug 78 - 01 Feb 79	<ul style="list-style-type: none"> ● For "extended source" reduction, change min and max plotted fluxes for "log net" to 3.0 and 6.0 (replacing 2.0 and 5.0).
09 Sep 78 - 01 Feb 79	<ul style="list-style-type: none"> ● Begin using automatic order-finding software (DSPCON), where possible, to determine spectral registration.
20 Sep 78 - _____	<ul style="list-style-type: none"> ● Fix "ETOEM" to read only byte 50 (not 49 and 50) of first label record to obtain camera number for scale-factor record of extracted spectrum.
21 Sep 78 - 01 Feb 79	<ul style="list-style-type: none"> ● Begin using improved low dispersion wavelength calibration line libraries.
25 Sep 78 - 01 Feb 79	<ul style="list-style-type: none"> ● Move background location to "DIST=11" for low dispersion "point-source" reductions in large aperture (e.g., suppress geocoronal Lyα).

Chronology of Modification to IUESIPS
Output Products (5 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
09 Nov 78 - _____	<ul style="list-style-type: none"> ● 2 Å/inch high dispersion CalComp eliminated except by special authorization.
10 Dec 78 } (low) } - 07 Mar 79 13 Dec 78 } (high) }	<ul style="list-style-type: none"> ● Photometrically correct only a circular region of image ("FICOR5") in SWP high and low dispersion, LWR low dispersion.
13 Dec 78 - 25 Jan 79	<ul style="list-style-type: none"> ● Change "EXTLOW" and DATEXTH2 to write line and sample shifts into label in auto registration case.
13 Dec 78 - 05 Jun 79	<ul style="list-style-type: none"> ● Change "EXTLOW" to write "omega", "hback" and "distance" into the labels of extracted spectra.
19 Dec 78 - 14 Feb 79	<ul style="list-style-type: none"> ● Eliminate processing of order 65 in SWP high dispersion.
04 Jan 79 - 07 Mar 79	<ul style="list-style-type: none"> ● Photometrically correct only a circular region of image ("FICOR5") in LWR high dispersion (FICOR5 now used throughout).
30 Mar 79 - _____	<ul style="list-style-type: none"> ● 10 Å/inch high dispersion CalComp eliminated in cases were 2 Å/inch plot is authorized.
05 Apr 79 - 01 Feb 79	<ul style="list-style-type: none"> ● Correctly enter line & sample shifts into label for the case of MANUAL registration.

Chronology of Modification to IUESIPS
Output Products (6 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
05 Apr 79 - Sep 78	● Suppress excess label-plotting on CalComp plots.
30 Apr 79 -	● Begin writing raw image to tape for images designated "Do Not Process".
25 May 79 -	● Add plotter registration benchmark symbols at start and end of each plot.
02 Jun 79 - _____	● Add tape contents summary log at end of G.O. tape labelprints.
08 Jun 79 - 12 Jul 79	● Correct error in integer-scaling routine ("ITOE") for extracted-spectrum files, so that all negative fluxes are converted properly. (See NASA IUE Newsletter No. 7).
15 Jun 79 - 10 Jan 80	● Create "extended source" reduction capability in high dispersion (HT=7).
19 Jun 79 -	● Eliminate redundant tape files in the case of calibration-image reduction.

Chronology of Modification to IUESIPS
Output Products (7 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
30 Jun 79 - 01 Feb 80	● Begin plotting high dispersion net ripple-corrected spectra with "CUTMERGE" to suppress noise at ends of orders and allow auto-scaling of flux axis (applies ONLY to CalComp plots; G.O. tapes unchanged).
02 Jul 79 - _____	● Begin writing identifying header file on G.O. tapes (for data management accounting purposes).
07 Jul 79 - 07 Aug 79	● Correct error in SWP ITF.
08 Jul 79 - 10 Mar 81	● Change ΔS and ΔL pixel offsets for large aperture dispersion relations to correspond to actual object placement point. (See NASA IUE NEWSLETTER No. 6.)
27 Jul 79 - _____	● Begin use of new CalComp plotter hardware. Plots are more precise and on wider paper, but still 10-inch full scale grid.
06 Aug 79 - 10 Mar 81	● Change ΔS and ΔL pixel offsets for large aperture dispersion relations to correspond to physical center of large aperture. (In coordination with telescope operations change, so that offsets still correspond to object

(continued on next page)

Chronology of Modification to IUESIPS
Output Products (8 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
	placement. Change refers to all data acquired as of 1 August 1979. (See NASA IUE NEWSLETTER No. 6).
28 Sep 79 - 01 Feb 80	● Modify the program "OSCRIBE" to generate overlay more efficiently and suppress overlay entirely outside of tube face. (See 11 Nov 79 entry).
08 Oct 79 - _____	● Begin producing computer-generated GO data product receipts.
11 Oct 79 - _____	● Upgrade tape contents summary log at end of GO tape labelprints to include additional information.
30 Oct 79 - _____	● Begin use of mean dispersion constants for low dispersion spectra. (See NASA IUE NEWSLETTER No. 7).
11 Nov 79 - 01 Feb 80	● Correct problem in version of OSCRIBE implemented 28 Sept 79 in order to place overlay over entire image for large aperture spectra.
23 Nov 79 - 10 Mar 81	● Begin using improved high dispersion wavelength calibration line libraries.

Chronology of Modification to IUESIPS
Output Products (9 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
08 Jan 80 - 01 Sep 78	● Eliminate 10 Å/inch plot of net ripple corrected spectrum in high dispersion and make 2 Å/inch plot of same the standard.
08 Jan 80 - 01 Feb 80	● Begin using FICOR6 photometric correction program which <u>extrapolates</u> the ITF at or near the upper limit. (See NASA IUE NEWSLETTER No. 8).
08 Jan 80 -	● Change symbol key on CalComp plots to allow "+" to mean either "saturated, or limited extrapolation".
09 Jan 80 - 02 Apr 80	● Begin producing absolutely calibrated net spectra in low dispersion (See NASA IUE NEWSLETTER No. 8), using LWR calibration revised at 1900 Å.
01 Mar 80 - 06 Mar 80	● Begin using EXTLOW2 to place background extraction further from center of order by a factor of $\sqrt{2}$. (See NASA IUE NEWSLETTER No. 9).
18 Apr 80 - _____	● Begin using further improved high dispersion wavelength calibration line libraries.

Chronology of Modification to IUESIPS
Output Product (10 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
22 Apr 80 -	● Begin using improved cross-correlation template for large reseau in FNDRES and add 2 more reseaux in LWR and 3 more reseaux in SWP.
31 May 80 -	● Begin finding reseaux on TFLOOD images instead of low dispersion platinum-plus-TFLOOD images.
18 Jul 80 - 10 Mar 81	● Begin use of mean reseau sets and mean high and low dispersion constants. (See NASA IUE NEWSLETTER No. 11).
18 Aug 80 - 30 Dec 80	● Correct two minor errors in automatic registration programs DSPCON and DCSHIFT: properly convert integer pixel values to real values, and properly generate a perpendicular shift.
28 Aug 80 -	● Begin use of <u>mean</u> positions of lines to start preliminary wavelength solutions.
28 Aug 80 - _____	● Correct the OSCRIBE problem for large aperture spectra (See 11 Nov. 79 entry) which inadvertantly infiltrated

(continued on next page)

Chronology of Modification to IUESIPS
Output Products (11 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
	production system on 30 Jul 80 when program was recompiled for system reasons.
29 Aug 80 -	● Begin using final improved versions of high dispersion wavelength calibration line libraries.
18 Sep 80 - 30 Sep 80	● Change program ETOEM to correctly write 5-digit image sequence numbers in scale-factor record ("record zero") of extracted spectra.
04 Nov 80 - 10 Mar 81	● Begin use of new low dispersion software (See NASA IUE NEWSLETTER No. 12).
04 Nov 80 -	● Modify manual registration program REGISTER (new name = REG) to calculate shifts which are exactly perpendicular to the dispersion from operator inputs.
04 Nov 80 - 10 Mar 81	● Flag shifts as either "manual" or "auto" in image headers in new <u>low dispersion</u> software.

Chronology of Modification to IUESIPS
Output Products (12 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
04 Nov 80 - _____	● Change labelprinting program to use new low-dispersion file nomenclature; use "PI" instead of "GPI" even for <u>high dispersion</u> photometrically corrected image (still old software).
04 Nov 80 - 10 Mar 81	● Put scheme name in output file labels in high and low dispersion.
04 Nov 80 - 30 Jan 81	● Flag shifts as either "manual" or "auto" in image headers in current <u>high dispersion</u> software.
26 Nov 80 - _____	● Correct an error in the registration program REG so that shifts for the SWP camera will be perpendicular to the dispersion.
22 Dec 80 - _____	● Modify program VBBLK so that the values of starting sample and starting line in the RAW image label will be 001 and 001 instead of 895 and 895. This change only affects tapes sent to the National Space Science Data Center (NSSDC).

Chronology of Modifications to IUESIPS
Output Products (13 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
16 Jan 81 -	<ul style="list-style-type: none">● Modify program SPECLO to put the correct declination of southern objects in the output label, and to output correct line and sample shift information.
19 Jan 81 -	<ul style="list-style-type: none">● Correct small registration error (~0.4 pixels) for SWP-HIGH, LWR-LOW and all trailed images.
03 Mar 81 -	<ul style="list-style-type: none">● Use temperature correction algorithm and new mean dispersion constants for LOW dispersion calibration files. Modify labels to reflect this change.
03 Mar 81 -	<ul style="list-style-type: none">● Begin use of an improved center and radius defining region of photometric correction for LOW dispersion processing. The new radius is smaller than the preliminary one.
05 Mar 81 -	<ul style="list-style-type: none">● Modify the LOW dispersion program SPECLO to test the quality of each pixel for photometric correction before using in an extracted flux computation.
06 Mar 81 -	<ul style="list-style-type: none">● Modify LOW dispersion program POSTLO so that it blank-fills unused

(continued on next page)

Chronology of Modification to IUESIPS
Output Products (14 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
	portions of the IUESIPS label of extracted spectra.
_____ - 17 Apr 78	● LWR ripple parameters K=231 075 and A=0.09 used.
_____ - 06 Jul 78	● Change high dispersion CalComp from 2 Å/inch to 1 Å/cm.
_____ - 12 Jul 79	● Begin producing absolutely calibrated net spectra in low dispersion (using original A & A calibration).
- 12 Jul 79	● Begin plotting all spectra in histogram style.
- 11 Oct 79	● Provide an option to ignore Geocoronal Lyman α in scaling SWP low dispersion net plots.
- 16 Nov 79	● Correct error in printer output from "EXTLOW" so gross-background given with correct sign.
- 10 Jan 80	● Write camera, image and aperture identifier on all plots.
- 28 Feb 80	● Produce plots on narrow paper as standard, wide paper available by special request.

Chronology of Modification to IUESIPS
Output Products (15 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
- 17 Apr 80	● Replace program 'CUTMERGE' by program 'CORTAME' which only cuts bad data from orders and leaves some order overlap on plots.
- 17 Apr 80	● Install restructured plot program 'NEWPLOT'. No change to plots but printer output messages now clearer and correct.
- 30 Dec 80	● Use program ESMOOTH for background smoothing in <u>high</u> dispersion. Implements a median + mean smoothing similar to new low dispersion S/W.
- 10 Mar 81	● Install program INSERT in all low dispersion schemes. Automatically reformats partial read images for standard processing.
- 10 Mar 81	● Implement schemes and software for processing LWP camera images in both high and low dispersion.
- 10 Mar 81	● Modify and standardize format of labels inserted during processing.
- 10 Mar 81	● Include NOLYMAN option for SWP high dispersion NET plots.

Chronology of Modification to IUESIPS
Output Products (16 of 16)

GSFC - VILSPA

<u>Date</u>	<u>Modification</u>
- 10 Mar 81	● Revise plotting program to improve plot layout and appearance. Box drawn around plot area, tick marks placed inside box, all data now plotted inside box, titling information repositioned and object catalog designation added, alternate high dispersion orders plotted in contrasting colors.