



July 31, 1985

Special Edition

Greenbelt, Maryland

MORE POWER TO IUE

The IUE Observatory has embarked on an ambitious program to extend the lifetime and usefulness of IUE as far as possible. As part of this program, an evaluation was made of the power consumption by the various devices on board the spacecraft. It was found that the Panoramic Attitude Sensors, a backup attitude recovery system, could be turned off for a significant power savings. The additional power has resulted in extending the available beta range to roughly what existed a year ago, thus counterbalancing the degradation of the solar arrays.

In addition, the decision was made to relax the formal beta constraints associated with the heating of the on-board computer. In the past no observations could be performed at betas of 55 to 95° once the computer had warmed up to 55.8°C. It has been known for some time that the computer does not heat as much during the summer months, when the Earth is near aphelion. Analysis of engineering data show that during the summer the computer temperature would not reach 55.8°C at any beta. Therefore, the formal restrictions have been revamped to take into account the annual variation in the on-board computer heating. This should allow added flexibility in scheduling and performing observations during much of the year.

Additional details on both these decisions are given in the article "IUE Spacecraft Status" and in the paper by Sonneborn, both in this newsletter.

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IUE RECALIBRATION UPDATE

Work is proceeding on the recalibration of IUE's scientific instrument. The images obtained for the new LWP ITF have been analyzed and combined. By the time this newsletter comes out, the new ITF will have been created. A number of calibration images will then be processed with the new ITF to evaluate its performance. Because the previous ITF is composed largely of single images per level, obtained over a time span of several years, it is hoped that the new ITF will provide a significantly improved calibration of the LWP. Once this ITF has been created and tested, work will start on creation of a new SWP ITF as well. The new LWR ITF was created last year.

The Resident Astronomers at Goddard and Vilspa have been acquiring new absolute calibration data on all three cameras. Because of the greater linearity errors and sensitivity changes seen in the LWR camera, work on its calibration has been given the higher priority. Nearly all the data for the LWR are in hand; these images must be reprocessed with the new LWR ITF before the creation of a new absolute calibration. Well over 50% of the LWP and SWP data have also been acquired.

It is hoped that the new LWR ITF and absolute calibration can be implemented this winter.

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FAST TRAILS

As part of the recalibration effort, the IUE staff have been looking into ways to obtain very short exposures. Such techniques are needed in order to obtain good low-dispersion data on several of IUE's basic calibration standards, such as the fundamental standard Eta UMa. In addition, several hot, bright stars of scientific interest such as Vega have not been observed reliably in low dispersion.

In collaboration with the Operations Control Center spacecraft analysts, the Resident Astronomers have examined the accuracy of very fast trails through the aperture. Using current standard techniques, slews at rates of 30 to 60 arcsec/sec are known to be inexact. In extreme cases the star misses the aperture entirely! Analyses of gyro telemetry shows that at large trail rates the slew starts with a small sinusoidal wobble as the spacecraft accelerates in two axes (pitch and yaw) at once, but that the wobble damps out to the intended straight line if the slew is allowed to continue for a large enough distance. The Resident Astronomers experimented with new trailing methods where the starting point is much farther from the aperture.

The technique has been quite successful. The fastest successful trail attained so far has been at a rate of 88 arcsec/sec. To perform this trail, the star was moved 45 arcmin from the aperture before the trail was started. Even so the star appeared to cross the 10 arcsec wide aperture accurately! It is hoped that trails at rates as fast as 120 arcsec/sec should be possible once the technique has been fully explored.

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LWR CAMERA UPDATE

Usage of the LWR camera has been extremely low, due to the brightness of the flare in the Ultraviolet Converter (UVC). Recently 10 and 13 min exposures produced a noticeable flare, with an intensity of about 2.5 - 3.0 DN/min.

Ground system modifications needed to implement the new configuration of the camera with a 4.5 kv UVC high voltage setting are nearly complete. This mode of operation will probably be implemented early this fall. A recent 3-hour exposure obtained at the 4.5 kv setting showed no hint of the flare. However the sensitivity of the camera is reduced by a factor of 1.37. It is envisioned that the new configuration of the LWR camera will allow it to serve as a backup to the LWP camera.

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EXTENDED LINE-BY-LINE FILES FOR LOW DISPERSION SPECTRA

As of October 1, 1985, both Goddard and Vilspa will begin processing low dispersion spectra with a new scheme that will produce greater spatial resolution, perpendicular to the dispersion direction. Instead of 55 pseudo-orders of width 1.414 pixels, 110 pseudo-orders of half the width will be produced.

In addition, the convention of numbering the pseudo-orders will be changed for the LWP to make it consistent with the other cameras. These order numbers will then always increase along the direction from the large aperture to the small aperture. Currently the LWR and SWP follow this convention, but the LWP orders are numbered the opposite direction.

Tests of the new scheme indicate that, as one might expect, the fluxes derived from the data processed with both the old and new schemes differ by a fraction of a percent. An article describing the new processing scheme in detail is included in this newsletter.

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MANEUVER ACCURACY AND GYRO RESCALING

Due to the failure of the remaining gyro temperature control thermister last December, some changes in the temperature and calibration of the gyros have occurred. The IUE staff have been continually monitoring the maneuver accuracy, which has been degraded by the temperature changes. Every effort is made to try to maintain an accuracy sufficient to place the target within the FES field of view after a long slew (i.e. to within about 6 arcmin). Towards this goal, a rescaling of the gyros was performed in May. The rescaling significantly improved the maneuver accuracy, but the gyros have continued to heat up so that the slews have become less accurate with time. Thus another gyro rescaling was needed. This was performed on July 17. It is expected that until the temperature of the gyro package reaches equilibrium, additional gyro rescaling will be required about every 3 months. Guest Observers are advised to bring good coordinates and finder charts in case a poor slew places their target outside the FES field of view. There is no evidence that the health of the gyros themselves has degraded.

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VISITORS' ROOM REARRANGEMENT

Our Guest Observer and RDAF Visitor's office has been moved into Room G53A (the IUE library room). The script volumes have been moved across the hall to Room G54, the IUE Photowrite Browse File room. The RDAF staff now occupy Room G53B, the former GO office. Due to the building's space crunch, the area set aside for our visitors has shrunk a bit. We have tried to make the GO area as useful and comfortable as possible. We had a choice of locating a third desk in the area or retaining the couch. We opted for the couch, but will change this if our visitors so desire. Please see Cathy Imhoff to express your opinion!

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GETTING AROUND BY METRO

If you fly into Washington National Airport, or are just plain adventurous, you may choose to take Washington's new Metro rail service and busses to and from Goddard. To reach Goddard from National Airport you must leave the air terminal and walk to the Metro station nearby. This is the "Blue Line". Take the Blue Line to Metro Center, which is in the middle of downtown. Trains run frequently, every 5 - 10 minutes, during operating hours. Change over to the Orange Line. (The Blue Line and the Orange Line follow the same tracks through the District of Columbia, but diverge as they approach the suburbs.) Take the Orange Line to its terminus at the New Carrollton station. The cost is around \$1.10 to \$2.20, depending upon whether it is rush hour.

At New Carrollton, you must switch over to a bus. The Greenbelt Line, T16, runs between the Metro station and Beltway Plaza (the shopping center on Greenbelt Road, just east of Route 1). It has a regular stop at Goddard. The fare is 55¢.

The Metro runs from 6 am to midnight on weekdays, 8 am to midnight on Saturday, and from 10 am to 6 pm on Sunday. Holidays may have either "Saturday hours" or "Sunday hours", depending upon the holiday. It normally takes about 45 minutes to go from the airport to New Carrollton.

The busses run from 05:45 am to 08:15 pm from New Carrollton on weekdays, reaching Goddard in about 20 minutes ("westbound"). On Saturday they run from 08:40 am to 07:40 pm; on Sunday there is no bus service but a taxi may be called. From Goddard to New Carrollton, the busses run from 05:56 am to 08:25 pm on weekdays, from 08:49 am to 07:49 pm on Saturday ("eastbound"). Busses run every hour or half hour depending on whether it is near rush hour.

Another bus line, F6 (the Silver Spring line), connects to the Silver Spring Metro station on the Red Line (also accessible at Metro Center) and at certain hours goes to Goddard. The route goes past the University of Maryland, with stops along Route 1 near the motels that are south of Greenbelt Road. This route is a bit complicated that we won't attempt to summarize it here - consult the bus route flier please.

If you have time for sightseeing, the Smithsonian Metro station on the Orange and Blue Lines drops you right in the middle of the Mall. The monuments, Capitol, and National Zoo are also accessible by various lines. If you intend to visit either the NSF or AAS offices, they are also very convenient to Metro stops. Get off at Farragut West (Orange/Blue Lines) for NSF and at Farragut North (Red Line) for the AAS office. Good maps and instructions are posted at each Metro station and on the trains. There is also long-term parking at the New Carrollton and Silver Spring stations if you are driving and wish to take the Metro into the city.

Fliers giving the routes and times for the busses are available at the Metro stations. The schedules change, so please check for updated information on the busses if you decide to try these routes.

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OOPS!: LWP RIPPLE

In the last newsletter, we reported on the new LWP ripple constants implemented in December 1984. The value of k was off by almost a factor of 10 due to a typographical error. The correct values are given here:

$$k = 230701 + 5.573 * m$$
$$\alpha = 0.896$$

where m is the order number. Our apologies!

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IUE PERSONNEL CHANGES

Two new Resident Astronomers have just started with IUE. Dr. Michael Crenshaw comes to us from Ohio State University, where he has just finished his dissertation on line profiles of Seyfert 1 galaxies. Dr. Chris Shrader obtained his degree at Rutgers and has been teaching at Fordham. His interests include X-ray observations of quasars and active galaxies.

A new Telescope Operator, Peter Summers, has joined the staff. Peter hails from the Boston area and received his degree from Hartwick College in New York. New faces in the Image Processing and Data Management groups are Joseph Garner and Stacey Hammer.

Musical Chairs Division: Resident Astronomer George Sonneborn has been promoted to Supervisor of the Science Operations group. His duties also include overseeing the Data Management area and the long-range planning effort. Resident Astronomer Catherine Imhoff continues as Supervisor for the calibration work and the RDAF. In addition she is now overseeing the Image Processing group. She has taken over some of the duties previously performed by Dawn Stone. Dawn has been promoted to Assistant Manager, while Dr. Barry Turnrose continues as the Manager for the IUE Science Operations support group.

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WEATHER FORECAST

A flurry of new proposals is expected in mid-November, followed by blizzard-like conditions in the vicinity of Don West's office by November 23. Telescope Operators with shovels will be called in to clear a path to the observing room. Guest Observers arriving during this period are advised to allow extra time to reach the console before their shifts begin.

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