

IUE Project Policies and Procedures

(Revision 4 - 30 Aug 1990)

Following is a description of the IUE Project's current policies of which the Guest Observer (GO) should be aware in planning and carrying out his or her IUE research. Further details about these policies are available through the references given in the policy summaries and by consulting the Project Scientist, Dr. Yoji Kondo (301-286-6247), the Operations Scientist, Dr. Donald K. West (301-286-6901), or the Resident Astronomers (301-286-7537).

From time to time, project engineers recommend changes in mission operations to extend the life of the spacecraft or to work around minor spacecraft malfunctions. Changes in mission operations procedures may also require modifications to these science operations policies. Current IUE Project Policies are maintained on an electronic bulletin board which may be accessed on a 24-hour basis via SPAN or a long-distance call (see Section 1.4).

A number of the following policies require prior notification to the observatory. If the GO fails to comply with the requested prior notifications, the GO's science program may be impacted. Last minute requests will be denied if they impact other GO programs or if they violate GSFC administrative rules or mission operations policies. Such rules and policies cannot be waived.

Note that the requirements for notifying the Observatory are NOT met by information contained in the observing proposal itself. The purpose of the proposal is for the peer review to assess the scientific value and general technical feasibility of the proposed research. By the beginning of the observing episode, the GO is likely to have modified his or her priorities and observing plan. Thus the Observatory requires separate notification at the beginning of the episode for various special requests.

This year there is a special series of GO programs both here and at VILSPA requiring coordinated observations with the ROSAT spacecraft, which was launched at the beginning of June, 1990. The overall campaign is being coordinated by ESA at the VILSPA station. The plans call for minimal impact to normally scheduled IUE programs. However, due to the large number of ROSAT shifts to be scheduled (the combined total for both observatories is ~ 100 shifts) there will likely be some impact to programs in the form of decreased flexibility. Once the schedule is published, there will be less flexibility for last minute shift trades. Shifts for ROSAT observations will require the concurrence of both NASA and ESA to be traded or cancelled. Both NASA and ESA view the upcoming IUE/ROSAT observations as a unique opportunity to obtain simultaneous and near-simultaneous X-ray/ultraviolet observations to help answer a number of current astrophysical questions.

1 Administrative Requirements

1.1 Assignment of Responsibility

Observatory Notification Requirements:

The Observatory must be notified in writing in order to delegate Principal Investigator (PI) responsibilities. This is required even if a Lead Investigator (LI) or other is explicitly designated in the original observing proposal to undertake the proposed observations.

Statement of Policy:

The PI is responsible for all aspects of the observing program, including scheduling, adding targets, observing, and receiving the data. A PI may delegate all of these responsibilities to a colleague by informing the IUE Project Scientist or Resident Astronomers (RA) in writing. A PI or LI may also designate only a portion of these duties such as pre-visit planning (*e.g.* scheduling, receipt of skymaps) or receipt of processed data to a Co-Investigator, again by notifying the Observatory in writing. No prior notification is required for a colleague to perform the observations themselves (assuming he or she has arranged for a GSFC badge and all necessary observing information such as the schedule, sky-maps, target lists, *etc.*). An **Assignment of Responsibility Form** is available for the required Observatory notification. (See Appendix V of IUE Newsletter No. 32, or contact the Observatory.)

1.2 Required IUE Guest Observer Badges and Car Passes

Observatory Notification Requirements:

At least two weeks notification is needed for normal processing. Late requests will be submitted to GSFC security, but badges and car passes may not be ready by the requested date.

Statement of Policy:

Access to GSFC is by badge and car pass. Each Guest Observer (GO) or Regional Data Analysis Facility (RDAF) visitor must have in his or her possession an IUE badge or temporary GSFC visitor's badge. IUE badges are non-transferable and can only be issued to US GOs officially listed as Principal Investigators, Lead Investigators, or Co-Investigators (Co-I) on approved programs. All other GOs and visitors must be issued temporary badges on a visit-by-visit basis. Note that it is a PI's prerogative to add Co-Is to a program at any time via a letter to the IUE Project Scientist. Please note also that the special IUE badges are to be used for IUE-related visits only. Visits to GSFC for other purposes require the use of other GSFC badges.

Badges for this episode will be issued automatically to PIs, LIs, and Co-Is who our records show have not received these items previously. We will purposely exclude only those non-US Co-Is who are part of large collaborative efforts having US PIs and whose travel to GSFC on IUE business is considered unlikely. Nevertheless, omissions may occur. **The PI is responsible for ensuring that all persons travelling to GSFC in connection with their program have the proper credentials.**

Requests for temporary GSFC badges and car passes should be received by the Operations Scientist at least two weeks prior to a visit. Requests may be submitted by telephone call but must provide the Observatory with the name of the person, their institutional affiliation, the name of their country of citizenship, and the dates for the visit. Badges and car passes prepared on request are held for pickup at the GSFC main gate.

1.3 Adding Targets to Your IUE Program

Observatory Notification Requirements:

At least 30 days notice is required for normal processing. Last minute requests may be submitted to the Project Scientist; however, no data will be released until all paperwork, including approvals, has been completed.

Statement of Policy:

It is expected that PIs may wish to add targets to their programs to provide observing flexibility. The PIs should submit target information on an **Observation Specification Form** (See Appendix V of IUE Newsletter No. 32, or contact the Observatory) with a brief explanatory letter to the Project Scientist. Alternatively, requests may be submitted by electronic mail (see Section 1.4). In this case, the format of the Observation Specification Form should be used for the request.

Requests for added targets should be submitted at least 30 days in advance of the observing run. *Required information includes target name, 1950 coordinates, object class, and the PI's program identification (five-letter code).* Approval is contingent on suitability of the targets to the program and lack of conflict with the approved targets on other GO programs. Approval of the added targets is required before the data are released to the GO.

In exceptional cases, data may be archived to a temporary program ID pending a decision on the distribution of the data. In such a case, the PI must submit a written request to the Project Scientist for approval of the observed target and release of the data under his or her program ID. The data will not be processed until approval is received.

1.4 Electronic Mail and Bulletin Board

Observatory Notification Requirements:

Not applicable.

Statement of Policy:

IUE maintains a general account for receipt of all project related electronic mail messages called IUEMAIL. The **SPAN** address is

IUESOC :: IUEMAIL

This account is checked on a daily basis by the on-shift RA. Please use the general account for all messages involving your observing program, including scheduling requests. You will receive confirmation of receipt of messages sent to the general account. Because the observatory staff members have non-standard work schedules, messages related to project business sent to individuals may not be seen in time to be useful.

The RAs also have individual accounts on the above node. Personal messages may be sent to them at IUESOC using the RA's last name as the account name.

The Observatory also maintains a general account which contains a copy of these policies, an electronic bulletin board, the current IUE GSFC observing schedule, and other GO software. The account is generally designed for the remote observing mode, but a number of its capabilities may be of general interest. The **SPAN** address is

IUESOC :: REMOTE.

Please contact the observatory for the required passwords and a complete description of the available program aids.

GOs are encouraged to provide the Observatory with their current e-mail addresses. This facilitates contacting observers about their upcoming shifts as well as special announcements by the Observatory.

1.5 Scheduling of IUE Programs

Observatory Notification Requirements:

In general, specific scheduling requirements (including special requests such as battery discharge, heavy camera overexposure, closing of the large aperture, *etc.*) should be communicated to the Observatory Scheduler before the beginning of the episode. Requests for specific dates submitted later than this should be submitted at least 90 days in advance of the desired shift date. Requests received after a schedule has been published may not be honored. This deadline does not apply to target-of-opportunity programs.

Statement of Policy:

All PIs are sent a **Scheduling Request Form** and an **Assignment of Responsibility Form** for each approved program at the beginning of the episode. PIs are asked to complete the scheduling form to make each program's scheduling requirements known to the Observatory. The **Assignment of Responsibility Form** must be completed if someone other than the PI is to be authorized to make observing plans or receive the GO data.

At the beginning of the episode a scheduling request deadline is established. This date is usually 4-6 weeks after the Project Scientist announces the accepted programs. PIs are requested to send scheduling requirements for the entire episode for each observing program to the Observatory by this date. *If a program's scheduling requirements remain as stated in the observing proposal, this fact must also be communicated to the Observatory.* These requests are used to establish a draft schedule for the episode. Requests received before the deadline are weighted according to scientific need and are not considered in order of receipt. Requests received after the deadline will be accommodated only to the extent allowed by the earlier requests. In view of increasing constraints on telescope operations GOs are strongly urged to observe the deadline.

The Observatory attempts to honor all reasonable requests for specific observing dates to perform time-critical or coordinated ground-based observations or to satisfy other scientific requirements. *It is the GO's responsibility to verify that the target will be at a favorable beta angle on the dates in question. Specific time requests should include information concerning scientific constraints of the observations and specify a range of dates, if appropriate, rather than a single date to permit some flexibility in scheduling.* Except for observing dates for collaborative programs, specific observing dates cannot be guaranteed. Collaborative programs are scheduled for the entire year at the beginning of the episode.

Requests to schedule observations requiring heavy overexposures, closing the large aperture, or discharge of the spacecraft batteries must be made at the beginning of the episode.

Please refer to the specific policy statements on these matters. Requests should be made for specific dates (or range of dates) to observe solar system objects. It is the GO's responsibility to check the dates for best planet-satellite configuration, if applicable, and to provide an ephemeris specifying UT or local time and including the object's drift rates (in arcseconds per hour) in right ascension and declination prior to the observing run.

Programs will be scheduled, if possible, at a time when high-priority targets are at beta angles where the spacecraft batteries will not discharge, but outside the on-board computer (OBC) heating region. In the absence of designated target priorities, programs are scheduled at a time when a majority of their targets will be available. The availability of all targets cannot be assured for those programs with a small number of shifts and/or a long target list. For programs having a small number of targets or all targets in a localized region, possible conflict with the moon will be checked manually. For those programs with large numbers of targets or with changing target priorities and with remaining shifts to be scheduled, GOs should fill out a **Scheduling Update Form**. A supply of these forms is kept at the GO desk in the Telescope Operations Control Center (TOC). Completed forms should be left with the on-duty RA or mailed to the Scheduler.

The monthly NASA IUE observing schedule is finalized three months in advance. Once the schedule for a given month is complete the Observatory will not initiate any revisions without strong scientific justification to do so. If a GO wishes to change the dates of his/her scheduled shifts, we ask that he/she contact the GOs thereby affected to arrange a time trade. The Observatory must be notified of any such arrangements as soon as these trades are finalized.

When major targets of opportunity appear, such as comets or novae, the PIs having approved Target-of-Opportunity Programs should call the Project Scientist to determine how much observing time should be allotted to the particular event under discussion. In the case of comets, there is usually sufficient lead time to incorporate them into the normal scheduling process. The sudden appearance of a bright nova or supernova would require last-minute scheduling, possibly preempting previously scheduled observers. The programs affected will be compensated for the lost observing time.

Programs are scheduled for eight-hour low (US1) and high (US2) radiation shifts according to the shift allocation given by the Project Scientist. The Observatory will attempt to honor requests for partial shift scheduling if there is scientific justification. As a rule, observing time will not be scheduled in segments less than four hours duration; partial US1 shifts will be scheduled only for highly time-critical observations.

Approximately four shifts per month (usually US2) are set aside for calibration and maintenance. At the end of the month the Observatory normally absorbs the two hour loss due to the monthly shift time change. Wavelength calibration shifts will be specifically scheduled and will generally not be rescheduled, in order to minimize the impact of the use of the aperture mechanism on subsequent observations.

Conflicts with teaching obligations, AAS meetings, IAU symposia, etc., will not be

taken into consideration for scheduling purposes, since many GOs tend to have similar conflicts. Should the observer have other, more compelling reasons for not being scheduled on a given date, these should be presented in writing to the Observatory as soon as possible.

Loss of observing time resulting from ground system or spacecraft operations problems or from earth or lunar shadows is not reimbursed automatically. Under exceptional circumstances, such as the loss of at least half a shift, the Project Scientist may approve reimbursement. A written request from the PI to the Project Scientist is required.

1.6 Requests for Discretionary Observing Time

Observatory Notification Requirements:

Requests for Project Scientist's Discretionary Observing Time should clearly state the reason for the request, why the proposer cannot wait for the next proposal cycle, and include an outline of the science to be performed. The proposal should be brief, ideally one page and not more than two. It should be accompanied by an **Observation Specification Form** (See Appendix V of IUE Newsletter No. 32, or contact the Observatory). The request should be addressed to the Project Scientist.

Statement of Policy:

Limited amounts of observing time are available for projects which, for scientific reasons, cannot wait until the next IUE observing year. Unlike some ground based observatories, almost all available time is given out to programs which have undergone peer review. Only minimal amounts are set aside for Observatory maintenance and engineering time and an even smaller amount for discretionary requests.

The Project Scientist's Discretionary Observing Time is intended for short observing projects for which no approved observing program exists. However, the Project Scientist may approve Discretionary Time where observations must be performed by a certain date or where the project's scientific nature dictates urgency.

Examples of type of observations which might be considered for Discretionary Time include the following.

- One or two observations are needed to complete a program which has expended its allocated observing time, especially if the program has suffered a significant time loss during the episode.
- An exploratory observation is needed to prove program feasibility so that a complete program may be submitted for peer review in the next cycle.
- One or two observations are needed to complete a data set for an archival program in progress.
- An unexpected observing opportunity occurs. Note that most categories of this type such as novae, supernovae, cataclysmic variables, *etc.* have standing target-of-opportunity programs which would be activated.
- A single observation is needed to confirm the identity of an X-ray or γ -ray source.

Discretionary Proposals, like all other requests for observing time, are reviewed by the Observatory staff for technical feasibility and spacecraft constraints. An **Observation**

Specification Form with target information (See Appendix V of IUE Newsletter No. 32, or contact the Observatory), desired exposure times, specific dates for time-critical observations, and so forth should accompany the proposal for Discretionary Time.

2 Science Operations, Constraints, and Policies

2.1 Observable Area of the Sky

Observatory Notification Requirements:

Not applicable.

Statement of Policy:

In general any area of the sky will be observable in a power positive β region sometime during the year. However, the entire sky cannot be observed on any given date. The main criteria governing target availability for observing follow.

- Except for certain pre-approved cases, all observations must be performed at power positive β s. Currently, the zone extends from $\beta \sim 30$ to 112° . By the spring of 1991, the zone will probably be $\beta \sim 31$ to 108° . During Earth shadow seasons, a special restricted range of $\beta \sim 48$ to 90° is generally in force for 8 to 12 hours following daily shadow (see Section 2.6). If you plan on observing near limits, please check with the Scheduler or an RA prior to your scheduled shift for the current β limit values.
- With battery discharge approval, observations of up to several hours duration may be made in the power negative β regions from $\beta \sim 28$ to 29° and 113 to 135° (see Section 2.3). Due to the limitations of the Fine Sun Sensor used to control spacecraft pointing, observations cannot be made below $\beta = 28^\circ$ or above $\beta = 135^\circ$. IUE project guidelines require a backup ground station be available for power negative operations. **Thus, no power negative operations are possible without prior notification and approval.**
- Targets near the Moon's apparent path as seen by IUE may be unavailable due to lunar occultation. In general the occultation lasts only a few hours, but it may occur at an inconvenient time. Please consult your GO skymap to see if this might be a problem with your targets.
- The Earth transits the sky, as seen by IUE, once a day. Its brightness creates a zone several times its actual size where observations of either very faint targets or targets with faint guide stars may not always be possible. *Since the IUE shift times are determined by sidereal rather than solar time, a target occulted by the Earth during the middle of a given shift will always be occulted in the middle of that respective shift, no matter what time of year.* Please refer to your GO skymap to see if this will be a problem.

- The areas near the ecliptic poles are especially favorable for targets which must be regularly monitored for long periods of time. These areas of the sky remain power positive throughout the year.
- Because of heating problems of the OBC, overhead of several hours duration may be required to cool the OBC if it hits the redline temperature. This can normally be averted by avoiding the hot β zone where heating is expected to occur. The size of the zone varies during the year (see Section 2.2).

2.2 Beta Restrictions Due to Heating of the On-Board Computer

Observatory Notification Requirements:

Not applicable.

Statement of Policy:

The S/C computer can not be allowed to stabilize at the telemetry temperature point of 57.0° C, as this could possibly result in the loss of the OBC. Once telemetry indicates that the OBC temperature is "glitching up" from 55.8 - 57.0° C, stabilization can occur in less than 30 minutes, so immediate action must be taken to prevent this.

The OBC temperature constraints for science operations are as follows.

- Observations with OBC temperatures up to and including 55.8° C are permitted.
- **SHOULD THE OBC TEMPERATURE AT ANY BETA BEGIN GLITCHING UP TO 57.0 DEGREES, CURRENT OBSERVATIONS MUST BE IMMEDIATELY STOPPED AND THE S/C SLEWED TO A BETA OF 40 DEGREES OR LESS UNTIL THE OBC IS GLITCHING DOWN TO 54.6 DEGREES.** It has been found that cooling near β 30 requires at least a couple of hours before the OBC has cooled sufficiently. Cooling just below β 40 may require several times as long. The β selected for OBC cooling will depend on the lower power positive β limit which in turn will depend on spacecraft activity (*i.e.* prepping a camera, taking an exposure, *etc.*). The observer who is responsible for the OBC heating is expected to absorb this overhead (see below).

A "hot" β zone has been defined to assist the observer in planning and scheduling observing shifts.

- In the "hot" OBC zone, the on-board computer will rise to at least 57.0° C after extended periods of observing. Long exposures should not be scheduled in the OBC hot zone if at all possible; some exceptions for targets-of-opportunity and time-critical observations may occur. Short exposures may be obtained if the OBC temperature is at or below 55.8° C. *If you need to spend a long time in the hot β zone, you may be required to spend time cooling the spacecraft.* The GO should consult with the RA to get an estimate of the time required and the most strategic time in the shift to do it. This requirement is made to insure that the observer who is responsible for heating the OBC absorbs most of the overhead for cooling, rather than imposing this on subsequent observers.

Hot Beta Zones for Each Month of the Year	
Month	Hot Zone
January	56.0-94.0
February	59.0-90.0
March	64.0-86.0
April	65.0-84.0
May	69.0-81.0
June	————
July	————
August	68.0-81.0
September	65.0-84.0
October	62.0-88.0
November	59.0-90.0
December	57.0-93.0

2.3 Discharging the Batteries at Power Negative Beta Angles

Observatory Notification Requirements:

The Observatory requires notification in writing at the beginning of the episode. Late requests will be evaluated on the basis of impact to other GSFC and VILSPA programs and may be denied. This deadline is not applicable to Target-of-Opportunity programs. **However, the IUE project now requires a backup ground station for all power negative operations. Target-of-opportunity observations at power negative β are subject to availability of a backup groundstation. The more advance notification the Observatory has, the more likelihood of such a backup station being available.**

Statement of Policy:

The primary function of IUE's two batteries is to provide spacecraft power during the semi-annual Earth shadow seasons. The batteries may also be used on a limited basis to supplement the power generated by the solar arrays in order to perform special observations, such as time-critical observations, comets at small Sun angles, or targets of opportunity, at high and low β angles. The slow degradation of the solar array output, currently several percent per year, has meant that there is an increasing demand for use of the batteries to support GO observations as the power positive β region has decreased in size. On the other hand, the batteries have shown some degradation in performance. Battery No. 1, in particular, does not appear to hold a full charge for extended periods of time.

In the last few years, changes have been made in the rules which govern the use of the batteries, in response to the results of the continuing studies of their performance and the battery health maintenance program established by project engineers. Currently the following directives are in effect:

- Up to 36 battery discharges, where a voltage of 22.5 volts or less is reached on either battery, are permitted in any 12 month period for science observations. Of these, 24 are allocated to GSFC and 12 to VILSPA. These allocations do not include shadow season.
- Of the 36 battery discharges, up to 12 may involve battery discharge to the "red line" value of 20.6 volts. Of these, 8 are allocated to GSFC and 4 to VILSPA. At present, the red line value may be reached in as little as 3 to 4 hours of power negative operations, depending on spacecraft activities (*i.e.* reads, camera preps, *etc.*).

- Power "neutral" (*i.e.* neither measurable charge nor discharge on the batteries) observations are not allowed. IUEOCC will turn on additional spacecraft equipment in the power neutral zone until a measurable discharge current is observed on both batteries.
- After discharge, the batteries must be fully recharged. Some "dump current" is required during the recharging process, which means that the recharge must be done at $\beta \sim 48$ to 90° . This rule is in effect for all battery discharges, whether for GO observations or during shadow season. The recharge period may require up to twice as much time as the discharge period (*i.e.*, 8 to 12 hours).

It is the responsibility of the GO who is planning on requesting specific observing dates to check at the beginning of the episode whether battery discharge will be required and to request approval. The current power positive β range is 30 to 112° . By next spring, it is roughly estimated that the range will be 31 to 108° .

Goddard and VILSPA are coordinating the scheduled dates of all shifts involving battery discharge. This is necessary because any battery discharge has significant effects on the GO observations that are performed for up to 12 hours afterwards, primarily due to the recharging requirements. *Consequently, any observer planning to discharge the batteries must notify the IUE Observatory in writing of their requirements. In order to be properly scheduled, this information should be communicated to the Observatory by the deadline established for other scheduling requests, i.e. the beginning of the episode.* Programs requiring battery discharge will be reviewed on a case-by-case basis for scientific justification and potential impact on other programs. Requests for battery use received after this date will be considered only if they can be accommodated without impact to the other GSFC and VILSPA observers whose programs are already scheduled.

2.4 Overexposing the Cameras

Observatory Notification Requirements:

Expected cumulative camera overexposures of 50 times or more per camera, per shift should be communicated to the Observatory in writing at the beginning of the episode. Late requests will be evaluated for impact on other scheduled observations (including VILSPA). Without prior notification, the cumulative overexposure per camera, per shift is limited to less than 50 times.

Statement of Policy:

The overexposure level of a given image is the ratio of the exposure time to that required for an optimum exposure (about 210 DN maximum). If the optimum exposure time for a given object cannot be reliably estimated from previous IUE or other satellite UV flux measurements, test exposures may be required. *Overexposure estimates based on overexposure levels recorded on observing scripts and in the Merged Log may be inaccurate. Overexposed images should, therefore, not be used for estimating exposure times.* Heavy overexposures on the cameras have been found to affect subsequent observers by producing residual images on shift-long exposures for up to a week after the heavy overexposure. As a result the Observatory maintains a policy which balances the interests of programs requiring heavy overexposures against those programs which can expect only very low signal strengths. **Programs expecting a single or cumulative overexposure of 50 times or more in either emission or continuum within an 8-hour period should inform the Observatory by no later than the beginning of the new episode (normally June 1), noting which shifts and/or which dates such overexposures are planned.** This information will be used by the GSFC and VILSPA schedulers to schedule these shifts. In addition, the number of shifts on which a single or cumulative overexposure in continuum or emission can exceed 100 times during an 8-hour period is limited to a specific number per year. Requests for overexposures received after this date will be honored only if they do not impact already scheduled GSFC and VILSPA observers or exceed the annual allocation. Thus requests received after a shift has been scheduled may not be honored. Detailed guidelines are given below:

- By IUE Three Agency agreement, there are limits to the frequency with which large overexposures of the IUE cameras may be performed.
- A "heavy overexposure" is defined to be a *cumulative* overexposure of 100 times or greater on one camera within an eight-hour period. For example, five spectra, each 20 times overexposed, would qualify as a heavy overexposure.

- No overexposure of 1000 times or greater is permitted due to the potential for permanent damage to the cameras.
- No more than 12 eight-hour periods containing a heavy overexposure are permitted per camera in any 12-month period (8 shifts for GSFC, 4 for VILSPA).
- There are no restrictions or special requirements for shifts where the cumulative overexposure is less than 50 times per camera.
- GSFC and VILSPA are coordinating the scheduled dates of all shifts where cumulative overexposures of 50 times or greater are planned, even though there are no limitations on the number of shifts where the cumulative overexposure is less than 100 times. Consequently, any program planning cumulative overexposures of 50 times or more must notify the Observatory in writing of these requirements. In order to be properly scheduled, this information should be communicated to the Observatory by the beginning of the episode. Programs requiring heavy overexposures, as defined above, will be reviewed by the IUE Project on a case-by-case basis for scientific justification and potential impact on other programs. Scheduling and detailed exposure information for approved programs planning such overexposures will be exchanged between Goddard and VILSPA, so that the impact of overexposures on subsequent observations can be minimized by appropriate scheduling.
- In cases where there is disagreement or uncertainty about the optimal exposure time, the on-duty RA's estimate will be used in making calculations of the amount of overexposures.

2.5 Restrictions on Closing the Large Apertures

Observatory Notification Requirements:

The Observatory requires notification in writing at the beginning of the episode. Late requests will be evaluated on the basis of impact to other GSFC and VILSPA programs and may be denied.

Statement of Policy:

The IUE Three Agencies have adopted a policy which limits the frequency with which the aperture mechanism is cycled. This limitation has been imposed due to electronic interference between the aperture closing mechanism and the FES. The interference causes a shift in the FES pointing, so that a star supposedly centered in the aperture is actually offset by up to 4 arc seconds. Such a shift can persist for several hours and can have a major impact on observations. The aperture mechanism must be closed whenever wavelength calibration observations are obtained or whenever small aperture observations are required that could be contaminated by light coming through the large aperture.

Goddard and VILSPA are coordinating the scheduled dates of all shifts where the closing of the large aperture is planned. *Consequently, any observer planning to use the aperture mechanism must notify the Observatory in writing. In order to be properly scheduled, this information should be communicated to the Observatory by the deadline established for other scheduling requests, i.e. the beginning of the episode.* Programs requiring aperture closing will be reviewed by the IUE Project on a case-by-case basis for scientific justification and potential impact on other programs. Requests for aperture closing received after this date will be considered only if they can be accommodated without impact to the other GSFC and VILSPA observers whose programs are already scheduled. Scheduling information for approved programs planning aperture closing will be exchanged between Goddard and VILSPA, so that the impact of aperture use on subsequent observations can be minimized by appropriate scheduling.

The IUE Observatory maintains a regular schedule of wavelength calibration observations. The frequency of these observations has been decreased to one set of observations per camera, per month, the minimum frequency to maintain and update the wavelength calibration. The shifts are usually scheduled on the last US2 shift of the month, which is only 6.7 hours long. These observations are explicitly listed on the IUE schedule as "wavecal" to facilitate schedule coordination with VILSPA.

2.6 Observing Restrictions during Earth Shadow Season

Observatory Notification Requirements:

Not applicable.

Statement of Policy:

For about three weeks in late summer, and again in late winter, the IUE's orbit carries it through the Earth's shadow once each day. During the shadow passages, which may last as long as 81 minutes, the batteries lack sufficient power to permit observations or maneuvers. On exiting shadow, the spacecraft is reconfigured for normal Science Operations. Several restrictions apply to observations made during Earth shadow seasons. Details are given below.

- No discharge of the batteries for other than daily Earth shadow passage is permitted during shadow season.
- Following the daily period of shadow, science observations are restricted to a charging β zone, currently between $\beta \sim 48$ and 90° , until the batteries have been fully recharged. This normally requires from 8 to 12 hours. This affects the VILSPA and US1 shift during the winter shadow season and US2 and VILSPA shifts during the summer shadow season.
- In addition to the time lost to shadow itself, there is a period of 50 minutes prior to daily shadow required to power down parts of the spacecraft and prepare for shadow passage. There is also a period of time after shadow required to reconfigure the spacecraft for science operations. The actual period of time varies in a complex manner, but traditionally has not exceeded 30 minutes. During the summer shadow season, shadow occurs during the latter part of the US1 shift. During the winter shadow season, shadow occurs during the second part of the US2 shift.
- The start times of the shift are altered during shadow season so that VILSPA absorbs approximately 1/3 of the time loss and GSFC absorbs 2/3. Whenever possible, half-shifts are scheduled for programs with the observatory program PHCAL being assigned the portion of the shift when shadow occurs. However, this is not always possible.
- Programs suffering time loss due to shadow are not automatically reimbursed. Those programs suffering significant time losses may request consideration for reimbursement of time from the Project Scientist following normal project guidelines (see Section 2.11).

- Certain monitoring or time-critical programs may become unfeasible during shadow season due the extra restrictions. These restrictions cannot be waived.

2.7 Using the LWR Camera

Observatory Notification Requirements:

Advance notification is not required. However it is advisable to discuss possible use of the LWR camera with a Resident Astronomer before the observing run, since there are few scientific advantages in using this camera rather than the LWP camera.

Statement of Policy:

There are currently no policy restrictions on using the LWR camera to obtain IUE observations. However, due to the flare in the Ultraviolet Converter (UVC), the LWR is configured to the reduced UVC voltage of -4.5 kv. This reduces the sensitivity of the camera by a factor of 1.37 from its original configuration. With the LWR camera's sensitivity degradation and reduced voltage, the LWP camera is now more sensitive than the LWR camera at all wavelengths.

The extra overhead required to turn the camera on and off must be absorbed by the observer's program. Calibration exposures are still routinely performed on the LWR camera, but at a *reduced* rate compared to the LWP camera. The LWR is therefore not recommended for most IUE Guest Observer programs. (See also NASA IUE Newsletter No. 28, pp. 7, 10, and 22, 1985).

2.8 Targets of Opportunity

Observatory Notification Requirements:

As soon as possible notify the Project Scientist and the Resident Astronomer on duty during US shifts. If an RA is not available, a message may be left with the IUE secretary during normal working hours at (301) 286-7664. Otherwise leave an electronic mail message in the IUESOC::IUEMAIL account via SPAN. A phone number and short message for the Resident Astronomers may also be left with the Data Operations Controller (DOC) at (301) 286-8625. This is at the IUE Operations Control Center, which is staffed on a 24-hour basis.

Statement of Policy:

Novae, supernovae, cataclysmic variables, and other similar objects are normally observed as target-of-opportunity programs, as approved by the Project Scientist. PIs with approved target-of-opportunity programs should contact the Project Scientist to activate the program when suitable observing opportunities arise (IUE User Guidelines 1979; also NASA IUE Newsletter No. 5, pp. 15-16, 1979). If the GO is unable to be present in person for the observations, the Resident Astronomers will obtain the observations. The GO should contact a Resident Astronomer to arrange for the remote transmission of IUE scripts to the Observatory for the planned observations. A FAX machine is available for the transmission of finder fields, provided they are legible.

Target-of-opportunity programs take precedence over normal already-scheduled programs; however, they may or may not take precedence over other time-critical observations. When necessary, the Project Scientist will decide the order of priority for scheduling purposes.

2.9 The Remote Observing Mode

Observatory Notification Requirements:

Advance approval and additional pre-observing planning is required as well as a working knowledge of the equipment at the remote site. Contact the Observatory for remote observing guidelines and observatory notification requirements.

Statement of Policy:

The University of Colorado and the University of Chicago currently support equipment which enables remote observing with IUE. The efficiency of observing in this mode varies considerably depending upon the type of program and the experience of the observer. In addition, the current remote mode does not yet have redundant equipment. If a major disruption of communications should occur during a remote shift, the RA on duty will decide whether sufficient information is available to continue the observations. If it is not possible to continue with the remote user's program, an observatory program will be substituted but the time will be charged to the GO's program.

The GO is expected to operate the observing equipment at the remote site during the shift. Certain restrictions apply; for instance the remote user must have some recent experience observing with IUE at Goddard. Advance approval and additional pre-observing planning are required.

The Observatory now maintains a software package on the IUESOC MicroVAX for remote generation of IUE scripts and other informational features for the current remote sites. A number of the more generally useful portions of this package (*e.g.* calculating β angles and position angles for targets, copies of the current IUE observing schedule, *etc.*) are available to the general user community. Interested GOs may contact any IUE Resident Astronomer for details and passwords.

2.10 The Service Observing Mode

Observatory Notification Requirements:

The Observatory prefers notification at the beginning of the episode, but at least 30 days notification is normally required. The request should include a completed Service Observing Request form to allow evaluation of the request. (Contact the Observatory or see the GO packet mailed to observers at the beginning of the episode.)

Statement of Policy:

In special cases requiring no real-time science decisions, experienced GOs may not need to be present to perform routine observations. For instance, this mode of observing may be especially useful for long-term monitoring observations which are being scheduled on a weekly or monthly basis. *Note that, though GOs are not required to be at GSFC for service observing, they are normally required to be available for immediate consultation by telephone during the observing shift.*

Requests and all required information for evaluating the observing plan must be received at least 30 days prior to the scheduled shift. GOs will be informed of the results of the review at least a week prior to the shift. GOs are encouraged to submit their requests at the beginning of the episode. Accepted programs may be required to provide observing scenarios for high and low radiation and/or for cool and hot OBC conditions. For more details consult the Service Observing Policy guidelines, which are available upon request from the Observatory (See also the GO packet sent to observers at the beginning of the episode). Scripts may also be transmitted electronically. A FAX machine is available for transmission of finder fields, provided they are legible. Please contact the Observatory for details.

2.11 Observing Time Losses

Observatory Notification Requirements:

A written request must be made to the Project Scientist for consideration of reimbursements of lost observing time. In general, the time loss must be at least 4 hours. Anything less is difficult for the observer to make good use of and for the IUE Observatory to schedule.

Statement of Policy:

Even with optimal planning, observing time may be lost due to a variety of hardware or software problems. In practice, only a very small fraction of time is lost during a shift; however, if it happens on your scheduled shift, it may have a large impact on your program.

Except for necessary overhead, for which no reimbursement is allowed, the Project Scientist is informed whenever an observer has lost a significant amount of observing time (*i.e.* any occurrence which results in a time loss of over 10 minutes in an 8-hour shift). Reimbursements are not made for such small losses, but they are necessary for accurate records. Several minor losses of time during the year may cumulatively amount to a major time loss for a particular program. In addition to hardware or software problems which cause a loss of observing time, any staff errors are also reported. Losses of time which are the result of errors by the GO are not grounds for reimbursement and are generally not reported.

Reimbursement is not automatic. The GO is required to send a written request for consideration of reimbursement for major time losses to the Project Scientist. It will be evaluated on the basis of the impact of the time loss to the goals of the program, whether any non-allotted time is available, and whether reimbursement can be scheduled in a timely basis (*e.g.* a monitoring program).

Common time losses include the following.

- Crash of the ground system computer. The computer simultaneously handles a large number of tasks. It is not unusual for the computer to crash several times a day. Normally, it can be restarted within 2 to 3 minutes and operations can resume. If the crash is caused by a power surge, as may occur during thunderstorms, it may require several hours for the system to be brought back on-line.
- Communications link to the Wallops Island Tracking Station (WPS). The signal received at WPS is converted by a dedicated computer to a digital signal, uplinked to a commercial satellite, downlinked to a GSFC ground station, and then converted

back to an analog signal which is fed to the IUE ground computer. A crash of one of the dedicated microcomputers used in this datalink can cause a temporary loss of telemetry data. Normally this can be restored within a few minutes. In extreme cases, it may be necessary to switch to a backup satellite or ground communications link.

- Receiving and transmitting antennas at WPS. The command and receiving antennas at Wallops are computer controlled. A crash of the controlling computers can result in the antennas temporarily slewing off the spacecraft. Redundant antennas and receivers are available.
- On rare occasions the on-board computer may halt. This crash usually causes a loss of attitude as the spacecraft drifts away from its original pointing. A major attitude recovery will normally be required; this may take several hours.
- Loss of science data. The READ of the cameras is a destructive process. Once the READ is started, the data must be collected by the ground computer. Wallops maintains analog recorders which record the data as it is received by the downlink antenna. If the receiving antenna crashes, the data are lost. If any of the other ground computers crash, the data can normally be recovered using a "history replay". It is extremely rare for an image to be irrevocably lost. The process of recovering the data requires additional time and may delay the shipping of the affected image by several weeks, compared to normally processed images.
- Earth shadow seasons. Earth shadow seasons last for several weeks, twice a year and result in time losses of up to several hours daily.
- Required overhead. Spacecraft rangings are required to periodically redetermine IUE's orbit. If the on-board computer becomes too hot, a period of cooling may be required.

3 Reduction, Shipping, and Publication of IUE Data

3.1 Distribution of IUE Data Products

Observatory Notification Requirements:

Notification is required only if data is to be shipped to someone other than the PI or if IUE archival data is to be requested.

Statement of Policy:

- The PI has exclusive right to his or her new IUE data for six months following receipt of the data. After this, the data will be available to all US astronomers through the National Space Science Data Center (NSSDC) and to foreign scientists through the World Data Center (IUE User Guidelines 1979; also NASA IUE Newsletter No. 5, pp. 15-16, 1979).
- The data will be shipped to the PI unless the Observatory has received a completed **Assignment of Responsibility Form** from the PI designating some other person as the recipient. This is required even if the PI has explicitly designated a Lead Investigator or other person in the original observing proposal (See Appendix V of IUE Newsletter No. 32, or the GO packet sent to observers at the beginning of the episode).
- Information on obtaining archival IUE data is sent to the IUE GOs at the beginning of the episode and is published in the NASA IUE newsletter. Small requests of up to four images may now be obtained from NSSDC via SPAN. Copies of request forms for more extensive requests may be used to obtain data from the Observatory or NSSDC (See the GO packet sent to observers at the beginning of the episode or contact the Observatory). The data stored at NSSDC is current as of the last time the image was processed by IUE SIPS, either the original processing or the last reprocessing that was requested for that data. One may also request that the data be reprocessed with the current processing schemes and calibrations (see Section 3.4).

3.2 Priority and Special Processing of Data Products

Observatory Notification Requirements:

Standard requests should be filled out on the form provided at the Observatory. Special requests should be in writing and addressed to the Operations Scientist for review.

Statement of Policy:

Visiting GOs who wish to have their IUE data processed quickly for use at the GSFC RDAF may routinely request priority processing before the observing run. All other requests for priority or special processing must be submitted in advance to the Operations Scientist for review. Note that the SIPS staff do not usually process images on weekends. Thus observations taken on a Friday will normally not be available until the following Monday at the earliest. This should be taken into account when scheduling RDAF time to coincide with observing runs. A form for priority and special processing requests is available at the Observatory.

3.3 Duplicate Copies of Data Products

Observatory Notification Requirements:

The request must be in writing and on the form provided at the Observatory. For remote observing shifts the on-shift RA will fill out the form with information provided by the GO.

Statement of Policy:

Copies of data for official VILSPA collaborators may be routinely requested through the IUE observing staff during the observing run.

- Only images initiated at one ground station and read down at the other are covered by this Three Agency agreement.
- The US GO must provide a shipping address for the VILSPA collaborator.
- All other requests for duplicate data products must be submitted in advance to the Operations Scientist for review. A request form may be obtained at the Observatory.

3.4 Data Reprocessing Requests

Observatory Notification Requirements:

Please use the form available upon request from the Observatory, or in Appendix V of IUE Newsletter No. 32.

Statement of Policy:

- GOs or archival users may wish to have data reprocessed using the most up-to-date processing software and calibrations. These reprocessed images may benefit from the improved techniques and calibrations that have become available with time. In addition, reprocessing images to a uniform standard facilitates intercomparison of the data. Information on data processing, calibrations, and reprocessing is given in the IUE Data Analysis Guide (NASA IUE Newsletter No. 39, 1989).
- Requests for reprocessing IUE archival data should be submitted to Donald K. West, Operations Scientist, Code 684, NASA Goddard Space Flight Center, Greenbelt, MD 20771.
- Requests should be on the form provided (See the GO packet sent to observers at the beginning of the episode, or contact the Observatory).
- Data reprocessing for approved requests will be performed on a time-available basis, with top priority going to PIs of NASA-supported programs.

3.5 Publications and Acknowledgements

Observatory Notification Requirements:

Not applicable.

Statement of Policy:

GOs are asked to send preprints and reprints of their IUE-related papers to the IUE Observatory in care of the Operations Scientist. The author's name should be annotated on the title page with the footnote: "Guest Observer with the International Ultraviolet Explorer Satellite" (IUE User Guidelines 1979; also NASA IUE Newsletter No. 5, pp. 15-16, 1979).

The IUE Project asks that investigators publishing data obtained from the IUE archives acknowledge the original PI who acquired the IUE data. In addition, the IUE Project asks the investigators acknowledge the use of the Regional Data Analysis Facilities and/or the National Space Science Data Center when appropriate.