SONNEBORN

PROPOSAL INSTRUCTION PACKAGE

FOR

THE SEVENTEENTH EPISODE

OF THE

NASA

IUE GUEST OBSERVER PROGRAM

AUGUST 1993

PLEASE READ CAREFULLY FOR SIGNIFICANT CHANGES

Setting Up A Remote Observing Site

Dear Colleague:

A remote IUE observing site can be set up at most institutions with little difficulty. All that is required is a workstation (VMS or Unix OS) which is running some version of IDL. We have a software package which we can send you (free of charge) which, once installed, lets the workstation display the EDS image and perform the same manipulations as are available at the local site.

We are working on a version of the software package which will run with IRAF, so that observers who do not have IDL will not need to buy IDL. At the time of this mailing, the IRAF version is not yet ready.

If you are interested in setting up a remote site, please contact Ron Pitts at 301-286-8060 (IUESOC::PITTS).

Sincerely.

Bruce McCollum

Bruce McCollum

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Dear Colleague:

I would like to remind you that a remote IUE observing site can be set up at most institutions with little difficulty. All that is required is a workstation (VAX or Unix OS) which is running some version of IDL. We have a software package which we can send you (free of charge) which, once installed, lets the workstation display the EDS image and perform the same manipulations as are available at the local site.

If you are interested in setting up a remote site, please contact Ron Pitts at 301-286-8060 (IUESOC::PITTS).

Sincerely,

Bruce McCollum

Bruce McCollum

MESSAGE FROM NASA HEADQUARTERS TO PROSPECTIVE IUE PROPOSERS

Even with HST in orbit, IUE has many capabilities not duplicated by any other space observatory. Its geosynchronous orbit has provided flexible observing schedules for target-of-opportunity objects such as novae, supernovae, cataclysmic variables and comets, as well as simultaneous observing with other astrophysical satellites. As the only astrophysical observatory currently in high earth orbit, only IUE has this flexibility in scheduling. Because of IUE's high observing efficiency resulting, in part, from its orbital environment, it is possible to invest large amounts of observing time in any given project. In addition, the IUE has broad wavelength coverage with spectral resolution up to 0.1 Å, and a large entrance aperture for observations of extended objects. Finally, the exceptionally stable photometric response of its SEC-vidicon detectors have made possible very long (spanning the lifetime of IUE) monitoring projects and an unusually uniform, well-calibrated dataset suitable for studying a variety of astrophysical objects and problems.

Several important fundamental problems need the unique capabilities of the IUE in programs that require multifrequency monitoring. Future IUE observing programs would not be limited only to such problems. Particularly serious consideration will be given by the IUE Review Panels to projects that:

(a) address the unique capabilities of the IUE,
(b) are part of a multifrequency program, and
(c) address fundamental astrophysical problems.

PROPOSALS SHOULD SPECIFICALLY DISCUSS THESE POINTS

A few examples of the types of physical problems that can be addressed are given below. This list is by no means exhaustive; however, other critical programs should be in the spirit of those given below:

- Probing the nature of accretion physics and mass flow in active galactic nuclei (AGN), massive X-ray binaries, cataclysmic variables, other interacting binary stars, and disks of protoplanetary systems. These investigations require extensive multifrequency monitoring programs, usually including observations from other space observatories.

- Delineating the spectral evolution and observational properties of outbursts associated with novae and supernovae, as well as stellar flares in late-type stars. Such studies require IUE's monitoring capabilities.

- Multifrequency monitoring programs to determine stellar cycles analogous to those seen in the Sun in late-type stars. These programs not only take advantage of the fact that the IUE has already devoted large amounts of observing time to these programs, but that the stability of the IUE detectors has led to a very uniform dataset for studying chromospheric and continuum variability in these stars. These observations could involve several space and ground-based observatories, covering optical, UV, EUV, and possibly soft X-ray wavelengths.

- Observations of spatially extended emission such as planetary aurorae, supernova remnants, nebulae, and extragalactic star formation regions. Observations of these objects make use of the large entrance apertures of the IUE spectrographs. The large 10 x 20 arc second apertures allow the detection and mapping of very weak extended emission in a variety of nebulae.

- Variable astrophysical phenomena. The IUE uniquely probes ultraviolet variability on the timescale of years. Its very stably calibrated datasets allow direct determination of changes in stellar activity cycles, AGN line and continuum emission, and long-term planetary atmosphere activity.

SUMMARY OF CHANGES FROM PREVIOUS PROPOSAL INSTRUCTION PACKAGES

The entries below highlight and reference significant changes in content or emphasis from previous instruction packages. More recent changes are listed first.

ALL PROPOSERS ARE URGED TO READ THE ENTIRE INSTRUCTION PACKAGE CAREFULLY

REFER TO:	CHANGE:
Page 11	Proposals submitted by **September 30, 1993**, will be reviewed for inclusion in the observing year beginning around January 1, 1994, and ending September, 1994.
Page 21	Electronic submission of target list in the correct format is **REQUIRED.** In addition, a printed list in the proper format is needed. (If you do not have access to a computer network, please make arrangements with TOC personnel.)
Page 14,18-19	The **STREAK**
Page 19	Light contamination at high betas
Appendix E	Comet Shoemaker-Levy Impact on Jupiter
	THERE IS NO COST SECTION REQUIRED

PHOTOGRAPHIC TRANSPARENCIES OF RAW IUE DATA ARE NO LONGER DISTRIBUTED TO OBSERVERS.

PLEASE TALK TO TOC PERSONNEL ABOUT THE ALTERNATIVES.

Page 3	The ten-page limit for the description of the proposed research program, including text, tables, and figures will be strictly enforced. No appendices, vitae, etc. should be attached to the proposal.
Page 7	Abstracts should be limited to no more than 200 words.
Page 4	The summary information page should include the proposers' e-mail addresses, list of number of shifts requested by IUE episode, and give the number of existing archival images to be analyzed in conjunction with the observing program.
Page 10	A new research category, "Very Large Projects", has been defined in the last few years.
Page 18	Expected closure of the aperture mechanism, special wavelength calibration images, heavy overexposures, and battery discharges should be noted under Special Requirements and described in the text of the proposal.
Page 18	Expected beta ranges for hot on-board computer and power constraints have been revised.
Page 20	The IUE Project is preparing to produce a new, significantly enhanced version of the IUE Archives.

1. INTRODUCTION

On January 26, 1978, NASA successfully launched the International Ultraviolet Explorer (IUE) which was designed and built by NASA, the United Kingdom's Science and Engineering Research Council (SERC), and the European Space Agency (ESA) to obtain ultraviolet spectra of astronomical objects. IUE Guest Observers selected as the result of the sixteenth annual proposal review cycle are now obtaining observations. Sixteenth episode observers are scheduled to use the IUE for about the next 9 months of operation. Currently, NASA is receiving proposals for science programs to be supported during the seventeenth year of IUE operations which will begin in January, 1994. 17th Episode programs will run concurrently with those of Episode 16 for several months. SERC and ESA are allotted one-third of the observing time (i.e., 8 hours a day) for research which they sponsor. These two agencies are also inviting new observing proposals and will again review, select, and schedule observers jointly. The present instructions apply only to proposals being submitted to NASA. These instructions apply only to proposals requesting observing time; proposals to analyze existing, archival data only are to be submitted separately in accordance with a NASA Research Announcement (Astrophysics Data Program NRA 93-OSS-05 from by NASA Headquarters, dated August 26, 1993.

No special qualifications are demanded of proposers. The Principal Investigator (PI) has the prime responsibility for the planning and execution of the observing program and receipt of data products. A Lead Investigator (LI) may be designated, if needed due to institutional regulations or other requirements. The PI may then choose to delegate his or her responsibilities to the LI. The PI may also choose to delegate responsibilities to a Co-Investigator (Co-I); otherwise a Co-I has no special responsibilities. If a graduate student is to be the PI, the proposal should be accompanied by a letter from a faculty advisor certifying that the student is in good standing within the graduate program, is a candidate for the Ph.D. degree, and that the faculty advisor endorses the research program and will supervise it. Students listed as LIs or Co-Is do notneed faculty recommendations.

The purpose of this proposal package is to provide prospective proposers with information needed to submit their proposals and a brief general description of IUE Observatory science and data operations systems. Section 2 gives the instructions for the submission of proposals and the requirements for the contents of the technical section. Section 3 addresses proposals for targets of opportunity, and Section 4 describes proposals for short, high priority observations. Section 5 describes the IUE observing activities, including previsit planning and scheduling, daily planning, observing with the telescope, and data processing at the IUE Science Operations Center. Section 6 provides instructions for completing the IUE Observation Specification Form. For your information, a short history of IUESIPS reduction software changes of interest to archival data users and lists of the observing programs already approved by NASA, SERC, and ESA for the sixteenth year of operation are given in the Appendices.

2. THE PROPOSAL

The proposal shall contain a Technical Section as described in Section 2.1.

2.1 Technical Section

Each proposal should be confined to a single, specific objective and not describe a "grab bag" of observations. Since there is a great demand for IUE observing time, proposals for large observing programs need to be strongly justified. Proposers who do not require long exposures should consider requesting to be scheduled during NASA Shift 2 (see Section 5.3 for a description of the characteristics of Shift 2), since the competition for these shifts is less than for Shift 1. Every proposal should explicitly describe the observing program, why ultraviolet data from IUE are required, and the type of data analysis to be performed.

Proposers should also note the new discussion points outlined in the "Message from NASA Headquarters" on page iii.

In preparing the proposal it is worth remembering the following criticisms which have been frequently expressed by reviewers of previous IUE proposals:

1. Insufficient scientific justifications. Many proposals read like "fishing expeditions".

2. Insufficient justification for IUE data. Many scientific objectives could be achieved using ground-based observations.

3. Insufficient reference to existing observations from other UV satellites, from the IUE data archives, and from the proposer's previous IUE observing runs. Proposers are asked to explicitly address existing data in a required section of each proposal.

4. Excessively long and unprioritized target lists. Proposers should not "lay claim" to all potential targets for their projects. Proposers should clearly identify those targets they are most interested in observing.

5. Absence of justification for the specified exposure times and requested number of shifts. Historically, proposal observing time requests have oversubscribed available Shift 1 (US1) time by a factor of three and available Shift 2 (US2) time by about a factor of two. Hence, requests are critically reviewed by the peer panels judging them and should be well-justified.

The Technical Section of the proposal is composed of five parts and must be complete as submitted, without appendices, curriculum vitae, or other supporting documents. The various parts of the Technical Section should conform to the following page limitations and be presented in this order:

	Part	Length Limitation
A.	Title Page	1 page
B.	Summary Information Page	1 page
C.	Previous IUE Programs	1 page
D.	Proposed Research Program	10 **double-spaced** pages
E.	IUE Publications/Research in Progress	2 pages
F.	Observation Summary Sheet	Use format provided
G.	Targets for Observation	**Submit electronically**

Sections 2.3 and 2.4 give more explicit information about target list submission.

Note that the proposal must be limited to 10 pages, including tables and figures, and with the text double-spaced.

If the proposal text is produced on a laser printer, the type font should be 10 to 12 point; 8 point is too small. Use of dot-matrix printers which do not produce letter-quality characters is strongly discouraged. Pages should be numbered.

In order to simplify the review and promote a fair evaluation of all proposals the following standard format should be used:

A. <u>Title Page</u>

The Title Page should contain the following items:

1. Proposal Title
2. Principal Investigator's Name, Institution, Address, Telephone Number, E-mail address, signature

3. Lead Investigator's Name (if applicable--see below), Institution, Address, Telephone Number, Signature
4. Co-Investigators' Names, Institutions, Addresses, and Signatures
5. Faculty advisor endorsement if P.I. is a student
6. Institutional approval signatures, if required

In some cases, the person formally designated as Principal Investigator may not intend to play the lead role in the acquisition, analysis and interpretation of the data. In those cases, the Lead Investigator should be clearly identified and distinguished from any other Co-Investigators. After proposal selection the PI may choose to have most Observatory communications carried on directly with the Lead Investigator.

B. Summary Information Page

This page summarizes some important data in a convenient form and contains the abstract of the proposal. It <u>MUST</u> be confined to a single page and shall be organized as follows:

SUMMARY INFORMATION

Proposal Short Title: (must be less than 70 characters)__________

Investigator(s): (PI first; Lead I, if any, underlined; Co-Is)__________

PI's Institution:______________________________________

E-mail addresses:______________________________________

Proposal Category: Regular____TOO____Large Project____
Consortium_____ Very Large Project: _______

Research Category: Primary (See below) Secondary (See below) Please specify subcategories as defined below.

No. of 8-hour shifts requested: US1: ______ US2: ______

Approx. number of targets: ______ Approx. number of spectra: ______

No. of existing images to be analyzed for this research: (See below)

No. of images for which reprocessing will be requested: (See below)

Special requirements: (See below)____________________________

Related proposals submitted to ESA-SERC: (See below)__________

ABSTRACT

(Place abstract here - may be single-spaced, and no more than 200 words).

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a) Research Category

The proposer should classify his or her proposal into one of the research categories listed below. This classification will be considered in assigning the proposal to the most appropriate science review panel. The choice of category identifies the expertise of reviewers who are best suited to judge the proposal. The designated research category may be changed by the Observatory if, in its judgement, another category would be more appropriate for the review or to better distribute the proposals among panels. A critical factor in any decision to change the proposer's designation of research category is the need to ensure that all proposals having similar goals are judged by the same panel.

Please note the category, "Very Large Projects", defined on the basis of a recommendation from the IUE Users' Committee. This category involves proposals which address broad, interdisciplinary, or fundamental issues, considered broader in scope than those in the "Large Projects" category. Some examples might be studies of the physical processes producing winds in a variety of types of stars; investigations of the interactions between a hot star, a circumstellar gas, and the interstellar medium; or synoptic studies of the behavior of emission lines at different ionization temperatures in active galactic nuclei. It is anticipated that proposals under this category would require larger allocations of IUE shifts than "Large Project" proposals.

RESEARCH CATEGORIES

A. Hot Stars	- Subclass A1.	- Mass loss Spectroscopic variability
	- Subclass A2.	- Spectral energy distributions Fundamental stellar parameters (M,L,R, T_{eff} and abundances) Hot stars in other galaxies
B. Cool Stars	- Subclass B1.	- Chromospheric, transition region, and coronal activity (generally F,G, and K stars) Mass loss
	- Subclass B2.	- Variability in M stars Hot companions of cool stars Pre-main sequence stars
C. Variable Stars		- Pulsational variables Spotted stars (RS CVn stars, etc.) Flare stars Others (R CrB stars, etc.)
D. Interstellar Material		- Gas absorption Dust extinction Circumstellar material
E. Nebulae		- Planetary nebulae Reflection nebulae Emission nebulae Supernova remnants
F. Extragalactic	- Subclass F1.	- AGNs Quasar variability Other galaxy variability
	- Subclass F2.	- Quasar continua and absorption Composite stellar systems (galaxies, star formation, regions, globular clusters, etc.)
G. Solar System Sources		
H. Binary Stars	- Subclass H1.	- Radial velocity studies Photometric variation studies
	- Subclass H2.	- Mass exchanging systems Cataclysmic variables Symbiotic stars X-ray sources Supernovae
L. Large Projects		
V. Very Large Projects		

Often proposals will bridge categories. For example, a researcher may propose to study the properties of hot stellar atmospheres (Hot Stars category) by determining the luminosity of the central stars of planetary nebulae (Nebulae category) through an investigation of the interstellar extinction of field stars near the nebulae (Interstellar Matter category). In this example, the scientific goal (to study stellar atmospheres) and the technique to be used (measurement of extinction) could assign the proposal to different review panels. In addition, the targets in this example may be included on other proposals so that a third panel, that for nebulae, should be made aware of the proposal. If no single category fits the proposal well, the proposer may list a primary and a secondary category. In all these cases the IUE Observatory staff will decide which panel or panels (but normally only one) will review the proposal.

b) Number of Shifts Requested, Targets, and Spectra

The proposer should explicitly divide shift requests between US1 and US2 time. See Section 5.3 for a discussion of the differences between the two US shifts. Please estimate approximately how many targets you propose to observe and how many spectra you wish to obtain for this research proposal.

c) Existing Data

Proposals which involve analysis of archived IUE data, as well as new data, should identify the number of existing images believed applicable to the proposed research. Any anticipated requirement for reprocessing of some or all of these existing data (see Section 2.1D) should also be identified. Researchers who expect to propose to do a significant amount of archival data analysis as part of their seventeenth episode observing program may find it to their advantage to propose separately for observing time and for archival research support under the NASA Headquarters Astrophysics Data Program.

d) Special Requirements

Any special requirements should be noted on the line indicated on the Summary Information Page. In addition, the requirements should be discussed fully in the description of the observing program in Part D of the proposal. Examples of these requirements follow. Please note that some of these items now require IUE Project Approval (denoted by [PA]), due to the potential impact on other observers or on the aging spacecraft systems.

- Special scheduling constraints, such as coordination of IUE observations with other satellites or ground-based telescopes, time-critical observations, periodic observing dates for variability monitoring, or observations requiring specific aperture orientation.
- Special observing techniques, such as tracking of rapidly moving targets or acquiring time-resolved spectra.
- High priority targets, especially if they constitute a minority of the targets listed on the Observation Specification Form.
- Special scheduling requests, such as requests for half shifts.
- Heavy overexposures, which are defined to be overexposures of 50 times or more, relative to an optimum exposure of 210 DN (see below). This refers to the cumulative overexposure in a given shift.[PA]
- Battery discharge, such as observations of comets at small sun angles (see Section 5.4).[PA]
- Target of opportunity, which may require special scheduling arrangements.[PA]
- Use of the aperture mechanism or special wavelength calibration observations.[PA]

IUE's Three Agencies have a policy which limits the frequency with which large overexposures of the IUE cameras may be performed. As observers continue to push the capabilities of the instrument, use of both very long exposures and heavy overexposures has increased. However, very overexposed spectra can contaminate long exposures for many days afterwards. Proposers should therefore specify if heavy overexposures are planned in the Special Requirements section of the Summary Information Page. A "heavy overexposure" is defined to be more than a 50 times overexposure, relative to an optimum exposure of 210 DN. Include details of such observations in the description of the observing program in the text.

Some proposers (or proposal teams) submit similar proposals to NASA, and to ESA and the SERC. Programs which require any level of coordination should be listed giving the titles and authors of these other proposals. If the observing schedules of the several proposals need to be coordinated, please note this.

Observing dates for collaborative programs which have coordinated NASA and ESA/SERC shifts will be determined very soon after successful proposals are announced. Both NASA and ESA/SERC proposals should contain complete information to properly schedule the proposed coordinated observations. The dates for the observing shifts for collaborative programs will be assigned by the beginning of the episode.

e) Abstract

The Abstract should be a carefully written narrative summary of the proposed research including a clear statement of the proposal's scientific objectives. The Abstract may be single-spaced. It should be no longer than 200 words.

C. Previous IUE Programs

This information should be divided into two parts. Part 1 is a summary of previously approved IUE programs involving (in any investigative capacity) the Principal Investigator and/or any of the Co-Investigators. It should list such programs according to the format prescribed below. This information should appear immediately following the proposal's Summary Information Page.

APPROVED IUE PROGRAMS

Short Title & Investigators	Year (1,2,3, ... or 16	Shift Allotment (US1, US2, AR = archival research including SADAP and ADP programs)
1.		
2.		
3.		

The list of previous and/or current programs should be limited to one page. Lists which would otherwise be longer may, for example, specifically identify programs most closely related to the present other programs with a summary statement such as "_____ other programs assigned _____ shifts."

D. Proposed Research Program

This section contains the main body of the proposal and should be limited to ten <u>double-spaced pages</u>. It should be clearly and concisely written and should generally conform to the following outline:

1. Introduction
2. Description of the scientific objective(s)
3. Discussion of why IUE data are needed for this problem
4. Discussion of existing IUE data and their applicability to this program, and why additional data are necessary

5. Description of the observing program, including estimates of exposure times for proposed new observations of targets
6. Description of the expected methods of analysis

Please note that item 4, above, is <u>required</u> as a topic to be explicitly addressed by each proposal. In each case this information will be <u>critically evaluated</u> by the review committee considering the scientific merit of your proposal and your request for observing time. Proposers might anticipate, however, that in questionable cases the review panels may expect a stronger, more convincing justification for new data from experienced IUE users than from potential new users. Reviewers will be provided with cross-reference listings which identify existing spectra of proposed targets.

Interactive searches through the IUE Merged Log may be performed through the IUE Data Analysis Center (see Section 5.5).

In many cases, existing IUE spectra are, in their originally processed form, directly applicable to new research programs. In certain cases, however, reprocessing of older spectral images with current IUE Spectral Image Processing System (IUESIPS) reduction software may be appropriate. Enhancements installed in IUESIPS software at various times are summarized in Appendix I of these instructions. References describing these enhancements are also provided. The IUE Project is prepared to reprocess older data with current software on a resource-available basis in support of approved seveneenth episode programs. Following approval of the research program the PI must request this reprocessing in writing. Justifications will be evaluated, for instance, in terms of the need for a detailed comparison of images originally processed with software in use at different epochs, or in terms of a demonstrable need to take full advantage of processing enhancements in order to achieve the scientific goals of a program. However, proposals should discuss any <u>expectation</u> of the PI to request reprocessing of spectra and should estimate the number of spectra involved. Request procedures for obtaining archived IUE data and reprocessing requests are described in IUE NASA Newsletter No. 39, pg. 35, July 1989 (ISSN 0738-2677).

<u>Any special requirements which your program may have should be fully described in this part of your proposal</u>. Examples of such requirements were given in Section 2.1B of these instructions. Proposals involving coordinated observations with the IUE and other ground-based or satellite facilities should address the criticality of the other observations to the success of the proposer's IUE program. Steps being taken to ensure the availability of the other observations, e.g., coordinated observing time at multiple, geographically separated ground-based facilities should be noted. The proposal should contain all information required to properly schedule the proposed observations. Proposals for time-critical observations should provide scheduling tolerances and either specific dates and times or ephemerides for periodic phenomena. Expected heavy overexposures, use of the aperture mechanism, or expected battery discharge should be fully described.

The proposal should include a clear discussion of the feasibility of any unusual or non-standard observing and/or data analysis techniques. No assumption should be made that either the Resident Astronomer performing the feasibility review or the Peer Reviewer is familiar with particular techniques. <u>Any questions regarding feasibility may be discussed with the IUE Observatory staff prior to proposal submission (phone (301) 286-7537)</u>.

The proposer should include a description of the existing data for his or her targets. Justification for the new observations, explaining why the existing data are not sufficient to obtain the proposed scientific goals, should be presented.

In addition, the description of the observing program should contain a list of targets with <u>estimates of exposure times for proposed observations provided for each target.</u> Finally, the number of 8-hour shifts being requested should be justified in terms of the required exposure times and the number of exposures given in the target list. Exposure times may be estimated from the sensitivity curves given in Section 5.3 and from the exposure information provided for entries in the merged log. When determining the requested number of shifts, refer to the comments on set-up time and observing efficiency to be found in Section 5.3 of these Instructions.

E. IUE Publications/Research in Progress

Part 2 of this section is a further summary of previous or ongoing IUE research programs. Part 2 should be placed at the very end of the proposal. Part 2 should contain a bibliography of IUE-related publications resulting from the previously approved programs listed in Part 1, or from analysis of other IUE data. It should also contain a very brief status report on IUE research programs still in progress. A sample format for Part 2 data is given below.

IUE-RELATED PUBLICATIONS
(Title, authors, reference)

1.
2.

STATUS OF IUE RESEARCH IN PROGRESS
(100 words or less for each major area of research)

Part 2 should be limited to two pages. Longer bibliographies might specifically address IUE research in progress and only those published works most closely related to the current proposal. A summary statement such as "There are _____ other IUE-related publications credited to this proposal's investigators" may be used at the end of a truncated list.

G. Targets for Observation

The targets that are proposed for observation must be submitted by electronic mail to the TOC according to the format specified in Section 6. A printed versionof the target list in the indicated format is to be included with each proposal.

A detailed discussion of target list submission requirements is in Section 6.

After the proposal has been approved, targets may be added only with the Project Scientist's approval. He generally approves all reasonable requests, if the new targets are consistent with your approved research objectives and if the targets are not already on the list of another program with similar research objectives. The NASA IUE Users' Committee recommends that at least 75 percent of a program's observing time be devoted to the originally proposed targets.

2.2 Large Projects and Consortium Proposals

In the eleventh episode a new category of observing proposal known as "Large Projects" was introduced, one-year proposals that ask for 10 or more US1 shifts and/or 15 or more US2 shifts. In principle, Large and Very Large Project proposals will be considered only for that category; however, in special circumstances, peer review panels may accept portions of such Projects, making them ordinary projects.

If investigators located at several different institutions wish to submit a collaborative program of significant scope, they may submit a consortium proposal. A consortium proposal should be clearly designated as such on the title and summary pages; its counterparts from other institutions should also be unambiguously identified.

2.3 Submission of Proposals

Proposals may be submitted at any time. Complete proposals in hand by September 30, 1993, will be reviewed for inclusion in the observing year starting in January, 1994. Those received after September 30 will not be accepted unless marked for the Project Scientist's Discretionary Observing Time (see Section 4).

(Scientists planning to submit proposals to SERC and ESA should request information from those agencies about their deadline for receipt of proposals requesting observing time during their seventeenth year of operations.)

To be complete, proposals must address each of the aforementioned items and be submitted in the following number of copies (including originals):

- o Twelve (12) copies of the Technical Sections including target lists.
- o Three (3) additional copies of the Title Page and Summary Information Page (first two pages of the proposal) alone.
- o Electronic submission of target list **AND** printed version of target list

These materials should be submitted to:

Dr. Donald K. West
IUE Operations Scientist
Code 684 (Bldg. 21, Room G61C)
NASA/Goddard Space Flight Center
Greenbelt, Maryland 20771
Telephone: 301-286-6901

If the proposals are to be shipped via an express mail service, please be sure to include the building and room numbers.

Additional questions concerning the submission or review of proposals may also be addressed to the IUE Operations Scientist. Proposals are first reviewed by members of the IUE Observatory staff for technical feasibility.

A peer group of scientists chosen from the astronomical community at large provides NASA with a scientific evaluation of each proposal. NASA Headquarters makes the final selection. Proposers should receive notification of results by letter in December 1994.

In summary, the schedule for the submission, review, and notifications for the IUE proposals is given below.

September 30, 1993	Proposal due date, to be included in the sixteenth episode observing proposal review
November 1993	IUE observing proposal peer review
December 1993	IUE observing proposal selection and notification
January 1, 1994	Approximate beginning of Episode 17

3. PROPOSALS FOR TARGETS OF OPPORTUNITY

There are two types of unscheduled observing time that can be made available with the approval of the Project Scientist. The first deals with major targets of opportunity, such as novae or comets. Scientists wishing to observe such targets should submit proposals according to Section 2 of these Instructions. Target of opportunity status should be clearly noted under the Special Requirements section of the Summary Page. The proposals will be reviewed in the regular review cycle. When suitable targets appear, the Project Scientist will consult with the approved observers and determine how much of the allotted observing time should be devoted to the particular event under discussion. regular review cycle. When suitable targets appear, the Project Scientist will onsult with the approved observers and determine how much of the allotted observing time should be devoted to the particular event under discussion.

4. PROJECT SCIENTIST'S DISCRETIONARY OBSERVING TIME PROPOSALS

The second type of unscheduled time, called Project Scientist's Discretionary Observing Time, is intended for short observing projects for which no approved observing program exists. Normally, of course, proposals for such projects will be held for consideration during the next proposal review cycle. However, the Project Scientist may approve Discretionary Observing Time in those cases where the observation is required by a certain date or where the scientific timeliness of the project is such that it should be done quickly. Requests will also be considered if one or two additional observations are needed to complete an already approved observing program or if one or two exploratory observations are needed to demonstrate the feasibility of a new observing program. A proposal for Discretionary Observing Time may consist of an informal letter describing the observations and the scientific objective, and explaining why discretionary time should be granted in lieu of consideration during the next proposal cycle. These requests should be identified as proposals for use of the Project Scientist's Discretionary Observing Time and should be sent to the Project Scientist, Dr. Yoji Kondo, at Code 684, NASA GSFC, Greenbelt, MD 20771.

Since the total amount of discretionary time is limited, only projects that can be accomplished in one or two observing shifts are likely to be approved. All requests for discretionary time will be considered, but if at all possible they should be in the Project Scientist's hands three months in advance of any specific observation dates requested. In judging a late request, the objections from scheduled observers who would be preempted will be taken into consideration.

5. IUE OBSERVATORY SCIENCE AND DATA OPERATIONS

A detailed description of the IUE and its in-orbit performance can be found in two papers by Boggess et al. (Nature 275, pp. 372-415, 1978), in the calibration papers by Bohlin et al. (Astron. & Astroph. 85, pp. 1-13, 1980), by Holm et al. (Astron. & Astroph. 112, pp.341-349, 1982), by Thompson et al. (Astron. & Astroph. 107, pp. 11-22, 1982), and in numerous IUE NASA Newsletter reports. Further information on observing techniques and operational constraints is available in the "IUE Observing Guide" (published in NASA IUE Newsletter No. 47) which may be obtained from the IUE Observatory staff. Proposers are invited to discuss specific technical questions with the staff before submitting proposals.

The summary which follows should suffice for the preparation of most proposals.

5.1 The IUE Observatory

The IUE Observatory consists of the flight system plus the ground system. The flight system includes the spacecraft, the telescope, and the scientific instrumentation. The ground system includes the NASA IUE Science Operations Center located at the Goddard Space Flight Center in Greenbelt, Maryland, and the European Space Agency Operations Control Center near Madrid, Spain. In addition, NASA has established an IUE Regional Data Analysis Center at Goddard. These facilities are described further in Section 5.5.

The IUE is in a geosynchronous orbit having an inclination of about 34 degrees. It is visible 24 hours per day from the NASA tracking station at Wallops Island, Virginia. The IUE Observatory is designed to make maximum use of the continuous contact offered by the geosynchronous orbit. Normally, Guest Observers come to the Observatory's Science Operations Center at Goddard or observe from a remote site, taking an active part in the real-time control of their observations and the analysis of their data. This approach has the benefit thatthe Guest Observer has the flexibility to take advantage of observing opportunities as they arise. Experienced Resident Astronomers and other IUE

Observatory staff members assist the Guest Observer in optimizing the scientific output from IUE by providing real-time advice on program planning, instrument operation, and data reduction techniques.

5.2 The IUE Spacecraft

The IUE is a three-axis-controlled spacecraft able to point to any position on the celestial sphere which lies more than 45 but less than 152 degrees from the sun. The spacecraft control system can repoint the telescope to a new target star with slew rates of 4 to 6 degrees per minute per axis. Telescope pointing is controlled by operators in real time from the IUE Telescope Operations Center with the aid of a ground control computer. Through a series of commands from the ground computer, the spacecraft can be instructed to slew, one axis at a time, using an on-board inertial reference unit to control the slews. After slewing, the desired new target typically falls within 3 to 6 arcminutes of the center of the acquisition field of view, which is up to 16 arcminutes in diameter. The inertial reference system together with an offset tracker is used to guide the telescope during long exposures.

The IUE spacecraft is currently controlled by the two-gyro/FSS attitude-control system, following a gyro failure on August 17, 1985. The system is described by Sonneborn (NASA IUE Newsletter No. 28, pg 147-153, also NASA IUE Newsletter No. 31, pg. 36).

5.3 Scientific Instrumentation

The scientific instrument consists of a 45-cm diameter f/15 Cassegrain telescope, offset star tracker, and two echelle spectrographs for ultraviolet spectroscopy in the spectral region between 1150 and 3200 Angstroms. After completion of a slew, a field (normally 11 arcminutes square) is scanned by the image dissector in the offset star tracker. The resulting visual image i relayed to the ground by the spacecraft telemetry system, recorded in the ground computer, and displayed on the observer display console. This image has low (8 arcsecond) optical resolution, but is adequate for the pattern matching needed to recognize a star field. After the astronomer identifies the target star, small slews are calculated with the ground computer to center the star in a spectrograph aperture. The offset star tracker is then set on a guide star elsewhere in the field and used to control telescope pointing (to an accuracy typically better than 1 arcsecond). The physical parameters of the telescope and spectrographs are given in Table 1. Data on the sensitivity of the scientific instrument are summarized in Figure 1.

The Short Wavelength Prime (SWP) camera and the Long Wavelength Prime (LWP) camera are the standard cameras available for use. The Short Wavelength Redundant (SWR) camera has not been functional since launch. Use of the Long Wavelength Redundant (LWR) camera is limited to its new configuration with lowered sensitivity (see NASA IUE Newsletter No. 28, pg. 7 ff). Comparisons of the LWP and LWR cameras exist in a number of reports (NASA IUE Newsletter No. 24 and No. 28). Proposers are advised to propose observations and make exposure time estimates and shift requests for the SWP and LWP cameras. Proposers using the cumulative merged logs to scale LWP exposure times from those for existing LWR spectra should consult IUE NASA Newsletter No. 24, June, 1984, p. 21 or the GO Guide for appropriate factors. In general LWP exposure times are about 80% of those obtained with the LWR. [Be certain to scale <u>net</u> data numbers (DN) and account for differences in the background signal in evaluating expected exposure levels.]

Approximate IUE exposure times in seconds may be estimated from the following:

1) $t_{HIGH} = E\,\lambda^{1}/F$ Å for large aperture, high dispersion, where $E\,\lambda^{-1}$ is given by the graph in Figure 1, and $F\,\lambda$ is the flux in (erg cm^{-2} s^{-1} Å $^{-1}$) for a continuum point source or (erg cm^{-2} s^{-1} Å $^{-1}$) per 10 $arcsec^2$ for an extended source.

For small aperture spectra, multiply these exposure estimates by 1.9 for the short wavelength spectrograph or 2.0 for the long wavelength spectrograph.

Features which are located off the peak of the echelle ripple will require longer exposure times to bring them up to the optimum level:

$$t_{OFF\text{-}PEAK} = X^2 \sin^2(X)\, t_{HIGH}, \quad \text{where} \quad X = \pi m^2 \; [\lambda - (K/m)]/K \,,$$

$$K = \begin{cases} 137{,}725 \text{ for the SWP camera} \\ 230{,}701 \text{ for the LWP camera} \end{cases},$$

and m = the order number; i.e., $m = \mathrm{INTEGER}[(K/\lambda)+0.5]$

2)

$$t_{LOW} = \begin{cases} t_{HIGH}/87 \text{ for SWP low dispersion} \\ t_{HIGH}/70 \text{ for LWP low dispersion} \end{cases}$$

These equations are appropriate only for continuum sources. For emission line sources the low dispersion exposure time should be multiplied by a factor of about
6/FWHM, where FWHM is the full-width (Angstroms) at half-maximum for the line.

3) $t_{TRAILED} = 3.7\, t_{LOW}$.

Absolute fluxes from IUE spectra are believed to be good to 10 percent in optimum conditions but may be degraded for high background or underexposed images because of residual non-linearities in the calibrations. A combination of high readout noise, low dynamic range, and some fixed-pattern noise keeps the signal-to-noise ratio for a single optimally-exposed spectrum in the range of 10 to 12.

Guest Observers should be alert to the fact that as a result of the FES Scattered Light Anomaly, long (> 1 hour) LWP low-dispersion exposures may be contaminated by scattered sunlight, particularly at the long wavelength end of the LWP. This contamination worsens for observations at high beta angles, and manifests itself as a solar spectrum filling the aperture.

NASA operates the Observatory for two 8-hour shifts each day. Observers awarded time on each may be scheduled to observe on two shifts, i.e. for 16 consecutive hours. Experience has shown that the telescope can be used more efficiently during long observing sessions than during short ones. The two NASA shifts are not of equal quality, however. US1 shifts occur when the satellite is near apogee and well above the trapped radiation belts. US2 shifts, on the other hand, occur when the satellite is near perigee. During US2 shifts a high particle radiation environment can produce high background signals in recorded images - an effect comparable to background fog on a photographic plate. The radiation environment during US2 varies on timescales of a few days and is generally not predictable. Recent experience indicates that during some portion of their shifts US2 observers are restricted to exposure times of less than two hours about 70 percent of the time, of less than one hour about 40 percent of the time, and to exposure times of less than 15 minutes about 10 percent of the time. The affected portion of the shift addressed by these numbers is itself variable. In the worst case a particle radiation background level near a given day's peak value will persist throughout the US2 shift. (See IUE NASA Newsletter No. 35, July 1988, page 91.) Proposers requiring some exposures longer than 90 minutes may find it advisable to request some US1 observing time.

Conversely, observers granted US2 time should devise observing programs that include some short exposures in order to make good use of high radiation time.

Table 1

Scientific Instrument Parameters

Telescope

Figure	Richey Chretien
Aperture	45 cm
Primary focal ratio	f/2.8
Effective focal ration	f/15
Plate Scale	30.5 arsec/mm
Image Quality	3 arcsec
Acquisition Field	16 arcmin diameter

Spectrographs

Type	Echelle	
Entrance Apertures	3 arcsec circle	
	10 x 20 arcsec ellipse	
Dectectors	SEC Vidicon Cameras	
High Disp Range	SWP: 1165-2126 Å	LWP 1845-3230 Å
Resolving Power	10000	10000
Low Disp Range	SWP: 1150-2000 Å	LWP 1825-3300 Å
Resolution	6 Å	6 Å

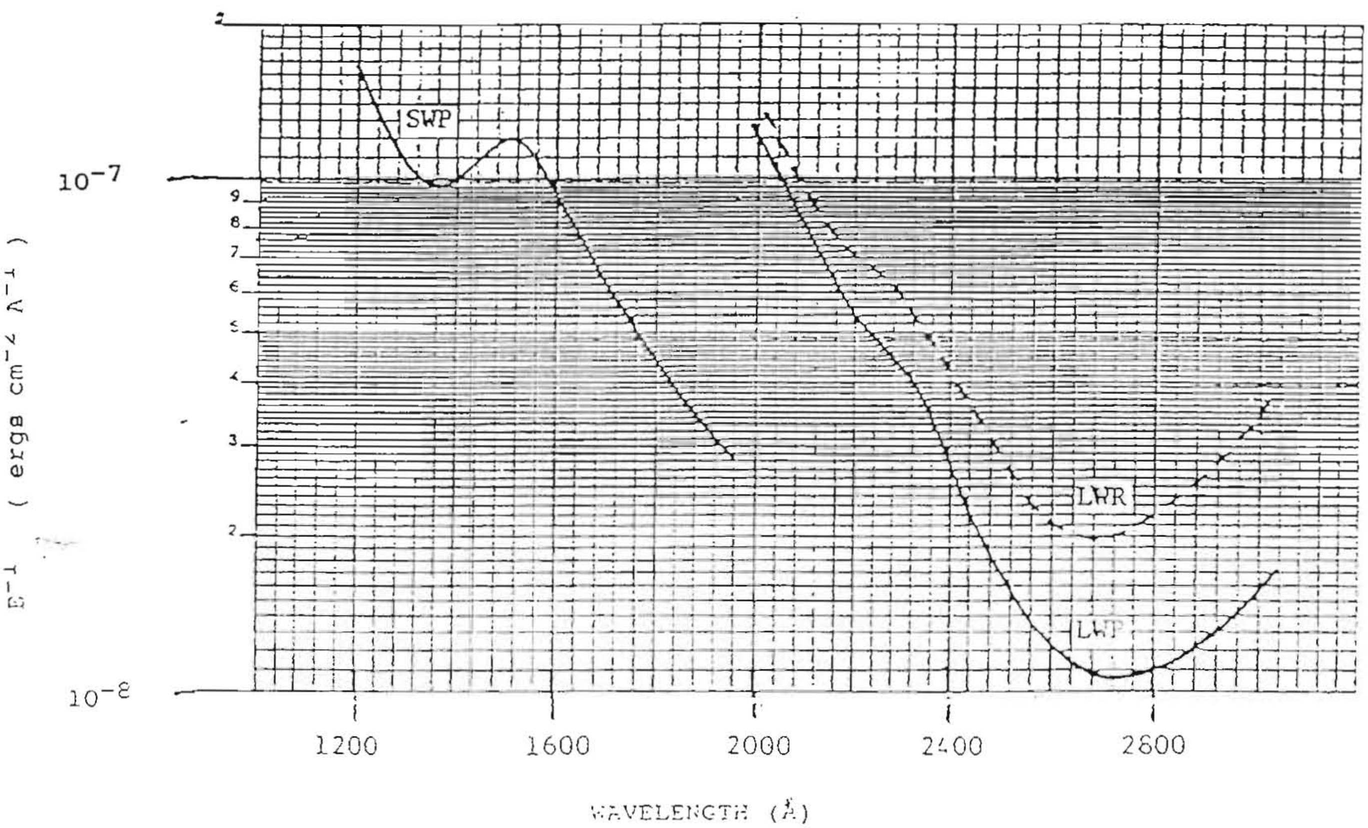

Figure 1. IUE inverse sensititity functions. The LWR curve is shown for the reduced UVC voltage (4.5 kV).

The two NASA shifts are kept approximately fixed in sidereal time rather than solar time. This has two consequences. The first is that the earth as seen from the IUE satellite always traverses the same region of the sky in a given shift. During the US1 shift the apparent location of the earth moves in right ascension and declination from approximately 7 hours, -15 degrees to 13 hours, +30 degrees, and during the US2 shift it moves from approximately 13 hours, +30 degrees to 0 hours, -25 degrees. Hence, a target that is occulted by the earth during a given shift will be occulted during that shift throughout the year. The second consequence is that the observing shifts precess with respect to solar time by two hours every month. Therefore, the best month for coordinated observations between the US1 IUE observer and western U.S. ground-based observers is July, when the US1 shift runs from 11 p.m. to 7 a.m. EDT. Observations during the US2 shift can be best coordinated with western hemisphere observers in November, when that shift runs from 10 p.m. to 6 a.m. EST. The times for the beginning of the US1 and US2 shift are given in Table 2.

The typical setup time for a new target between 45 minutes and 1 hour. Average setup time for a repeat observation using the same camera on the same target is 35 minutes. An observer with short exposures on both cameras may anticipate observing from four to six targets in a standard 8-hour observing session.

The maximum exposure time is usually about 14 hours, after which the integrated background will affect data quality significantly. To obtain exposures exceeding about 8 hours, it is necessary to begin the observation on ESA/SERC observing time in order to avoid the high radiation background which commonly occurs during US2 shifts. Therefore, observers requiring such long exposures need to have collaborators with approved programs for observing time from the European ground station near Madrid (see Section 2.1B).

Table 2

Starting Times of NASA IUE Observing Shifts

	US1			US2		
Month	UT	local	time	UT	local	time
Jan	15:00	10:00	EST*	23:00	18:00	EST*
Feb	13:00	08:00	EST*	21:00	16:00	EST*
Mar	11:00	06:00	EST	19:00	14:00	EST
Apr	09:00	04:00	EST#	17:00	12:00	EST#
May	07:00	03:00	EDT	15:00	11:00	EDT
Jun	05:00	01:00	EDT	13:00	09:00	EDT
Jul	03:00	23:00	EDT*	11:00	07:00	EDT*
Aug	01:00	21:00	EDT*	09:00	05:00	EDT*
Sep	23:00	19:00	EDT	07:00	03:00	EDT
Oct	21:00	17:00	EDT#	05:00	01:00	EDT#
Nov	19:00	14:00	EST	03:00	22:00	EST
Dec	17:00	12:00	EST	01:00	20:00	EST

* Shift times will be adjusted during the 3-week shadow seasons.

# Note time change between EST and EDT during April and October.
EST = UT - 5 hrs at GSFC.

5.4 Science Operations Center

The IUE Observatory science operations system and procedures are designed to be flexible and adaptable to an individual Guest Observer's needs. Observers will normally be in contact with the IUE Science Operations Center at Goddard during their
allotted observing periods. They will direct their own programs, monitor the observations in real time, and may alter the programs to enhance their

scientific value. The responsibility for the safe operation of the scientific instrument and spacecraft, however, always lies with the trained operations staff.

A Guest Observer's program is accomplished in two phases. The first phase, called pre-observation planning, is carried out prior to a Guest Observer's arrival at the Observatory. The second phase includes daily planning, real-time execution of the observing program and the processing of the data and analysis.

Pre-Observation Planning

The areas of the celestial sphere which are available to the IUE are restricted at any particular time by the sun, earth, and moon. The sun baffle permits observations anywhere on the celestial sphere outside a 45-degree radius circle centered at the sun. Sky area availability is compared with each Guest Observer's target list. In lieu of other scheduling requirements, each observer is scheduled at times of the year when the majority of his or her targets are available. Since the positions of the earth and the moon change rapidly, they generally are not considered in making out the schedule. Guest Observers are notified of their scheduled dates and the time allotted for the observing run as far as possible in advance of their visits. Computer-compatible target lists and sky maps are generated for each Guest Observer program prior to the start of his or her scheduled visit. Copies of the target list and sky maps are sent to the observer prior to the scheduled observations. The sky maps show the program's target positions with respect to available viewing areas for the period of the Guest Observer's run. Guest Observers are expected to bring their own finder charts and are required to provide accurate coordinates and magnitude information for all targets and offset stars. Offset stars are recommended for targets fainter than 11th magnitude, for diffuse objects, and for close visual binaries. Blind offset acquisitions have errors less than 2 arcseconds for offset stars within 15 arcminutes of the target.

Observers requiring special observing conditions (for example, specific dates or position angles) need to be aware of possible limitations imposed by spacecraft sun baffling and power constraints. The impact of these constraints will be determined by spacecraft conditions at the time of observation. These conditions cannot be predicted completely in advance, but they are mostly dependent upon the angle between the target and the sun and are considered in the scheduling process insofar as it is possible to do so. The reference angle used in defining the IUE's attitude relative to the sun is actually measured from the anti-solar point and is known as the beta angle. The equation for computing the beta angle of an object on a given date is given in the "IUE Observing Guide", NASA IUE Newsletter No.47). This calculation can be performed by accessing the REMOTE_GO account on the Observatory's computer (contact the staff for information about passwords).

A primary constraint is imposed by the power supplied to the spacecraft by the solar arrays. This varies, for three reasons. (1) The solar arrays are degrading slowly due to normal, expected radiation damage. Thus the beta range at which sufficient power for normal operations is available is slowly shrinking with time. (2) There is a small yearly variation, as the earth-sun distance varies. (3) The power required for observations depends on the load, i.e., the activity going on in the spacecraft. The maximum normal load occurs when one camera is exposing, the other camera is being read or prepared, and both mirror heaters are turned on to control the telescope focus. The minimum normal load occurs when one camera is exposing, the other camera is in standby, and both mirror heaters are off. The operations staff try to minimize the power load, especially at the extremes of the power-positive beta ranges, so the minimum load beta range is usually appropriate for planning purposes. However observers should keep in mind this "grey area" which is often hard to predict.

Table 4
Estimated Power Positive
Beta Angle Regions

Month	Minimum Load	Maximum Load
Jan 94	30 - 112	33 - 105
July 94	33 - 109	37 - 103

Observations outside the power positive regions require discharging IUE's batteries. Since the batteries are a critical subsystem, only a limited number of discharges are allowed each year. Power constraints are normally avoided by scheduling observations at appropriate times of the year. For certain time-critical observations, however, battery usage may be unavoidable. In these cases observers must write to request the Project Scientist's approval in advance of the observations. If the batteries have been discharged within the previous 8 hours, operations rules prohibit discharging them again. During the period when the spacecraft passes through the earth's shadow (usually for 3-week periods in February and in August) no user-initiated battery discharges are permitted. After each shadow passage (which occurs at approximately 4:00 UT) the spacecraft must point between betas 50 and 90 for up to 8 hours in order to recharge the batteries. During the seventeenth episode the IUE shadow periods are predicted to be 1994 January 10 - February 8 and 1994 July 14 - August 6.

Within the last year degradation of the structures which keep sunlight out of the telescope tube has introduced additional constraints on some observations. For betas greater than about 60 degrees, a bright "streak" illuminates most of the aperture plate. Low-dispersion LWP exposures are contaminated with a solar spectrum which, by itself, saturates the camera near 3000 A in about 3 hours. Centering of targets in the small apertures may not be possible. Because guide stars which stand out above the streak are usually not available, wavelength resolution may be degraded and time lost checking whether the target is drifting out of the aperture during long exposures. Offset stars are necessary for targets fainter than 7th magnitude.

The problems created by the streak can be minimized by scheduling observations at low betas, where it is present but much weaker. However, time-critical programs may not have scheduling flexibility. In addition, targets within 30 degrees of either ecliptic pole never dip below beta 60, and so some observations of these objects, possible in previous episodes, may no longer be feasible.

For beta angles near 75 degrees there is a tendency for many components of the spacecraft, in particular the on-board computer (OBC), to heat up. Occasionally near perihelion a component exceeds its maximum allowed temperature and it is necessary to cool the spacecraft by moving to a lower beta. It is roughly estimated that the OBC may overheat in January after 24 hours at betas between 65 and 85, or in February after 24 hours between betas 70 and 79.

Finally, no observations are permitted at beta angles greater than 135 or less than 28 under any circumstances. These limits are imposed by the angles where the Fine Sun Sensor (FSS), used by the two-gyro plus FSS backup control mode, can view the sun.

Daily Operations

The IUE Resident Astronomers and Telescope Operators provide daily support to the Guest Observers. The real-time operations interface between the Guest Observers and the IUE is an interactive control and image display console. This console is manned by the Telescope Operator who is a specialist in spacecraft maneuvering, target acquisition, and instrument operation. The Telescope Operator performs many functions, some of which are analogous to those provided by a night assistant in a ground-based observatory. The Guest Observer sits adjacent to the Telescope Operator where he or she can readily see the displays, consult with the operator, and direct critical aspects of his or her observations including target acquisition, instrument operation, and data evaluation.

The interactive display provides the observer with all the information required to plan slews, identify targets, and verify the quality of observational data. During the course of target acquisition the star field, as imaged by the offset star tracker on IUE, is displayed for target identification. It is the responsibility of the Guest Observer to identify his or her target. A quick-look image display of the raw data is presented as soon as the spectral image is transmitted to the ground, reconstructed, and archived by the computer. This display allows the Guest Observer to evaluate the level of exposure and decide whether to proceed to the next target or repeat the observation. A Polaroid photo or hardcopy of the image may be produced for qualitative use.

New Guest Observers should arrive at the Science Operations Center at least one day before their run in order to familiarize themselves with equipment and plan the final details of their observing programs in consultation with Resident Astronomers.

Data Processing

Instrumental corrections are made to raw IUE spectral images in a series of standard processing steps. The raw data consist of integrated camera charge as a function of raster scan coordinates, the same data evaluated by the observer in the quick-look analysis performed shortly after observation. The routine processing steps applied by the IUE Spectral Image Processing System (SIPS) correct the raw data for the effects of the geometric distortion and the response nonlinearities and nonuniformities introduced by the SEC vidicon detectors and also transform the spectral information into a tabulation of instrumental flux versus wavelength. An additional step calibrates the instrumental fluxes against standard stars to produce time-integrated spectra in absolute units (erg cm^{-2} $Å^{-1}$).

The Guest Observer is given the data in the form of magnetic data tapes. Note that the IUE observatory has recently stopped generating photographic transparencies of the raw images. These materials are normally delivered to the observer about two weeks after his or her observing run. However, observers using the IUE Data Analysis Center at Goddard may request a one- to two-day turnaround on their data. The magnetic tape constitutes the primary data product and contains the raw and processed science data, relevant engineering data, and a history of the science operations and image processing procedures pertaining to the data. Data processing, calibration, and analysis facilities are discussed in detail in the "IUE Data Analysis Guide" (Grady and Taylor, 1989, NASA IUE Newsletter No. 39, pg. 81). The IUESIPS System is described in detail in the IUE Image Processing Information Manual (Version 2, Turnrose and Thompson, 1984).

The "Final" IUE Archives

The IUE Project is preparing to produce a new, significantly enhanced version of the IUE Archives. The various steps include (1) creation of an enhanced data base of the IUE observation log, (2) improved photometric correction and signal to-noise, (3) new calibrations, including corrections for time dependence and other effects, (4) increased archival accessibility, through the use of FITS format for data distribution, archival storage on optical disk, and access via

During the fifteenth episode, reprocessing of some of the archival data using the new calibrations and processing system began.

During a period of time, at least a year, the archive will be in transition. After an initial commissioning period, reprocessing of current and archival data may be requested using the new "final archive" software for whichever cameras and dispersions are available at that time. It will not be-advisable to ~mix" images processed on both systems in research analysis, because of significant differences between the processing techniques, calibrations, and data formats. The National Space Science Data Center (NSSDC) will maintain the current archive of IUE data processed with the existing software until the new version of the archive is complete.

5.5 IUE Data Analysis Center (IUEDAC)

Computer facilities for interactive analysis of IUE data are available at the IUEDAC at Goddard. Software is available at this facility to allow the observer to display and reduce IUE spectra, to make quantitative measurements (e.g., equivalent widths, radial velocities, emission-line fluxes, etc.), to convert the data to units appropriate for comparison with theory (e.g., inverse microns, magnitudes, etc.), and to make plots suitable for publication. The IUEDAC has a library of IUE spectra of standard stars for comparison purposes and can recover IUE spectra from the data archives for analyses to be done here. The latter capability may be used to augment an observer's data for comparative purposes. In addition, the IUEDAC is available to IUE observers who wish, to begin analysis of their data as soon as possible. An observer can normally be able to examine spectra within 24 to 48 hours of the observation. The staff of astronomers and assistants is available to assist the observer with the analyses. Experienced users may use the facilities remotely from their home institutions. (See IUEDAC write up in Appendix D.) More information regarding these facilities are included in the "IUE Data Analysis Guide" (Grady and Taylor, 1989, NASA IUE Newsletter No. 39, pg. 81).

5.6 Data Rights

Observers have exclusive rights to their observations for 6 months after receipt of data products. After 6 months, the data are deposited in the NSSDC at the Goddard Space Flight Center and in the data centers of the United Kingdom and the European Space Agency. These data are then available on request. Observers are encouraged to use data from the data centers whenever possible, rather than needlessly repeating observations, and may find it advantageous to share their observations with other astronomers with similar observing programs so that combined observing times can be used to the greatest advantage. Such arrangements are left entirely to the discretion of the individual observers.

6. OBSERVATION SUMMARY SHEET AND ELECTRONIC TARGET LIST

Proposers are required to submit two forms to assist the Observatory with feasibility assessment and in scheduling of the accepted proposals. The Observation Summary Sheet is a checklist to be filled out and returned with the proposal. The Target List is to be submitted electronically unless the proposer lacks access to a networked computer. Target lists are due at the same time as the proposals. There are two methods of electronic submission.

1. Electronic mail submission. The formatting instructions at the end of this section must be followed. The header line should include the name of the Principal Investigator. If the same PI is submitting more than one proposal, the header line should also contain a running count of the number of target lists submitted thus far and a proposal title, condensed to fit in an 80-column line if necessary. Send the file to iuesoc::proposal on SPAN or proposal@iuesoc.gsfc.nasa.gov on Internet with a subject heading of "17th episode target list".

2. Interactive submission. Proposers may log in (via SPAN or INTERNET) to the IUESOC remote observer account and run a canned program which accepts the

target information and puts it into the correct format. Each target list thus entered will be assigned a serial number, which the proposer must include on the Observation Summary Sheet. An electronic mail copy will be sent to the proposer. Target lists may be modified until September 30 deadline by entering a password specified at the creation of the list.To obtain passwords for the remote account, or any other assistance in transmitting your target list, contact Denise Proctor, (iuesoc::proctor or 301-286-5906) or the Resident Astronomers, (iuesoc::iuemail or iuemail@iuesoc.gsfc.nasa.gov or 301-286-7537).

A hardcopy of the target list should be transmitted only if electronic submission is impossible. The format specified on the following pages must be used. Proposers with network accounts who submit hardcopy target lists will be required to re-submit them electronically. A list of targets needs to appear in the proposal for peer reviewers. See sample in Section 6.1

If the target list is identical to that of an accepted current-episode program, or if the proposal is for target-of-opportunity observations of objects to be specified later, no target list need be submitted; but the fact must be noted on the Observation Summary Sheet.

The Observation Summary Sheet is intended for quick reference by the Resident Astronomers. The top half of the page is in multiple-choice format. Check at least one option under each heading. For example, an observing program for F stars might involve optimally exposed LWP and SWP spectra which are overexposed at the long-wavelength end of the camera in order to bring out weak short-wavelength emission lines. Both "Well-exposed" and "Overexposed" should be checked. In the bottom half of the page, place a mark next to any of the special scheduling considerations or observing techniques which apply. If you wish to elaborate, do so in the text of the proposal, not on this form.

The Observation Summary Sheets and electronic target lists are for the use of Observatory staff. They will not be easily accessible to the peer reviewers. Section D of the proposal should not reference the electronic target list. When submitting a target list please note the following:

1. Target sequence number is indicated implicitly by position in the file. The first line of the file is a header containing the PI's name and other information.

2. Target coordinates are to be specified in 1950 equinox, corrected for proper motion (if significant) to the current epoch. Right ascension is to be given to a tenth of a second of time and declination to one second of arc. Good coordinates are necessary even for easily identifiable objects because the accuracy of spacecraft maneuvers depends upon the positional accuracy of the previously observed object as well as the desired target. Furthermore, these coordinates are used to verify that requested (post-peer-review) additions to one program do not duplicate targets on another approved program.

3. Except where noted, all entries should be right justified within the appropriate fields, with no leading zeroes.

4. The FORMAT given in the parameter description below refers to the standard FORTRAN format field specification with which the item will be read. The decimal point, if omitted, is assumed to be to the right of the rightmost digit position in the field.

PARAMETER	NAME	FORMAT	COLUMN
Catalog Source	A	A1	1

The preferred catalog source is the HD.

Y - Bright Star Catalog
1 - BD
2 - CD
3 - CPD
G - Boss General Catalog
H - HD catalog
N - NGC
P - PG numbers
K - Parkes catalog numbers
Q - other extragalactic sources with designations of the form HHMMDM; e.g., Burbidge catalog of quasars
S - SAO catalog numbers
X - X-ray sources with designations of the form HHMM±DDM; e.g., 2A, MXB, 4 U numbers.
O - other designations as chosen by the observer; e.g., RHO CAS, AR PAV, 3C120 (right justified)

Object Number/Name	IDENT	A8	2-9

Eight alpha-numeric characters, right justified.

A		
Y	XXXX	XXXX is the Bright Star Catalog number
1	±XX YYYYY	BD number X = declination zone (omit minus
2	XX YYYYY	CD number sign for CD and CPD entries)
3	XX YYYYY	CPD number Y = star number
G	XXXXX	XXXXX is the GC number
H	XXXXXX	XXXXXX is the HD number
N	XXXX	XXXX is the NGC number
P	XXXX±YYY	XXXX is the RA portion of the designation
K	XXXX±YYY	in the form HHMM
Q	XXXX±YYY	YYY is the Dec portion of the designation
X	XXXX±YYY	in the form DDM
S	XXXXXX	XXXXXX is the SAO number
O	XXXXXXXX	XXXXXXXX is specified by the observer

Coordinates (1950 epoch only)

RIGHT ASCENSION: HOURS	HR	I2	13-14
MINUTES	MIN	I2	16-17
SECONDS	SEC	F4.1	19-22
DECLINATION: SIGN	±	A1	25
DEGREES	DEG	I2	26-27
MINUTES	MIN	I2	29-30
SECONDS	SEC	I2	32-33

Spectral Type	SP	A2	36-37

First character--one of the letters W, O, B, A, F, G, K, M, C, R, N, S.
Second character--one of the digits 0-9; C or N for WC, WN.

Luminosity Class	L	I1	39

A single digit from 1 to 9 given as follows.

CLASS	L
Ib	1
II	2
III	3
IV	4
V	5
SD	6
WD	7
Ia	8
Iab	9

Visual Magnitude	VIS MAG	F6.2	41-46

Specify visual magnitude, right justified.

Reddening Mode Indicator	E/F	A1	49

Indicates the type of information specified in the next field. (blank) means B-V; E means E(B-V).

Color or Reddening	B-V/E(B-V)	F5.2	51-55

If REDDENING MODE is blank, specify

If REDDENING MODE is blank, specify B-V. For REDDENING MODE E, specify E(B-V). Should be right justified.

Target Priority	RANK	I3	58-60

To assist the Observatory in scheduling programs, targets should be ranked by priority, with RANK=1 being the highest. Targets of equal priority can be given equal ranking and rankings need not be sequential. Backup targets, for instance, can be given much lower ranking than the primary targets. If all targets have equal priority and no preferences exist, all targets should be assigned RANK=1. Right justify.

<u>Object Class</u>	OBJ CLASS	A2	64-65

Classify each target according to the codes (01 through 99) supplied on the enclosed description of Object Classification. Right justify.

<u>Day of Observation</u>	DAY	F7.3	67-73

Use this field <u>for Solar System objects only</u>, to specify the day of the year (1 to 365) on which the given coordinates are valid. This may be specified with a time resolution of up to .001 days, and should be right justified. The year is implied by the approximate dates of the observing episode (9 months in length) beginning in January 1994.

6.1 Examples of Entries on the Electronic Target List

The following examples should clarify any questions regarding the application of the coding form parameters.

<u>EXAMPLE 1</u> The shell star alpha Coronae Borealis is a second-priority target. Its name is given as an HD number in preference to other possible designations. The reddening is entered as E(B-V).

<u>EXAMPLE 2</u> The subdwarf O star BD+28 4211 has a high priority. The color is given as a (B-V) magnitude difference, since column 49 is blank.

<u>EXAMPLE 3</u> 3C 273 is a variable source, so only an approximate magnitude is given. A spectral type entry is not appropriate and so it is omitted. It is a low-priority target (RANK = 3).

<u>EXAMPLE 4</u> The proposer wishes to observe Uranus on or about December 4, 1993 (day 338), and therefore gives its coordinates for that date. If observations at more than one epoch were desired, more entries for the same target could be specified with different coordinates. Because the details of the observing plan often change after proposal submission, the program will not actually be scheduled for a specific date without a further communication from the PI after the proposal's acceptance.

<u>SAMPLE</u>

```
Proposer, John Q. - 4 targets  - This is a Proposal Title
H  139006    15 32 34.1  +26 52 55  A0 5   2.21  E  0.20     2   60
1+28 4211    21 48 57.4  +28 37 34  O5 6  10.34     -0.34     1   16
O  3C 273    12 26 33.4  +02 19 42        13.                 3   85
O  URANUS    20 08 32.2  -21 07 48  G2 5   5.6   E  0.00     1   03 338.000
```

OBJECT CLASSIFICATION CODES

Classification of Objects Used in the IUE Observation Log

00	Sun
01	Earth
02	Moon
03	Planet
04	Planetary Satellite
05	Minor Planet
06	Comet
07	Interplanetary Medium and Sky Background
08	Great Red Spot
09	
10	WC
11	WN
12	Main Sequence O
13	Supergiant O
14	Oe
15	Of
16	O Subdwarf
17	WD O
18	
19	Other Strong W Sources
20	B0-B2 V-IV
21	B3-B5 V-IV
22	B6-B9.5 V-IV
23	B0-B2 III-I
24	B3-85 III-I
25	B6-B9.5 III-I
26	Be
27	Bp
28	B Subdwarf
29	WDB
30	A0-A3 V-IV
31	A4-A9 V-IV
32	A0-A3 III-I
33	A4-A9 III-I
34	Ae
35	Am
36	Ap
37	WDA
38	Horizontal Branch Stars
39	Composite Spectral Types
40	F0-F2
41	F3-F9
42	Fp
43	Late-Type Degenerates
44	G V-IV
45	G III-I
46	K V-IV
47	K III-I
48	M V-IV
49	M III-I
50	R, N, or S Type Star
51	Long-Period Variable Stars
52	Irregular Variables
53	Regular Variables
54	Dwarf Novae
55	Classical Novae
56	Supernovae
57	Symbiotic Stars
58	T Tauri Stars
59	X-Ray Source
60	Shell Star
61	Eta Carinae
62	Pulsar
63	Nova-Like
64	Other
65	Misidentified Targets
66	Interacting Binary Stars
67	
68	
69	Herbig-Haro Objects
70	Planetary Nebula + Central Star
71	Planetary Nebula - Central Star
72	H II Region
73	Reflection Nebula-
74	Dark Cloud (Absorption Spectrum)
75	Supernova Remnant
76	Ring Nebula (Shock Ionized)
77	
78	
79	
80	Spiral Galaxy
81	Elliptical Galaxy
82	Irregular Galaxy
83	Globular Cluster
84	Seyfert Galaxy
85	Quasar
86	Radio Galaxy
87	BL-Lacertae Object
88	Emission Line Galaxy (Non-Seyfert)
89	
90	Intergalactic Medium
91	
92	
93	
94	
95	
96	
97	
98	Wavelength Calibration Lamp
99	Nulls and Flat Field

APPENDIX A

IUESIPS Reduction Software Changes

Pertinent to Archival Data Users

Summary of Most Significant IUESIPS Reduction Software Changes Pertinent to Archive Data Users

The following list summarizes those changes to the IUESIPS reduction procedures which are most likely to be pertinent to decisions as to whether archive data require reprocessing. As such, it provides guidelines only, and users are urged to consult the references listed at the end of the summary for more quantitative detailed discussions of the effects of the various changes listed.

<u>Low Dispersion</u>

7 July 1979 (GSFC) SWP ITF error corrected
7 August 1979 (VILSPA)
- Removed photometric error at 20% exposure level of SWP ITF

4 November 1980 (GSFC) Implementation of "new software"
10 March 1981 (VILSPA)
- Doubled spectral extraction frequency, halved slit width
- Geometric resampling handled differently
- Increased apparent spectral resolution
- Increased point-to-point noise (factor of 2)
- Better background handling
- Basic photometry unchanged

1 October 1985 (GSFC/VILSPA) Extended line-by-line file
- Increased spatial resolution, perpendicular to dispersion

22 December 1987 (GSFC/VILSPA) New LWP photometric calibrations
- Improved fluxes, signal-to-noise

<u>High Dispersion</u>

19 May 1981 (GSFC) Time/temperature corrected geometric and
11 March 1982 (VILSPA) wavelength calibrations
- Reduced residual internal wavelength errors (1 <2-3 km/s)

28 August 1981 (GSFC) Improved spectral registration at
11 March 1982 (VILSPA) crowded orders
- Better background placement, hence better net fluxes

10 November 1981 - LWR, SWP (GSFC) Implementation of "new software"
7 January 1982 LWP (GSFC)
11 March 1982 (VILSPA)
- Doubled spectral extraction frequency, halved slit width
- Explicit geometric resampling eliminated
- Increased apparent spectral resolution
- Increased (but more realistic) point-to-point noise (factor of 2 unfiltered, 2 when filtered)
- Further improved background placement, and better handling
- Better photometry (increased net fluxes at short wavelengths, due to lower background; better stability)

22 December 1987 (GSFC/VILSPA) New LWP photometric calibrations
22 December 1987 (VILSPA) New absolutely calibrated
29 August 1990 (GSFC) data file

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APPENDIX B

NASA Approved IUE Programs for the

Sixteenth Year of Operations

NASA APPROVED IUE PROGRAMS FOR THE SIXTEENTH YEAR

PI NAME/TITLE	INSTITUTION	PROGID	
Dr. M. A'Hearn	U Maryland	COPMA	TARG OF OPP
IUE Observations of Comets and Related Bodies			
Dr. S. Adelman	The Citadel	MMPSA	
Elemental Abundances of Mercury-Manganese Stars			
Dr. B. Altner	Applied Research Corporation	LBPBA	TARG OF OPP
An IUE Investigation of the Lamba Bootis-type Stars: To Be or Not To Be			
Dr. C. Ambruster	Villanova University	KDPCA	
Rotational Spin-Down and Activity in ZAMS D0-K2 Dwarfs			
Dr. T. Ayres	U Colorado - CASA	RSPTA	TARG OF OPP
Coronal Topology			
Dr. W. Bagnuolo	Georgia State University	OBPWB	
Tomography and Colliding Winds of O-Type Binaries			
Dr. G. Ballester	U Michigan	JUPGB	
Jovian Equatorial H Lyman-alpha and the Ionosphere			
Dr. W. Blair	Johns Hopkins University	CLPWB	
Cloud Crushing in the Southeast Cygnus Loop			
Dr. E. Bohm-Vitense	U Washington	FSPEB	
Transition Layers of Hyades F Stars			
Dr. J. Bookbinder	Harvard CFA - SAO	LAPJB	
Lyman Alpha Observations of High Velocity Dwarfs			
Dr. B. Bopp	U Toledo	FBPBB	
Pulsationally Induced Mass-Dumping in F + B Binaries			
Dr. C. Bowyer	UC Berkeley - CEA	DAPCB	
Heavy Element Abundance in Hot DA White Dwarfs			
Dr. A. Brown	U Colorado - JILA	RSPAB	
Simultaneous Coronal, TR, and Chromospheric Spectroscopy of HR1099			
Dr. F. Bruhweiler	Catholic University	PNPFB	
High Dispersion IUE Studies of Hot Central Stars of Planetary Nebula			
Dr. G. Burks	U Colorado - CASA	ABPGB	
A Study of Radio Continuum Loop I Absorption near the 3C273 Sight Line			
Dr. R. Buss	Johns Hopkins University	IGPRB	
Determining Gas Densities and Grain Compositions			
Dr. J. Cardelli	U Wisconsin - Madison	IGPJC	
Limits on Grain Surface Chemistry			
Dr. K. Carpenter	NASA - GSFC	COPKC	
CO Molecular Absorption in Far-UV Spectra of Cool Stars			
Dr. K. Cheng	NASA - GSFC	GCPKC	
The Brightest Star in M79 at 1500 Angstroms: A future White Dwarf?			
Dr. Y. Chu	U Illinois	SHPYC	
The Supergiant Shell LMC3			
Dr. G. Clayton	U Colorado - CASA	DEPGC	
Catching It In the Act: Predictable Declines in V854 Centauri			
Dr. R. Cohen	UC San Diego	XGPRC	
Ultraviolet Observations of X-ray-luminous Spiral Galaxies			
Dr. M. Combi	U Michigan	MOPMC	
Variation of the Solar Lyman-alpha Line Profile with Solar Activity			

PI NAME/TITLE	INSTITUTION	PROGID	
Dr. P. Conti Spectroscopy of Wolf-Rayet Stars of Type WN	U Colorado - CASA	WNPPC	
Dr. A. Cowley LMC X-ray Sources	Arizona State University	LXPAC	
Dr. A. Crotts SN 1987A Light Echoes: Direct Determination of UV Shock Breakout Flux	Columbia University	SNPAC	TARG OF OPP
Dr. M. Cuntz Short-Term Variability of Luminous K Stars: A Test Case of Hydrodynamic Modelling	HAO - NCAR	VKPMC	
Dr. A. Danks Star Formation in Gas Rich S0 Galaxies	Hughes - STX	SGPAD	
Dr. L. Danly Infalling Gas in the Southern Galactic Hemisphere	ST ScI	IGPLD	
Dr. H. Drechsel The Evolutionary State of SV Centauri	U Colorado - JILA	SVPHD	
Dr. L. Dressel Star-Burst Rings in S0 Galaxies	Applied Research Corporation	SGPLD	
Dr. J. Drilling UV Spectroscopy of Very Hot Stars in the Galactic Halo	Louisiana State University	GHPJD	
Dr. R. Dufour Longslit IUE Spectroscopy of Planetary Nebulae	Rice University	PNPRD	
Dr. A. Dupree Study of the Atmosphere of Alpha Orionis	Harvard CFA - SAO	AOPAD	
Dr. J. Eaton Mapping the Chromosphere of 31 Cygni	CEIS - Tennessee State University	CYPJE	
Dr. R. Edelson International AGN Watch: Continuous Monitoring of NGC 4151	NASA - GSFC	IMPRE	
Dr. N. Evans Temperatures for Stars with Accurate Masses and Radii	ISTS - York University	TEPNE	
Dr. F. Fekel The Relationship of Metallicity and Activity	CEIS - Tennessee State University	MAPFF	
Dr. P. Feldman Observations of Comets with IUE	Johns Hopkins University	COPPF	TARG OF OPP
Dr. A. Fullerton HD 93521: Rosetta Stone for the Photospheric Connection	U Delaware	PCPAF	
Dr. I. George Intensive Monitoring of Spectral Evolution in 0716+714	USRA	IMPIG	
Dr. C. Grady The Evolution of Accretion Phenomena in Massive Proto-Planetary Systems	Applied Research Corporation	PPPCG	
Dr. J. Green The Line of Sight to HD 206267	U Colorado - CASA	ISPJG	
Dr. E. Guinan Eclipsing Binaries in the Magellanic Clouds: Fundamental Properties and Distances	Villanova University	EBPEG	
Dr. D. Hall The Temperature of Io Plasma Torus Electrons	Johns Hopkins University	IOPDH	
Dr. W. Harris Spectrosocpic Study of Jovian Auroral Phenomena Discovered by HST/FOC	U Michigan	JUPWH	

PI NAME/TITLE	INSTITUTION	PROGID	
Dr. P. Hodge	U Washington	LMPPH	
An HR Diagram for LH 72			
Dr. J. Holberg	U Arizona	HDPJH	
IUE Echelle Spectra of an EUV Selected Sample of Hot DA White Dwarfs			
Dr. K. Horne	ST ScI	IPPKH	
Phase-Dependent Observations of Intermediate Polars			
Dr. S. Howell	Planetary Science Institute	CVPSH	
IUE Observations of ROSAT Selected Magnetic Cataclysmic Variables			
Dr. M. Huang	Villanova University	WDPMH	
IUE Echelle Investigation of the Peculiar Helium-Rich Degenerate, PG 1346+0 82			
Dr. C. Imhoff	CSC - Astronomy Programs	DCPCI	
Star Formation in the Taurus-Auriga Dark Clouds			
Dr. R. Kaitchuck	Ball State University	UUPRK	
Ultraviolet Observations of the Cataclysmic Variable UU Aqr			
Dr. S. Kenyon	Harvard CFA - SAO	SSPSK	
Ultraviolet Observations of Accretion in Two Symbiotic Stars			
Dr. A. Kinney	ST ScI	SGPAK	
Ultraviolet Spectra of Normal Spiral Galaxies			
Dr. R. Kirshner	Harvard CFA - SAO	SUPRK	TARG OF OPP
Supernova Spectroscopy			
Dr. R. Koch	U Pennsylvania	BIPRK	
Nodal-Passage Spectra for Binaries			
Dr. D. Koester	Louisiana State University	ZZPDK	
The ZZ Ceti Instability Strip			
Dr. W. Landsman	Hughes - STX	LAPWL	
Further Studies of Stellar Lyman Alpha Emission			
Dr. T. Livengood	NASA - GSFC	JUPTL	
Jupiter's UV Aurora:Energy Input to the Polar Stratosphere			
Dr. D. Luttermoser	Iowa State University	MIPDL	
Fluorescent Clues to the Atmospheric Shock Structure of Mira Variable Stars			
Dr. D. Massa	Applied Research Corporation	BSPDM	
Long Term Variability of B Supergiant Winds			
Dr. B. McCollum	CSC - IUE Observatory	WCPBM	
A New WC 11 Star			
Dr. M. McGrath	ST ScI	URPMM	
Variability of Uranian Lyman Alpha Emission			
Dr. N. Morrison	U Toledo	MOPNM	
Main-Sequence O Stars in NGC 6231: Enhanced Winds			
Dr. J. Murthy	Johns Hopkins University	SBPJM	
Emission Lines from the Eridanus Superbubble			
Dr. R. Mushotzky	NASA - GSFC	AGPRM	
The Origin of the UV Radiation in Active Galaxies: Tests of the Reprocessing Models			
Dr. J. Nichols-Bohlin	CSC - Astronomy Programs	BEPJN	
Discrete Absorption Components and the Be Star Phenomenon			
Dr. S. Parsons	CSC - ST ScI	HCPSP	
Affirmative Data for Cool + Hot Binary Systems			

PI NAME/TITLE	INSTITUTION	PROGID	
Dr. M. Pena	UNAM	PNPMP	
LMC Planetary Nebulae with Wolf Rayet Features			
Dr. M. Perez	CSC - IUE Observatory	PMPMP	TARG OF OPP
The Blueing Effect in Massive Young Stars			
Dr. G. Peters	USC	BEPGP	
Long-Term Wind Variability and Photospheric Activity in Nearby Be Stars			
Dr. R. Polidan	NASA - GSFC	ALPRP	
A Quantitative Study of S Cancri: An Algol Binary at the Terminal State of Mass Transfer			
Dr. S. Saar	Harvard CFA - SAO	KDPSS	
Magnetic Doppler Imaging and UV Emission of an Active K Dwarf			
Dr. R. Schulte-Ladbeck	U Pittsburgh	SSPRS	
Baselineing the UV Properties of Slash Stars			
Dr. K. Sembach	MIT	GHPKS	
Searching for the Base of the Galactic Halo			
Dr. H. Shipman	U Delaware	WDPHS	
The Highest Quality Ultraviolet Spectrum of 40 Eri B			
Dr. S. Shore	CSC - GHRS	HWPSS	
Magnetically Controlled Circumstellar Matter Among the Helium Weak Stars			
Dr. J. Siah	Villanova University	AXPJS	
IUE Observations of an X-ray Anomalous A-Type Giant			
Dr. O. Siegmund	UC Berkeley	SHPOS	
Variability in Gaseous Shells Around A Stars			
Dr. T. Simon	U Hawaii	EBPTS	
Timing the Eclipse of HD 185510			
Dr. E. Sion	Villanova University	WDPES	
IUE Echelle Studies of Very Hot DA and DB White Dwarfs from the Edinburgh-Cape Survey			
Dr. M. Smith	CSC - Astronomy Programs	AHPMS	
Ultraviolet Variations in Alpha-1 Her and Alpha-1 Sco			
Dr. T. Snow	U Colorado - CASA	ISPTS	
The Relationship Between Interstellar Extinction and Depletions			
Dr. G. Sonneborn	NASA - GSFC	SMPGS	
An UV Spectrophotometric Census of B Supergiants in the SMC			
Dr. L. Sparke	U Wisconsin	RGPLS	
Star Formation and Accretion in Polar Ring Galaxies			
Dr. S. Starrfield	Arizona State University	LNPSS	
UV Observations of Novae During the Late States of Their Outbursts			
Dr. R. Stencel	U Denver	LPPRS	
Fifteenth Episode Monitoring of Long Period Eclipsing Systems			
Dr. S. Stern	Southwest Research Institute	IOPSS	
IUE Studies: A Galileo-Precursor Search for New Species in IO's Atmosphere			
Dr. P. Szkody	U Washington	DNPPS	TARG OF OPP
Target of Opportunity: Humps in V503 Cyg			
Dr. S. Torres-Peimbert	UNAM	PNPST	
Spatially Resolved IUE Spectrophotometry of the Planetary Nebula NGC 40			
Dr. D. Turnshek	U Pittsburgh	GAPDT	
Damped Lyman-alpha Absorption from Galaxies with Redshift < 1.6			

PI NAME/TITLE	INSTITUTION	PROGID
Dr. R. Tweedy	U Arizona	PCPRT
IUE Spectra of Two New Pre-Cataclysmic Binary Systems		
Dr. C. Urry	ST ScI	IMPCU
Intensive Multiwavelength Monitoring of PKS 2155-304		
Dr. S. Vrtilek	Harvard CFA - SAO	HXPSV
Multiwavelength Observations of Her X-1		
Dr. F. Walter	SUNY - Stony Brook	BXPFW
Late B Star X-Ray Sources		
Dr. D. Welty	U Chicago	ICPDW
UV Studies of Translucent Interstellar Clouds		
Dr. B. Wilkes	Harvard CFA - SAO	QSPBW
The Ultra-Violet and Soft X-ray Properties of the PG Quasars		
Dr. L. Willson	Iowa State University	DNPLW
Dust Nucleation and Mass Loss in Miras - L2 Puppis and V CVn		
Dr. C. Wu	CSC - ST ScI	SAPCW
Augmentation of the IUE Ultraviolet Spectral Atlas		

APPENDIX C

ESA and SERC Approved IUE Programs

for the Sixteenth Year of Operations

ESA APPROVED IUE PROGRAMS FOR THE SIXTEENTH YEAR

PI NAME/TITLE	INSTITUTION	PROGID
Dr. Almoznino	Tel Aviv	PE001
Star formation in blue compact dwarfs in the Virgo Cluster, SWP spectroscopy		
Dr. Patriarchi	Firenze	PM002
Carbon abundance in type I Planetary Nebulae		
Dr. Monier	VILSPA	PA003
Phase resolved spectrophotometry of Beta CrB (A8p) with the IUE		
Dr. Monier	VILSPA	PA004
Phase resolved spectrophotometry and mode identifications of Beta Cephei stars		
Dr. Monier	VILSPA	PA005
Phase resolved spectrophotometry and mode identifications for two Delta Scuti stars of spectral type F		
Dr. Friedjung	IAP Paris	PA007
Symbiotic stars misidentified as as Planetary Nebulae		
Dr. Friedjung	IAP Paris	PI008
Observation of old Nova at similar time as with the HST		
Dr. Alloin	CNRS Paris	PQ009
International AGN watch: probing the nuclear regions of NGC 5548 +25 Participants		
Dr. Wolf	Heidelberg	PA010
Chemical abundances from B field stars around young clusters in the Magellanic Clouds		
Dr. Reimers	Hamburg	PI012
UV-orbital variability of the new eclipsing CV 1804+6753		
Dr. Dennefeld	IAP Paris	PM014
Chemical evolution in the Magellanic Clouds through study of Planetary Nebulae and HII regions		
Dr. Bates	Belfast	PM015
Interstellar gas in the fields of globular clusters and a high velocity stream		
Dr. Doyle	Armagh	PC016
The nature of M dwarfs with a zero H alpha flux		
Dr. Hunsch	Hamburg	PC018
First observations of the atmospheric eclipse of Beta Scuti		
Dr. Jorissen	ESO Muenchen	PC020
Ultraviolet Observations of the Peculiar Star System HD 191589		
Dr. Bianchi	Torino	PI024
New X-ray sources in the LMC discovered by ROSAT		
Dr. Bianchi	Torino	PC025
IUE survey of X-ray selected late- type m.s. and evolved stars		
Dr. Morgan	Edinburgh	PI026
Symbiotic stars in the Large Magellanic Cloud		
Dr. Willis	UCL London	PA027
The UV spectrum of MCA - 1-B: the first Ofp/WN9 stars discovered in M33		
Dr. Stahl	Heidelberg	PA028
Multi-frequency observations of the outburst of the outburst phase of the LMC-LBV R127		
Dr. Jordan	Oxford	PC029
A magnitude-limited survey of single, non-variable G supergiants		
Dr. de Boer	Bonn	PM033
Detection of high-velocity halo clouds		
Dr. Bomans	Bonn	PM034
The dynamics of the supershell LMC 4		

PI NAME/TITLE	INSTITUTION	PROGID
Dr. Jorissen	ESO Muenchen	PC035
HDE 332077: a Tc-poor S star with a main sequence companion?		
Dr. Ulrich	ESO Muenchen	PQ037
UV variability of the quasar 3C 273		
Dr. Schroder	Hamburg	PC039
Observations of the cool corona of HR 2554 with high resolution		
Dr. Giovannelli	Frascati	PI043
Orbital and rotational modulations in the UV emissions from SS Cygni in quiescence		
Dr. Parthasarathy	Bangalore	PA044
Ultraviolet (IUE) spectra of Post AGB stars		
Dr. Vogel	Zurich	PC045
Empirical velocity laws for the wind of cool giants		
Dr. Vogel	Zurich	PI046
The hottest symbiotic nova: HM Sge		
Dr. Vogel	Zurich	PA047
Atmospheres of the hot components in symbiotic systems		
Dr. Bomans	Bonn	PM048
LMC giant shell N 154 and the origin of its X-ray emission		
Dr. Seggewiss	Bonn	PA049
The bright part of the stellar population in Region E in LMC 4		
Dr. de Boer	Bonn	PM050
New supernova remnant hidden in luminous HII region N 159 in LMC		
Dr. de Boer	Bonn	PM051
The core of 30 Doradus		
Dr. Nussbaumer	Zurich	PI052
PU Vul: from supergiant to the nebular phase		
Dr. Butler	Armagh	PC053
The origine of Balmer Emission from Stellar Flares		
Dr. Prinja	UCL London	PI054
Periodic variability in the UV resonance lines of V795 Her ?		
Dr. Gahm	Stockholm	PC055
Two T Tauri stars revisited		
Dr. Gondhalekar	RAL	PQ057
IUE Observations of EUV bright AGNs		
Dr. Gondhalekar	RAL	PQ058
Simultaneous IUE and ROSAT observations of MKn 478		
Dr. Cacciari	Bologna	PE059
The blue HB stellar population in NGC 6752		
Dr. Wonnacott	RAL	PA060
White dwarfs as probes of pulsating stellar atmospheres		
Dr. Wonnacott	RAL	PA061
Delta Cap: Pulsator or Algol		
Dr. Stickland	RAL	PC062
A study of new composite and Zeta Aurigae Binaries		
Dr. Stickland	RAL	PI063
Fundamental parameters of Massive Binaries		
Dr. Howarth	UCL London	PA064
Time-series spectroscopy of wind variability in the Wolf-Rayet star HD 193077		

PI NAME/TITLE	INSTITUTION	PROGID
Dr. Mason	Mullard	PQ066
New observations of liners: spatially resolved spectroscopy of the nuclear and extended regions		
Dr. Voels	Muenchen	PA067
UV observations of OB-stars in clusters		
Dr. Festou	Toulouse	PS069
Comparative ultraviolet studies of unexplored solar system surfaces		
Dr. Henrichs	Amsterdam	PA072
Mass Loss/Flux variations in large- amplitude rapid variable Be stars		
Dr. Patriarchi	Firenze	PA074
A study of two hot, luminous supergiants in the LMC		
Dr. Beuermann	Berlin	PQ076
IUE/ROSAT observations of new soft X-ray bright AGNs		
Dr. Rodriguez-P.	VILSPA	PQ078
Correlated studies of high luminosity and radio-loud AGN		
Dr. Monier	VILSPA	PC079
Phase dependent changes in the star, R Sct		
Dr. Harper	Oxford	PC081
Is HD 129456 another hybrid giant with Mg II h& k S>L asymmetry ?		
Dr. Montesinos	Oxford	PC082
Flux-flux and flux-rotation in G and K-type giants		
Dr. Montesinos	Oxford	PC083
IUE monitoring of the post- asymptotic giant branch star FG Sge		
Dr. Gonzalez-R.	VILSPA	PI084
IUE monitoring of symbiotic stars experiencing UV outbursts: BF Cygni and Z Zndromedae		
Dr. Stickland	RAL	PC085
The interacting binary HD 43246		
Dr. de Martino	VILSPA	PI086
UV orbital variability in Polars		
Dr. Bues	Bamberg	PA090
Atmospheric structure and abundances of white dwarfs in binary systems		
Dr. Engvold	Oslo	PC091
UV observations of Limb-crossing of active regions on Sigma Geminorum		
Dr. Czerny	Warsaw	PI092
Disk precession in the Magnetic Old Nova V603 Aql		
Dr. Verbunt	Utrecht	PI093
Phases of orbital variation in lines from cataclysmic variable winds		
Dr. Courvoisier	Geneve	PQ094
UV emission of the bright quasar 0914-62		
Dr. van der Hucht	Utrecht	PA096
Colliding winds and dust formation in the all-variable long-period WC7 binaries HD 193793 and HD 192641 a continuation		
Dr. Prange	Verrieres	PS097
H Lyman alpha dayglow emission line profiles from Saturn and Uranus		
Dr. Mouchet	Meudon	PI098
UV observations of X-ray sources newly identified with intermediate polars		
Dr. Walter	MPI Garching	PQ099
The origin of the in Ultra Soft AGN		
Dr. Walter	MPI Garching	PQ100
The origin of the of NGC 5548		

PI NAME/TITLE	INSTITUTION	PROGID
Dr. Walter	MPI Garching	PQ101
The origin of the and of the photoionization of the broad line region in PG 1211+143		
Dr. Buson	Padova	PE103
The stellar population of local group dwarf ellipticals		
Dr. Wamsteker	VILSPA	PQ104
Broadband microvariability in OJ 287 and MKN 421		
Dr. Walton	UCL London	PM105
UV spectroscopy of SMC type I Planetary Nebulae		
Dr. Prinja	UCL London	PA106
Wind variability in rapidly rotating B supergiants		
Dr. O'Brien	UCL London	PQ107
The lovers of Active Galaxies (LAG) collaboration: the Broad Emission and Absorption Line Region in NGC 3516		
Dr. Viotti	Frascati	PC108
Investigation of the UV spectrum of the VV Cep binary KQ Puppis		
Dr. Schmid	Zurich	PI109
CNO abundances in symbiotic stars		
Dr. Maraschi	Milan	PQ110
Intensive multiwavelength monitoring of 3C 279		
Dr. Ulla	LAEFF/Madrid	PI111
Investigation of the variable nature of the double-degenerate CR Boo		
Dr. la Dous	VILSPA	PI114
Spectacular cooling of the white dwarf and development of the quiescent accretion disk in a Dwarf Nova		
Dr. Mas-Hesse	LAEFF/Madrid	PE115
Energy source of luminous ROSAT/ IRAS galaxies		
Dr. Bertola	Padova	PE117
The influence of stellar population differences among elliptical galaxies on their estimated distances		
Dr. Buson	Padova	PQ118
The evolution of Lyman forest in quasars		
Dr. Buson	Padova	PI119
The symbiotic star C-1 in the draco dwarf galaxy		
Dr. Joblin	CPS Paris	PM121
Nature of interstellar matter by absorption and emission correlations		
Dr. Barstow	Leicester	PC122
A search for white dwarf companions to late type stars		
Dr. Barstow	Leicester	PA123
Effective temperatures and gravities for an EUV selected sample of DA white dwarfs		
Dr. Catala	Meudon	PA124
Cyclic activity in PMS Herbig Ae stars		
Dr. Ulrich	ESO Garching	PQ125
Observations of the Seyfert I Nucleus of NGC 4151		
Dr. Tweedy	Leicester	PA126
The white dwarf at the center of the Planetary Nebula DHW5		
Dr. Tweedy	Leicester	PM128
Understanding two-quantum emission in the Planetary Nebula NGC 7293		
Dr. Barstow	Leicester	PA129
High resolution observations of a newly discovered PG1159 star		
Dr. Barstow	Leicester	PA130
High dispersion SWP spectra of newly discovered DA white dwarfs		

PI NAME/TITLE	INSTITUTION	PROGID
Dr. Gomez de C.	VILSPA	PC133
On the origin of the UV excess in PMS stars		
Dr. Faraggiana	Trieste	PA135
Search for Lambda Boo stars		
Dr. Heber	Kiel	PA136
UV-spectrophotometry of peculiar hot stars discovered by the Hamburg Schmidt survey		
Dr. Artru	Lyon	PA139
Line variations of Carbon,Nitrogen and Oxygen in Magnetic Ap stars		
Dr. Theissen	Bonn	PA140
Physical parameters of Hot and Peculiar subdwarf stars		
Dr. Theissen	Bonn	PA141
Classification of PG 0229+064: A main sequence B star behind the HVC-complex AC III ?		
Dr. Werner	Kiel	PA142
High resolution UV spectroscopy of a new PG 1159 type central star		
Dr. Weidemann	Kiel	PA143
UV spectroscopy of selected white dwarfs		
Dr. Panagia	STScI	PE144
Observations of SN 1987A		
Dr. Lloyd	RAL	PA145
Probing the structure of Wolf- Rayet winds		
Dr. Byrne	Armagh	PC147
Transition regions of dM(e) stars		
Dr. Smith	Sussex	PA148
An ultraviolet and optical investigation of the 53 Per		
Dr. Catalano	Catania	PC149
Delineating the spectral type boundary for onset of chromo- spheric activity		
Dr. Calzetti	STScI	PE150
Ultraviolet spectra of normal spiral galaxies		
Dr. Bode	Lancashire	PI151
Ultraviolet monitoring of symbiotic stars		
Dr. O'Brien	Lancashire	PM152
UV spectroscopy of the T PYX and CP PUP Nova shells		
Dr. Naylor	Keele	PI153
The disk and wind structure of U Gem in outburst		
Dr. Krautter	Heidelberg	PI156
Late stages in the outburst of classical novae		
Dr. Byrne	Armagh	PC157
Flaring vs rotational modulation on the RS CVn star, IIPeg		
Dr. Gilmozzi	STScI	PM159
SN 1987A light echoes: direct determination of UV shock breakout flux		
Dr. Vauclair	Toulouse	PA160
The boundaries of the ZZ Ceti instability strip		
Dr. Vauclair	Toulouse	PA160
GD and the red edge of the ZZ Ceti		
Dr. Doazan	Paris	PA162
Phase changes in Pleione: towards a normal B phase ?		
Dr. Conlon	Belfast	PA163
Low resolution observations of hot post-asymptotic giant branch stars		

PI NAME/TITLE	INSTITUTION	PROGID
Dr. Orio	Torino	PI164
Observations of two classical novae with IUE and ROSAT		
Dr. Festou	Toulouse	PS165
Short-time-scale variabilities of the FUV emissions of Saturn and		
Dr. Hessman	MPI	PC167
Observations of the high state of the FU Orionis variable Z Canis Majoris		
Dr. Cassatella	Frascati	PA169
Study of the WN companion to the yellow supergiant HD 155603		
Dr. Cassatella	Frascati	PC170
Search for hot companions to yellow supergiants		
Dr. Cassatella	Frascati	PE171
The stellar content of the populous clusters of the Magellanic Clouds		
Dr. Barylak	VILSPA	PA172
The present activity phase of the LBV star AG Carinae		
Dr. Tjin A Djie	Amsterdam	PA174
Detection of accretion on Herbig Ae stars		
Dr. Zarnecki	Kent	PS176
Observations of Comet Crigg Skjellerup		
Dr. Eriksson	Uppsala	PC177
A complete sample of carbon stars		
Dr. Foing	Verrieres	PC178
Spatially-resolved environment and coordinated multi-frequency observations of HR 1099		
Dr. Elgaroy	Oslo	PC179
Deviation from the Wilson-Bappu relationship		
Dr. Vidal-Madjar	IAP Paris	PM181
Planetary perturbations in the disk of beta pictoris		
Dr. Hammerschlag	Amsterdam	PI182
Coordinated UV and X-ray obser- vations of Vela X-1		
Dr. Deleuil	Marseille	PM183
Ionization near beta pictoris		
Dr. Naylor	Keele	PI186
Line profiles of high inclination and high mass transfer cataclysmic variables		
Dr. Hack	Trieste	PI188
CH Cyg: a symbiotic star with peculiar spectral features		
Dr. Cassatella	Frascati	PI190
The UV luminosity and the emission spectrum of faint Old Novae		
Dr. Selvelli	Trieste	PI191
The very near outburst of the recurrent nova T Pyx		
Dr. Bromage	RAL	PC192
Outer atmospheres of EUV-selected extremely rapid rotating K-M dwarfs		
Dr. Bromage	RAL	PC193
IUE investigation of coronal sources with apparently very weak chromospheres		
Dr. Bertaux	Verrieres	PS194
Coordinated measurement of IUE Moon spectrum with Shuttle mission Atlas-1		
Dr. Volkova	Odessa	PI195
Investigation of circumstellar gas in V488 Cygni		

APPENDIX D

GSFC IUE Data Analysis Facility

and Access to the IUE Merged Log

The IUE Data Analysis Center and Access to the IUE Merged Log

IUEDAC Staff

9 August 1993

The IUE Data Analysis Center (IUEDAC)

Computer facilities for interactive data analysis of IUE data are available at the IUEDAC, formerly IUE Regional Data Analysis Facility (IUE RDAF). The hardware and software available allow the observer to display and reduce IUE spectra, to make quantitative measurements (e.g., equivalent widths, radial velocities, emission line fluxes, etc.), to convert the data to units appropriate for comparison with theory (e.g., inverse microns, magnitudes, etc.), to critically assess data quality, and to make plots suitable for publication. Alternate extraction procedures are also available. The IUEDAC has a library of IUE spectra of standard stars which may be used for comparison purposes. There is software for recovering other IUE spectra from the data archives for analyses to be done at the center. This capability may be used to augment an observer's data for comparative purposes. In addition, the center is available to IUE observers who wish, during or immediately after their observing run, to begin analysis of their data. This capability will normally allow an observer to examine spectra within 24 to 48 hours of observation. The center is staffed by astronomers and assistants to assist the observer with the analyses. Users are permitted to use the center remotely from their home institutions. The IUEDAC software library - written in Interactive Data Language (IDL) Version 3 - is also available for export via network distribution for UNIX and VMS platforms. For further information on the IUEDAC, please contact a member of the IUEDAC staff.

Logging onto the IUE VAX

Frequently it is important to know about IUE data which already exists. The routine SEARCH is provided to assist in searching the catalog of archived IUE images. To access SEARCH it is necessary to log onto the IUE VAX. Remote access is available via the Internet and DECnet network systems, or using standard phone lines. For NASA, the Internet and DECnet network systems are supported as part of the NASA Science Internet (NSI). In 1989, SPAN was brought under the umbrella of the NSI. NSI is different from most "internets" in that it supports both DECnet and TCP/IP protocols. The term Internet has become somewhat ambiguous as it is frequently used to refer to both the TCP/IP protocol and the various networks which use TCP/IP. The sections below describe each of these remote access methods as well as information on using SEARCH.

Using the IUEDAC via NSI-DECnet

The DECnet node number for the IUE computer is 15378, and the node name is IUE. If your computer supports DECnet and is connected to NSI you can log on remotely in the following manner:

1. Log on to your computer using an appropriate terminal (*i.e.*, any terminal is acceptable for running SEARCH).

2. Type the command:

   SET HOST IUE

   or

   SET HOST 15378
   (if your computer doesn't recognize IUE)

Once you are prompted for username you can type in your assigned name and password as you would if you were a visitor. If you do not have access to an IUE VAX account, you may use the IUEORDER account (password may be requested from Randy Thompson). Once on the IUE VAX, it is necessary to be in Version 3 of IDL. If you are using the IUEORDER account, it will automatically place you in an IDL session. From other accounts, it may be necessary to type:

iuerdaf

When your session is done, exit IDL by typing EXIT or a <CNTL-Z>, and type BYE. This should log you off the IUE computer and return you to your local computer.

File transfer is also possible using the VMS DCL command COPY. Files can be transferred from the IUE VAX to your local computer as follows:

COPY 15378"name password"::IUE$USER0:[name]file.ext file.ext

where name and password are your IUE account name and password, and file.ext is the name of the file to be transferred. Note that the example above assumes you are logged on to your local computer and you were given an IUE user account on disk drive IUE$USER0. More information can be obtained on COPY using the online VMS HELP utility.

Using the IUEDAC via Internet

Our Internet address is 128.183.57.58 and the name is IUE.GSFC.NASA.GOV. If your home computer supports TCP/IP and is connected to a wide-area network, you can log on to the IUE VAX in the following manner:

1. Log on to your local computer or workstation (as before, any terminal is acceptable for running SEARCH).

2. Type the command:

   telnet 128.183.57.58

   (If the IUE VAX is listed in your local hosts file, the number could be replaced with the name iue.gsfc.nasa.gov.)

Once you are prompted for username you can type in your assigned name and password as you would if you were a visitor. If you do not have access to an IUE VAX account, you may use the IUEORDER account (password may be obtained from Randy Thompson). Once on the IUE VAX, it is necessary to be in Version 3 of IDL. If you are using the IUEORDER account, it will automatically place you in an IDL session. From other accounts, it may be necessary to type:

iuerdaf

When your session is done, exit IDL typing EXIT or a <CNTL-Z>, and type BYE. This should log you off the IUE computer and return you to your local computer.

The TELNET command has several options that may be of interest to users. For example, the following set of commands show how to improve your control of starting and stopping text being displayed on your terminal by transferring the processing of the flow control characters to your local host:

telnet

toggle flowchars

display

open 128.183.57.58

File transfer is possible using the FTP command. The parameters specified with FTP however differ depending on whether the files are being sent to, or retrieved from, the computer on which you are logged on. There are also slight differences in the various versions of FTP now available for VMS computers. IUE currently uses the Wollongong TCP/IP support software.

To use FTP while logged on to your local computer to transfer an ASCII file (*e.g.,* a .TXT file) from the IUE VAX to your local computer, type the following:

ftp 128.183.57.58

(enter your IUE account name and password when prompted)

get file.ext

quit

where file.ext is the file you want to copy.

If you are logged on to IUE and want to transfer a file from IUE to your local computer, the commands are slightly different as shown:

ftp (local host name)

(enter your local account name and password)

put file.ext

quit

More information on FTP is available by typing ? or help from within FTP. Note that for security reasons, the IUE VAX does not currently support TFTP or anonymous FTP accounts.

Using the IUEDAC via Phone Lines

The IUEDAC supports two dial-in phone lines. For running SEARCH, any terminal can be used with a 1200 or 2400 baud modem. Personal computers with modems can also be used for remote use. No special emulating software is needed for running SEARCH.

The IUEDAC modems have a special "automatic call-back" security feature, which will disconnect your initial call and if the proper name and password were entered, will call you back using a Federal Telephone System (FTS) line. This requires that users first call Randy Thompson, the IUEDAC manager, at (301) 286-8800 to get both a special name and password for accessing the call-back authenticator, and an account name and password for logging on to the IUE VAX. Users will also be asked for the phone number at which to receive the returned call (i.e. the phone number for the modem).

How to Log On

1. After receiving your special name and password, call the center's computer at (301) 344-0709 or 344-5351 and hit the carriage return key until one of the following messages appears: