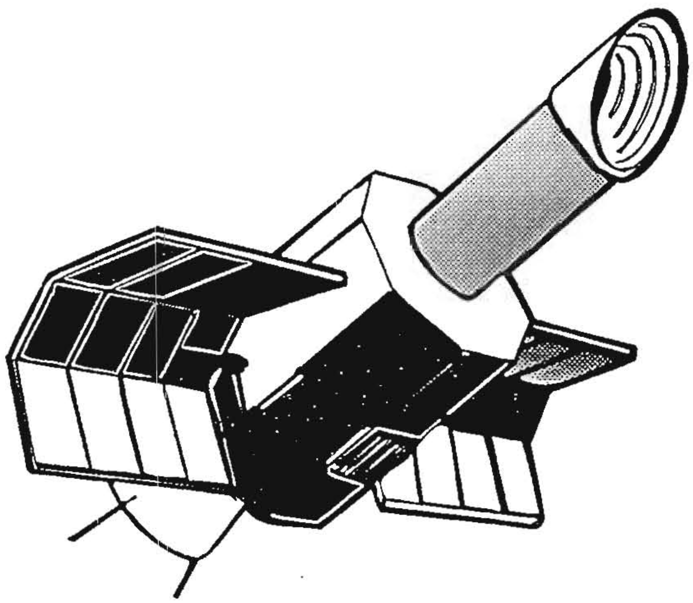
# INTERNATIONAL ULTRAVIOLET EXPLORER



PROPOSAL INSTRUCTION PACKAGE
FOR THE FIFTEENTH EPISODE
OF THE NASA
IUE GUEST OBSERVER PROGRAM

SEPTEMBER 1991

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## SUMMARY OF CHANGES FROM LAST YEAR'S PROPOSAL INSTRUCTION PACKAGE

The entries below highlight and reference significant changes in content or emphasis from last year's (fourteenth episode) instructions. They are placed here to catch the attention of previous IUE proposers already familiar with the instructions. However, <u>all</u> proposers are urged to read the entire instruction package carefully.

| Refer To: | Change: |
|---|---|
| Page 13 | Proposers may request a copy of the template for the electronic submission of their Observation Specification Form via e-mail, or may enter it directly into the TOC MicroVAX. |
| Page 15 | Proposers submitted by <u>December 16, 1991</u>, will be reviewed for inclusion in the observing year beginning around June 1, 1992. |
| Page 23 | Expected beta ranges for hot on-board computer and power constraints have been revised. |
| Page 25 | Photographic transparencies of raw IUE data will only be distributed to observers on request. |
| Page 25 | The IUE Project is preparing to produce a new, significantly enhanced version of the IUE Archives. |

Summarized below are additional changes that were instituted in the last few years.

| | |
|---|---|
| Page 5 | 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 6, 10 | Abstracts should be limited to no more than 200 words. |
| Page 6 | 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 7 | A new research category, "Very Large Projects", has been defined. |
| Page 10 | 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 13 | Electronic submission of target lists, in addition to the printed lists, is requested. |

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 fourteenth annual proposal review cycle have now begun to obtain observations. Fourteenth 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 fifteenth year of IUE operations which will begin in late May or early June, 1992. 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 91-OSSA-19 circulated by NASA Headquarters in August 1991.

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 the data product. 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 not need faculty recommendations.

The purpose of this proposal package is to provide prospective proposers with information needed to submit their proposals and with 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 and cost sections. 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 fourteenth year of operation are given in the Appendices.

## 2. THE PROPOSAL

The proposal shall contain a Technical Section as described in Section 2.1. Proposers from U.S. institutions may also submit a cost section as described in Section 2.3.

### 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.

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 |
| C1. | Previous IUE Programs | 1 page |
| D. | Proposed Research Program | 10 double-spaced pages |
| C2. | IUE Publications/Research in Progress | 2 pages |
| E. | Targets for Observation | Use the Observation Specification Form(s) provided. |

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. Title Page

The Title Page should contain the following items:

1. Proposal Title
2. Principal Investigator's Name, Institution, Address, Telephone Number, 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 MUST 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____Multi-year___Large Project____Consortium_____
Very Large Project: ______

Research Category: Primary (See below) Secondary (See below)

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

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

a) Research Category

The proposer should classify his or her proposal, if possible 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. 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 that a new category, "Very Large Projects", has been defined on the basis of a recommendation from the IUE Users' Committee. This category is expected to involve 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.

The research categories, and some subcategories that historically have been used, are:

A. Hot Stars
  - Subclass A1.
    - Mass loss
    - Spectroscopic variability
  - Subclass A2.
    - Special 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. The proposer may even define his or her own special 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. If the proposal is for more than one year, list explicitly how many shifts are requested for each IUE episode (eg. 15th, 16th, 17th). 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 fourteenth 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.

o 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.

o Special observing techniques, such as tracking of rapidly moving targets or acquiring time-resolved spectra.

o High priority targets, especially if they constitute a minority of the targets listed on the Observation Specification Form.

o Special scheduling requests, such as requests for half shifts.

o Heavy overexposures, which are defined to be overexposures of 50 times or more, relative to an optimum exposure of 210 DN (see below). [PA]

o Battery discharge, such as observations of comets at small sun angles (see Section 5.4). [PA]

o Target of opportunity, which may require special scheduling arrangements. [PA]

o 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. The description of the observing program in the text should include details of such observations.

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

Observing dates for collaborative programs which have coordinated NASA and ESA/SERC shifts will be determined very soon after successful proposals are announced. <u>Both</u> 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 may fill the remainder of the Summary Information Page and it should be a carefully written narrative summary of the proposed research. <u>Abstracts should include a clear statement of the proposal's scientific objectives.</u> The Abstract may be single-spaced. It should be no longer than 200 words.

### <u>C. Previous IUE Programs</u>

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 <u>immediately following</u> the proposal's Summary Information Page.

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APPROVED IUE PROGRAMS

| Short Title & Investigators | Year (1,2,3, ... or 14) | Shift Allotment (US1, US2, AR = archival research including SADAP and ADP programs) |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

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The list of previous and/or current programs should be limited to <u>one</u> 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."

Part 2 of this section is a further summary of previous or ongoing IUE research programs. Part 2 should be placed at the <u>very end</u> 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.

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IUE-RELATED PUBLICATIONS

(Title, authors, reference)

1.
2.
3.

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

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Part 2 should be limited to <u>two</u> 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.

<u>D. Proposed Research Program</u>

This section contains the main body of the proposal and should be limited to <u>ten double-spaced</u> pages. 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 as to their applicability to this program, and if additional data are necessary, why this is so
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 required as a topic to be explicitly addressed by each proposal. In each case this information will be critically evaluated 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.

To assist proposers in identifying existing data useful to their research, two microfiche logs of all IUE observations obtained through May 1991 are included with these instructions. One of these is organized by target right ascension, with solar system targets listed separately at its end. The second log is organized by right ascension within "object classification", a target identifier assigned independently by each observer obtaining a spectrum (see the list of classifications in Section 6). This latter log is useful, for example, for identifying existing observations of irregular variable stars (object class 52). However, this object class may not have been assigned to all such targets or even to all observations of a given target. Therefore, the log ordered by object classification should be used only in conjunction with the log ordered by right ascension, not in lieu of it. In addition, interactive searches through the IUE Merged Log may be performed through the IUE Regional Data Analysis Facilities (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 fourteenth 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 expectation 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).

Any special requirements which your program may have should be fully described in this part of your proposal. 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. Any questions regarding feasibility may be discussed with the IUE Observatory staff prior to proposal submission (phone (301) 286-7537).

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 target list. Estimates of exposure times for proposed observations should be provided for each target. 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 microfiches. 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. Targets for Observation

The targets that are proposed for observation should in general be listed on the Observation Specification Form, which is enclosed. It is permissible to submit the printed target list without using the Observation Specification Form, so long as all the same information and formats are used. The instructions for the full-sized form are given in Section 6. One separate, original form should be returned with each proposal. One copy, reduced to the text's size if possible, should be attached to each copy of the proposal submitted.

If at all possible, please submit your target list by electronic mail, as well as in the printed form with the proposal. Proposers who are on the SPAN network can log in to the TOC MicroVAX and enter their target list by answering the queries. Alternatively, the Observatory can email you a template file, which you can fill out and email back. Please contact Denise Taylor by email (iuesoc::dtaylor) or telephone (301-286-5906) to obtain the account name and password for the former, or to have the template sent to you.

This Target List is the only one you will be asked to submit. It should be limited to the targets you really need to observe in order to carry out your research objectives, plus enough alternate targets to give you some degree of flexibility during your observing run in order to make the most efficient use of your scheduled time. These alternate targets may also be needed in order to work around spacecraft pointing constraints which may arise at the time of observation. These constraints may arise if the spacecraft is in an underpowered or overheated condition and can usually be avoided by scheduling an observer at times of the year when the principal targets are at desirable orientations with respect to the sun. However, it is wise to have a few extra targets in the event a pointing restriction does arise. Whether your list is short or long you should indicate in your proposal and on the Observation Specification Form the ranked priority of your targets. Targets of equal priority should be given equal ranking. Target rankings need not be sequential.

After the Target List has been accepted, targets may be added to it only with the approval of the Project Scientist. He generally will approve all reasonable requests, provided the new targets are consistent with your approved research objectives and provided that 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, Consortium, and Multi-Year Proposals

During the eleventh episode a new category of observing proposal known as "Large Projects" was introduced. A Large Project is a proposal that asks for 10 or more US1 shifts and/or 15 or more US2 shifts per year with a commensurate budget. It may be a two or three year program. [A minimum of 10%, and up to 20%, of the available telescope time and guest observer funds will be set aside for Large and Very Large Projects.] 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. Each participant in a consortium proposal may submit an independent, separate budget, if applicable, appropriate for its share of participation in the collaborative effort.

The IUE Project will also entertain regular proposals that will last two or three years, but such proposals must strongly justify themselves on their scientific merits. To be successful, the proposers must succeed in persuading the Peer Review panel that their proposals are indeed worthy of multi-year commitment of the IUE resources.

### 2.3 Cost Section (U.S. Proposers Only)

The IUE Observatory can support travel costs and publication costs for observers from U.S. institutions. The costs of data analysis may also be supported, to the extent permitted by the Observatory budget, but proposers are urged to confine their requests to the most essential expenses. Proposers are encouraged to make use of the two NASA IUE Regional Data Analysis Facilities in order to reduce the proposal's data analysis and software development costs. These facilities are described in Section 5.5.

Funding for data analysis will be provided only to the extent required for the proposed observational program. Proposals to analyze existing, archival data only are to be submitted separately in accordance with the NASA Research Announcement (Astrophysics Data Program) circulated by NASA Headquarters in July 1991.

The Cost Section of the proposal must be distinct and under separate cover from the Technical Section. Do not include any cost data in the Technical Proposal. The Cost Section should contain the following elements: (1) A list of the budgetary assumptions concerning the type of support required, such as travel, graduate assistants, software development, computer time, publication costs, etc.; (2) A cost breakdown showing the areas of direct labor, materials, all travel, overhead, fees, etc. Travel budgets should be detailed enough to show explicitly assumptions as to number of trips, number of travelers, estimated airline fare per person, purpose and duration of stay, and per diem costs. Requests to utilize either of the two IUE Regional Data Analysis Facilities should be noted. Requests to have more than one observer travel for an observing run should be explained. Typically, only one trip to attend a meeting will be approved per IUE program.

Guest Observers requiring immediate funding at the beginning of the fifteenth year (e.g., those who do not have an ongoing IUE grant) should indicate the urgent nature of this need so that the IUE Project may expedite their funding. For funding purposes, the fifteenth episode begins June 1, 1992.

## 2.4 Submission of Proposals

Proposals may be submitted at any time. Complete proposals in hand by December 16, 1991, will be reviewed for inclusion in the observing year starting around June 1, 1992. Proposals received after December 16 will be saved for the following review cycle unless marked for the Project Scientist's Discretionary Observing Time (see Section 4). (Scientists planning to submit proposals to SERC and ESA should note that these agencies have also established December 16, 1991, as the deadline for receipt of proposals requesting observing time during their fifteenth 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):

- Twelve (12) copies of the Technical Sections including target lists.
- Three (3) additional copies of the Title Page and Summary Information Page (first two pages of the proposal) alone.
- One (1) original full-sized Observation Specification Form.
- Two (2) separate copies of the Cost Section (if applicable).

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 early April 1992.

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

| | |
|---|---|
| December 16, 1991 | Proposal due date, to be included in the fifteenth episode observing proposal review |
| March 1992 | IUE observing proposal peer review |
| April 1992 | IUE observing proposal selection and notification |
| June 1, 1992 | Initiation of funding |

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, and successful proposals will be approved but will not be assigned observing time. When suitable targets appear, the Project Scientist will consult with the approved observers and determine how much observing time should be devoted to the particular event under discussion.

4. PROPOSALS FOR THE PROJECT SCIENTIST'S DISCRETIONARY OBSERVING TIME

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. 32) 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 IUE Regional Data Analysis Facilities at Goddard and at the University of Colorado. These facilities are described further in Section 5.5.

The IUE is located in a geosynchronous orbit having an inclination of about 31 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 are expected to come to the Observatory's Science Operations Center at Goddard and, after a minimal amount of familiarization, take an active part in the real-time control of their observations and the analysis of their data. This approach has the benefit that the 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 his/or her 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 Science 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 is 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 I. 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, several papers). 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 net 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) $t_{HIGH} = E_{\lambda}^{-1}/F$ 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:

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

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

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) $t_{TRAILED} = 3.7\ t_{LOW}$ for widened spectra.

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.

Measurements of the scattered light due to nearby bright sources indicate that the rejection factor for a star 10 arcseconds away from the small aperture is about $3 \times 10^4$, and at 20 arcseconds away it is $10^5$. Light scattered by the gratings may be a serious contaminant in spectra of cool sources. (See IUE NASA Newsletter No. 14, pp. 143-148 and No. 28, pp. 58-73.)

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 from one day to the next 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 <u>requiring</u> 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 | Ritchey Chretien | |
| Aperture | 45 cm | |
| Primary Focal Ratio | f/2.8 | |
| Effective Focal Ratio | f/15 | |
| Plate Scale | 30.5 arcsec/mm | |
| Image Quality | 3 arcsec | |
| Acquisition Field | 16 arcmin diameter | |
| **Spectrographs** | | |
| Type | Echelle | |
| Entrance Apertures | 3 arcsec circle | |
| | 10 x 20 arcsec ellipse | |
| Detectors | SEC Vidicon Cameras | |
| High Disp Range | SWP: 1165-2126 A | LWP: 1845-3230 A |
| Resolving Power | 10000 | 10000 |
| Low Disp Range | SWP: 1150-2000 A | LWP: 1825-3300 A |
| Resolution | 6 A | 6 A |

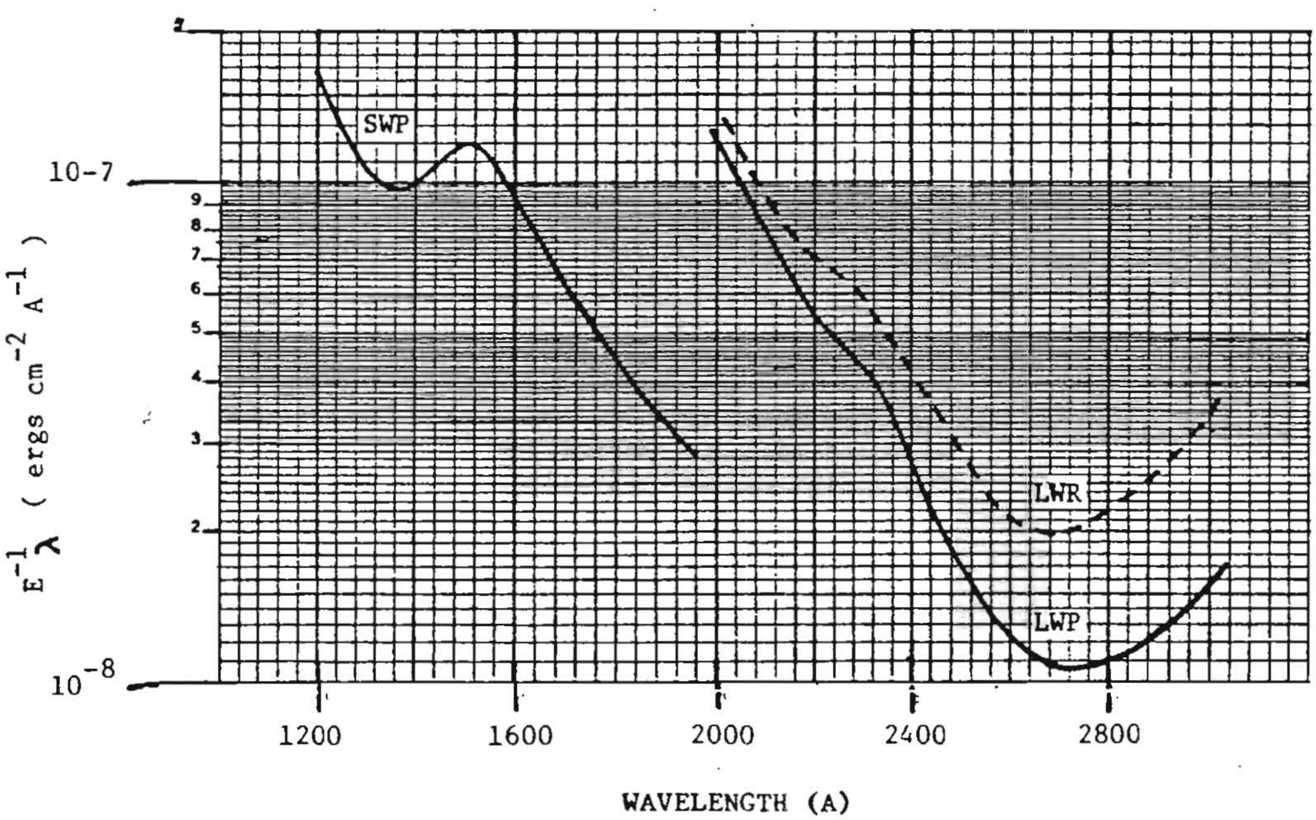


Figure 1. IUE inverse sensitivity functions. The LWR curve is shown for the reduced UVC voltage (4.5 kV).

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.

An efficient observer can keep 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 present at 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 visit. 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 coordinates and magnitude information for all targets and offset stars that are close visual binaries, diffuse, or fainter than about 13th magnitude. Offset stars are recommended for targets fainter than 11th magnitude. 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 thermal 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 <u>beta angle</u>. 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.32).

For beta angles between approximately 65° and 85° there is a tendency for the on-board computer (OBC) to heat up. The duration of any observation in that zone will be limited to the length of time it takes the computer to heat up to its maximum allowed temperature. This limitation is occassionally a problem during the winter months near perihelion. The beta angle region within which science operations may be restricted by a hot OBC temperature varies monthly. The IUE Project has recently relaxed its on-board computer (OBC) temperature constraints significantly. As a result the expected OBC heating zones have been redefined. In the "hot" zone, the OBC temperature will exceed its permitted maximum if an extended period of time is spent observing in the zone. If time-critical observations are required in the hot zone, some time may have to be spent cooling the OBC either before or after the observations. The boundaries of these regions are given in Table 3.

Table 3

Monthly Beta Angle Regions with Expected OBC Temperature Constraints

| Month | Hot Zone |
|---|---|
| January | 65 - 85 |
| February | 70 - 79 |
| March | ---- |
| April | ---- |
| May | ---- |
| June | ---- |
| July | ---- |
| August | ---- |
| September | ---- |
| October | ---- |
| November | 70 - 79 |
| December | 65 - 85 |

A second 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
Expected Power Positive
Beta Angle Regions

| Month | Minimum Load | Maximum Load |
| --- | --- | --- |
| Oct 91 | 31 - 109 | 33 - 104 |
| Jun 92 | 34 - 106 | 38 - 97 |
| Oct 92 | 35 - 105 | 39 - 97 |

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. During the fifteenth episode the IUE shadow periods are estimated to be 1992 July 24 - Aug 16 and 1993 Jan 16 - Feb 12.

Finally, no observations are permitted at beta angles greater than 135 or less than 15 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 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 except on request. These materials are normally delivered to the observer about two weeks after his or her observing run. However, observers using the IUE Regional Data Analysis Facility at Goddard may request a one- to two-day turnaround on their magnetic tapes. 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 networks, and (5) improved access to supporting documentation.

During the fourteenth episode, reprocessing of some of the archival data using the new calibrations and processing system will begin.

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 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 Regional Data Analysis Facilities

Computer facilities for interactive analysis of IUE data are available at Goddard and at the University of Colorado. Similar hardware and software are resident at these two facilities 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. Both facilities have a library of IUE spectra of standard stars which may be used for comparison purposes. Both facilities have the capability of recovering IUE spectra from the data archives for analyses to be done at the facility. This capability may be used to augment an observer's data for comparative purposes. In addition, the facility at Goddard 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 the observation. Both facilities are staffed by astronomers and assistants to assist the observer with the analyses. Experienced users are permitted to use the facilities remotely from their home institutions. Additional 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 are given exclusive rights to their observations for 6 months after receipt of their data products. After 6 months, the data are deposited in the National Space Science Data Center at the Goddard Space Flight Center and also in the data centers of the United Kingdom and the European Space Agency. These data are then made available on request. Observers are encouraged to use data from the data centers whenever they are suitable, rather than needlessly repeating observations. Two microfiche logs of IUE observations taken through May 1990 are attached to the back cover of these instructions. Observers may also find it advantageous to share their observations with other astronomers having similar observing programs so that their combined observing time can be used to the greatest advantage. Such arrangements are left entirely to the discretion of the individual observers.

## 6. OBSERVATION SPECIFICATION FORM

The information submitted on the Observation Specification Form will be used for scheduling Observatory operations and for estimating the exposure times required for each object. One original full-sized Observation Specification Form should be returned with each proposal. This year it is permissable to submit the target list without using the Observation Specification Form, so long as all the same information and formats are used. Reproduced forms attached as part of each technical proposal copy should, when possible, be reduced to the same dimensions as the proposal. An attempt has been made to provide an information format flexible enough to satisfy each user's observing needs, and every attempt will be made to schedule in accordance with the information given.

The Observatory strongly encourages electronic submission of target lists, in addition to the printed form in the proposal. To do this the proposer can either log in to the IUE MicroVax's remote observer account (via SPAN) and use the canned program, or they can send an ASCII file which contains the same information, and using the same format, as the Observation Specification Form. The electronic version of the target list must be received by 1991 Dec 16. The SPAN address is iuesoc::iuemail. To obtain the passwords for the remote account, or any other assistance in transmitting your target list, please contact Denise Taylor (iuesoc::dtaylor or 301-286-5906) or the Resident Astronomers (iuesoc::iuemail or 301-286-7537). ELECTRONIC SUBMISSION OF TARGET LISTS WILL BE OF GREAT ASSISTANCE TO THE IUE PROJECT IN CONDUCTING THE ENTIRE PEER REVIEW PROCESS.

Target priorities should be noted on the form and addressed in the body of the proposal. The IUE Project expects to be experimenting with increasingly automated scheduling routines in preparation for future episodes and IUE observational "windows" restricted by spacecraft constraints that worsen as the spacecraft ages. To ensure that your high priority objects receive greater consideration in scheduling, the importance of each target to your program should be noted in the target priority (RANK) columns of the Observation Specification Form. See the end of this section for detailed instructions on completing the form and specifying priority. Examples which show how the Observation Specification Form should be filled out for various types of objects are included.

Target coordinates are to be specified in 1950 epoch, giving right ascension to a tenth of a second of time and declination to one second of arc. Valid coordinates are necessary because the accuracy of a spacecraft maneuver depends upon the positional accuracy of both the desired target and the previously observed object. The necessity of having an accurate position is not reduced by any presumed "ease" of identifying the 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.

In filling out the forms please note the following:

(1) When using a catalog code for specifying object names, it is necessary for the object numbers to be right-justified, with no leading zeroes.

(2) "O" means the letter "oh"
"Ø" means the number "zero"

(3) The FORMAT given in the parameter description below refers to the standard FORTRAN format field specification under which the item will be read. Formats of the type Fn.0 can accept integer or floating point numbers. The decimal point, if omitted, is assumed to be to the right of the rightmost digit position in the field.

(4) Except where noted, all entries should be right justified within the appropriate fields.

(5) A new object class, 69, has been defined for Herbig-Haro objects.

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Sequence Number | SEQ | I3 | 1-3 |

Integer running from 1 to N, where
N is the total number of entries.

| | | | |
|---|---|---|---|
| Catalog Source | A | A1 | 4 |

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 | 5-12 |

Eight alpha-numeric characters, right justified.

| A | IDENT | |
|---|---|---|
| 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 |

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Coodinates (1950 epoch only) | | | |
| RIGHT ASCENSION: HOURS | HR | I2 | 14-15 |
| MINUTES | MIN | I2 | 17-18 |
| SECONDS | SEC | I2 | 20-21 |
| TENTHS OF SECONDS | SEC/10 | I1 | 23 |
| DECLINATION: SIGN | ± | A1 | 25 |
| DEGREES | DEG | I2 | 26-27 |
| MINUTES | MIN | I2 | 29-30 |
| SECONDS | SEC | I2 | 32-33 |
| Spectal Type | SP | A2 | 35-36 |

Spectral types are used to derive exposure times.
First character--one of the letters W, O, B, A, F, G, K, M, C, R, N, S.
Any other character will be treated as an M.
Second character--one of the digits 0-9; C or N for WC, WN.
If no type is specified, B0 is assumed for exposure time estimation.

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Luminosity Class | L | I1 | 38 |

A single digit from 1 to 9 given as follows. If not specified, a default value of 5 will be assumed.

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

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Brightness Mode Indicator | E/F | A1 | 40 |

Indicates the type of information
specified in the next two fields.
(blank) means VIS MAG and B-V.
E means VIS MAG and E(B-V).

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Visual Magnitude | VIS MAG | F6.2 | 42-47 |

For BRIGHTNESS MODE E or blank,
specify visual magnitude, right justified.

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Color or Wavelength<br>If BRIGHTNESS MODE is blank, specify B-V. If omitted, the target is treated as unreddened. For BRIGHTNESS MODE E, specify E(B-V). If omitted, the target is treated as unreddened. Should be right justified. | B-V/E(B-V) | F6.2 | 49-54 |
| Resolution<br>R=1 (HIGH)<br>R=2 (LOW)<br>R=3 (BOTH) | R | I1 | 56 |
| Wavelength Range<br>W=1 (LONG)<br>W=2 (SHORT)<br>W=3 (BOTH) | W | I1 | 57 |
| Target Priority<br>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, <u>all</u> targets should be assigned RANK=1. Right justify. | RANK | I3 | 59-61 |
| Day of Observation<br>Day of year (1 to 365) for the desired time of observation if the date and/or time of observation is scientifically critical beyond the normal beta-angle requirements. 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 (12 months in length) beginning in June 1990. In order to ensure that requests for specific dates and/or times are considered by the Observatory's scheduler, the Principal Investigator should communicate the program's requirements in writing to the Observatory immediately following program approval. | DAY | F7.3 | 70-76 |

| PARAMETER | NAME | FORMAT | COLUMN |
|---|---|---|---|
| Object Class | OBJ CLASS | A3 | 78-80 |

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

Examples of Entries on the IUE Observation Specification Form

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

EXAMPLE 1 HD 30614 is to be observed at high resolution (R=1), both long and short wavelength (W=3). Visual magnitudes and B-V are specified (E/F = blank). It is a backup for high radiation shifts and has been given a low (relative) priority (RANK = 10).

EXAMPLE 2 HD 36512 is to be observed at low resolution (R=2), long wavelength (W=1). Visual magnitude and E(B-V) are specified (E/F = E). It too is given a RANK = 10.

EXAMPLE 3 3C 273 is to be observed at low resolution (R=2), short wavelength (W=2). An approximate visual magnitude is given. A spectral type entry is not appropriate and so it is omitted.

EXAMPLE 4 AND 5 NGC 4472 is to be observed at low resolution (R=2) and both long and short wavelength (W=3). The short wavelength exposure, as well as those planned for target 7, are the highest priority observations to be made and are assigned RANK = 1. The long wavelength exposure is of a lower, but still important, priority (RANK = 2).

EXAMPLE 6 Jupiter is to be observed on July 29, when it is in a region which will not cause heating of the on-board computer (beta angle = 47 degrees). The observer should check the position of the Moon before requesting a specific date or time.

EXAMPLE 7 The subdwarf O star BD+28 4211 is the desired target.

EXAMPLE 8 RU Peg is a variable star, an example of an "OTHER" Catalog Source.

EXAMPLE 9 PKS 2216-038 is the target. Even if the observer does not care about the exposure time (an 8-hour exposure is not expected to overexpose the spectrum of this source), he should still provide as much information as possible, for example the visual magnitude and (B-V), so that it can be included in the observatory log.

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 UV 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 Fields |

## OBSERVATION SPECIFICATION FORM

PROGRAM ID ☐☐☐☐ | PROGRAM NAME: EXAMPLE | USER'S INITIALS ☐☐☐ | DATE | PAGE OF

| SEQ (1-3) | A (4) | IDENT (5-12) | RA (1950) HR (13-15) | RA MIN (16-18) | RA SEC • T (19-23) | DEC (1950) ±DEG (24-27) | DEC MIN (28-30) | DEC SEC (31-33) | SP (34-36) | L (37-38) | EF (39-40) | VIS MAG OR FLUX (41-47) | B-V E(B-V) WAVELENGTH (48-54) | RW (55-57) | RANK (58-61) | (62-68) | DAY (69-76) | OBJ CLASS (77-80) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | H | 3Ø614 | Ø4 | 49 | Ø4.5 | +66 | 16 | 32 | 09 | 1 | | 4.29 | Ø.Ø3 | 13 | 1Ø | | | 13 |
| 2 | H | 36512 | Ø5 | 29 | 31.2 | -Ø7 | 2Ø | 18 | BØ | 5 | E | 4.62 | Ø.Ø4 | 21 | 1Ø | | | 2Ø |
| 3 | O | 3C 273 | 12 | 26 | 33.4 | +Ø2 | 19 | 42 | | | | 13 | | 22 | 3 | | | 85 |
| 4 | N | 4472 | 12 | 27 | 13.9 | +Ø8 | 16 | 32 | | | | 13 | | 22 | 1 | | | 81 |
| 5 | N | 4472 | 12 | 27 | 13.9 | +Ø8 | 16 | 32 | | | | 13 | | 21 | 2 | | | 81 |
| 6 | O | JUPITER | 23 | 34 | 22.2 | -Ø4 | 16 | Ø3 | G5 | 5 | E | -1.43 | Ø.ØØ | 23 | 4 | | 21Ø.2 | Ø3 |
| 7 | 1 | +28 4211 | 21 | 48 | 57.4 | +28 | 37 | 34 | O5 | 6 | | 1Ø.34 | -Ø.34 | 23 | 1 | | | 16 |
| 8 | O | RU PEG | 22 | 11 | 35.6 | +12 | 27 | 2Ø | B2 | 6 | E | 13.1 | Ø.ØØ | 23 | 2 | | | 54 |
| 9 | K | 2216-Ø38 | 22 | 16 | 16.Ø | -Ø3 | 5Ø | 36 | | | | 16.38 | Ø.55 | 23 | 3 | | | 85 |

680-2 (6/80)

# 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)
- o Removed photometric error at 20% exposure level of SWP ITF

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

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

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

<u>High Dispersion</u>

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

28 August 1981 (GSFC) Improved spectral registration at
11 March 1982 (VILSPA) crowded orders
- o 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)
- o Doubled spectral extraction frequency, halved slit width
- o Explicit geometric resampling eliminated
- o Increased apparent spectral resolution
- o Increased (but more realistic) point-to-point noise (factor of 2 unfiltered, 2 when filtered)
- o Further improved background placement, and better handling
- o 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

## References


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Turnrose, B.E., and Thompson, R. W. 1984, IUE Image Processing Information Manual (Version 2), CSC/TM-84/6058.

Turnrose, B.E., Thompson, R.W., and Bohlin, R.C. 1982, "Implementation of New High Dispersion Software: Summary of Output Format Changes," NASA IUE Newsletter No. 18, 21.

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APPENDIX B

NASA Approved IUE Programs
for the Fourteenth Year of Operations

## NASA APPROVED IUE PROGRAMS FOR THE FOURTEENTH YEAR

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. M. A'Hearn | U Maryland | SCNMA |
| IUE Observations of Comets and Related Bodies | | |
| Dr. S. Adelman | Citadel | VENSA |
| IUE Spectrophotometry of Vega-Like Stars | | |
| Dr. S. Adelman | Citadel | BFNSA |
| IUE Spectrophotometry of Main Sequence B, A, and F Stars | | |
| Dr. T. Ake | CSC - GHRS | RGNTA |
| Coordinated Observations of Interacting Peculiar REG Giant Binaries | | |
| Dr. L. Aller | UC LA | PNNLA |
| An Intensive Study of the Variable Planetary Nebulae | | |
| Dr. C. Ambruster | Villanova University | KDNCA |
| The Evolution of 10-7 to 10-8 Yr Old K0-K2 Dwarfs | | |
| Dr. L. Auer | Los Alamos National Labs. | WRNLA |
| The Wind Structure of HD 5980 | | |
| Dr. T. Ayres | U Colorado - CASA | CCNTA |
| Coronathon Follow-On | | |
| Dr. S. Baliunas | Harvard CFA - SAO | MMNSB |
| The Maunder-Minimum Phase of Solar-Type Stars in the Ultraviolet | | |
| Dr. E. Barker | U Texas - Austin | VENEB |
| SO 2 on Venus: A Final Cross-Calibration with Pioneer Venus | | |
| Dr. T. Barker | Wheaton College | PNNTB |
| The Ionization Structure of Planetary Nebulae | | |
| Dr. T. Barker | Wheaton College | NPNTB |
| IUE Spectra of Peculiar Planetary Nebula | | |
| Dr. G. Basri | UC Berkeley | WDNGB |
| Temperatures of Hot DA White Dwarfs | | |
| Dr. W. Blair | Johns Hopkins University | CLNWB |
| Scattering and Grain Destruction in the Cygnus Loop | | |
| Dr. K. Bohm | U Washington | HHNKB |
| The Physical Structure of the Complex Herbig-Haro Object HH2 | | |
| Dr. E. Bohm-Vitense | U Washington | FGNEB |
| Transition Layers of F and Early G Giants | | |
| Dr. E. Bohm-Vitense | U Washington | MLNEB |
| Mass Loss of B3 to B6 Main Sequence Stars | | |
| Dr. J. Bookbinder | Harvard CFA - SAO | AENJB |
| Multiband Observations of the Flares on AE Aquarii | | |
| Dr. C. Bowyer | UC Berkeley | CVNCB |
| Coordinated IUE and EUVE Observations of Cataclysmic Variables | | |
| Dr. A. Brown | U Colorado - JILA | GSNAB |
| A Magnitude-Limited Survey of Single Non-Variable G Supergiants | | |
| Dr. A. Brown | U Colorado - JILA | CCNAB |
| Long-Term MG II Variability of Hybrid-Chromosphere Stars | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
| --- | --- | --- |
| Dr. F. Bruhweiler | Catholic University | ASNFB |
| Magellanic A Supergiants & the Effects of Metallicity on UV Fluxes & Mass Loss | | |
| Dr. D. Burstein | Arizona State University | CCNDB |
| Age Calibration of Mg II Chromospheric Emission | | |
| Dr. D. Burstein | Arizona State University | DMNDB |
| Detection of Tau Neutrino Decay Photons | | |
| Dr. J. Cardelli | U Wisconsin - Madison | GHNJC |
| Characteristics of Extinction in the Disk and Halo Gas | | |
| Dr. J. Clarke | U Michigan | JSNJC |
| Simultaneous IUE and IR Observations of Jupiter's Sulphur Aurora | | |
| Dr. J. Clarke | U Michigan | LANJC |
| H Lyman Alpha Emission Line Profile Studies of Jupiter and Saturn | | |
| Dr. J. Clarke | U Michigan | SSNJC |
| Targets of Opportunity in the Outer Solar System | | |
| Dr. P. Conti | U Colorado - CASA | NENPC |
| Spatially Integrated Spectroscopy of Nearby Giant HII Regions | | |
| Dr. P. Conti | U Colorado - CASA | WNNPC |
| Multi-Wavelength Study of HD50896 (WN+C?) Origin of its Variability | | |
| Dr. P. Conti | U Colorado - CASA | WRNPC |
| Spectral Synthesis of Wolf-Rayet Galaxies | | |
| Dr. F. Cordova | Penn State University | AGNFC |
| The Ultraviolet Continuum of the Softest Xray-Emitting AGN | | |
| Dr. A. Cowley | Arizona State University | XBNAC |
| Long-Term Variations of the Black-Hole Binary LMC X-3 | | |
| Dr. D. Crenshaw | CSC - GHRS | AGNDC |
| IUE and GHRS Spectra of Seyfert Galaxies | | |
| Dr. S. Curiel | Harvard CFA - SAO | CLNSC |
| UV Spectra of H2 Emitting Shocks | | |
| Dr. A. Danks | STX | SGNAD |
| The Connection Between Starburst and Seyfert Galaxies, A Case Study: NGC 1808 | | |
| Dr. L. Danly | ST ScI | IGNLD |
| IUE Observations of the Intermediate Velocity Arch | | |
| Dr. L. Danly | ST ScI | GANLD |
| IUE Observations of a Possible Galactic Chimney | | |
| Dr. R. Dufour | Rice University | NENRD |
| Ultraviolet Spectroscopy of the Helix Nebula | | |
| Dr. A. Dupree | Harvard CFA - SAO | AANAD |
| Periodic Variability in the Hybrid Supergiant: Alpha Aquarii | | |
| Dr. A. Dupree | Harvard CFA - SAO | LSNAD |
| Alpha Ori: A Case Study | | |
| Dr. J. Eaton | Tennessee State Univ. | SRNJE |
| Chromospheric Structure and Heating in Semiregular Variables | | |
| Dr. J. Eaton | Tennessee State Univ. | CBNJE |
| The Chromosphere and Wind of AI Velorum | | |
| Dr. J. Eaton | Tennessee State | IBNJE |
| Long-Term Observations of 31 Cygni | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. N. Evans | York University - Canada | BSNNE |
| Binaries in the Hertzsprung Gap? | | |
| Dr. N. Evans | York University - Canada | DCNNE |
| Classical Cepheid Luminosities | | |
| Dr. P. Feldman | Johns Hopkins University | SCNPF |
| Observations of Comets with IUE | | |
| Dr. A. Filippenko | UC Berkeley | WRNAF |
| UV Observations of Wolf-Rayet Stars in NGC 4214 | | |
| Dr. C. Grady | Catholic University | BPNCG |
| IUE Observations of Mass Outflows in Beta Pictoris and A-Shell Stars | | |
| Dr. C. Grady | Catholic University | PPNCG |
| IUE Observations of A and B Star Candidate Proto-Planetary Systems | | |
| Dr. E. Guinan | Villanova University | RSNEG |
| Activity Cycles in Stars with Highly Active Chromospheres | | |
| Dr. E. Guinan | Villanova University | VWNEG |
| Deciphering Long-Term Photospheric and Chromospheric Activity on VW Cep | | |
| Dr. E. Guinan | Villanova University | ERNEG |
| ER Vul: Studying Solar Magnetic Activity in the Extreme | | |
| Dr. E. Guinan | Villanova University | SUNEG |
| An Ultraviolet Study of Solar Proxies of Different Ages | | |
| Dr. J. Hackwell | Aerospace Corporation | IRNJH |
| The Link Between UV Extinction and IR Cirrus | | |
| Dr. S. Heap | NASA - GSFC | PNNSH |
| A Search for Evolutionary Changes in Planetary Nuclei | | |
| Dr. T. Heckman | Johns Hopkins University | IGNTH |
| The Far-Ultraviolet Spectra of Powerful Far-Infrared Galaxies | | |
| Dr. J. Holberg | U Arizona | WDNJH |
| IUE Observations of Hot DA White Dwarfs Detected by the ROSAT WFC | | |
| Dr. J. Holberg | U Arizona | DANJH |
| IUE Observations of the DAB White Dwarf G104-27 & Its Interstellar Environment | | |
| Dr. R. Humphreys | U Minnesota | BENRH |
| B (e) Supergiants in the Magellanic Clouds | | |
| Dr. J. Hutchings | DAO | WONJH |
| Continuum and UV Extinction in O Stars in M33 and M31 | | |
| Dr. C. Imhoff | CSC - Astronomy Programs | IMNCI |
| The 2200 A Extinction Feature in the Taurus Dark Clouds - II | | |
| Dr. P. Judge | U Colorado - CASA | SRNPJ |
| The Mira/Semi-Regular Connection II | | |
| Dr. M. Kafatos | George Mason University | RJNMK |
| UV Observations of the R Aquarii Jet Using HST and IUE | | |
| Dr. M. Kafatos | George Mason University | ZANMK |
| Observations of Symbiotic Stars | | |
| Dr. M. Karovska | Harvard CFA - SAO | RANMK |
| Coordinated IUE and Speckle Observations of R Aqr Central Region | | |
| Dr. S. Kenyon | Harvard CFA - SAO | XBNSK |
| IUE Observations of the X-Ray Binary HD 154791 | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. S. Kepler | U Montreal | WDNSK |
| What is the Amount of Hydrogen at the Surface of a White Dwarf? | | |
| Dr. A. Kinney | ST ScI | LANAK |
| Intermediate Redshift Counterparts to High Redshift Lyman Alpha Galaxies | | |
| Dr. R. Kirshner | Harvard University | SNNRK |
| Supernova Spectroscopy | | |
| Dr. R. Koch | U Pennsylvania | CBNRK |
| Hot, Massive Close Binaries | | |
| Dr. R. Levreault | Wesleyan University | FUNRL |
| Observations of the "High" State of FU Orionis Variable Z Canis Majoris | | |
| Dr. J. Linsky | U Colorado - JILA | LDNJL |
| Relationships Between Magnetic Fields & Non-Thermal Emission on the LMS | | |
| Dr. D. Luttermoser | Iowa State University | LGNDL |
| Flourescent Clues to the Atmospheric Structure of Cool, Variable Stars | | |
| Dr. A. Magalhaes | U Wisconsin - Madison | MCNAM |
| Dust in the Small Magellanic Cloud | | |
| Dr. D. Massa | Applied Research Corp. | EXNDM |
| The UV Extinction Properties of Carina Nebular Dust | | |
| Dr. M. McGrath | Johns Hopkins University | IONMM |
| IO and the Plasma Torus | | |
| Dr. M. McGrath | Johns Hopkins University | SSNMM |
| Ultraviolet Emissions from Saturn and Uranus | | |
| Dr. D. Meyer | Northwestern University | ISNDM |
| The Structure of Interstellar Clouds at the Smallest Scales | | |
| Dr. A. Michalitsianos | NASA - GSFC | ELNAM |
| Coodinated IUE-Groundbased Observations of the Peculiar Object MWC 560 | | |
| Dr. H. Moos | Johns Hopkins University | SJNHM |
| Excitation and Heating of the Jovian Atmosphere | | |
| Dr. J. Neff | NASA - GSFC | ARNJN |
| Fifth Epoch Doppler Imaging Observations of AR Lacertae | | |
| Dr. J. Nichols-Bohlin | CSC - Astronomy Programs | OBNJN |
| UV and Optical Covariability of O Star Winds | | |
| Dr. J. Patterson | Columbia University | CVNJP |
| X-Ray Selected Cataclysmic Variables | | |
| Dr. M. Perez | CSC - IUE Observatory | AENMP |
| MG II Lines as Diagnostic of PMS Nature in Herbig Ae/Be Stars | | |
| Dr. G. Peters | USC | BENGP |
| Multiwavelength Observations of "Rapid Variable" Be-Shell Stars | | |
| Dr. B. Peterson | Ohio State University | AGNBP |
| International AGN Watch: Mapping the Broad-Line Region in NGC 3783 | | |
| Dr. R. Polidan | NASA - GSFC | IBNRP |
| Pseudo-Luminous Stars in Binary Systems | | |
| Dr. A. Porter | KPNO - NOAO | QSNAP |
| EUVE and IUE Observations of Quasars in Directions of Low Neutral Hydrogen | | |
| Dr. L. Ramsey | Penn State University | RSNLR |
| Quiescent Prominences in Eclipsing RS CVns | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. J. Raymond | Harvard CFA - SAO | CVNJR |
| UV Spectra of Nearly Synchronous Magnetic Cataclysmic Variables | | |
| Dr. R. Rich | Columbia University | PNNRR |
| IUE Observations of a New Planetary Nebula Central Star Candidate | | |
| Dr. R. Robinson | CSC - GHRS | FKNRR |
| Structure and Dynamics of HD32918 | | |
| Dr. R. Robinson | CSC - GHRS | RFNRR |
| A Search for Energetic Transient Activity in Cool, Giant Stars | | |
| Dr. S. Saar | Harvard CFA - SAO | BYNSS |
| Long-Term Variability of Magnetic Structures on BD +26 730 | | |
| Dr. B. Savage | U Wisconsin - Madison | GHNBS |
| Galactic Radial Inflow/Outflow of Highly Ionized Gas | | |
| Dr. S. Shore | CSC - GHRS | LBNSS |
| Monitoring the Most Massive Stars | | |
| Dr. C. Shrader | CSC - GRO | XTNCS |
| X-Ray Transients as Targets of Opportrunity | | |
| Dr. J. Shull | U Colorado - CASA | AGNJS |
| Absorption-Line Studies of Three Seyfert Galaxies | | |
| Dr. T. Simon | U Hawaii | TTNTS |
| The Ultraviolet Variability of BP Tauri | | |
| Dr. T. Simon | U Hawaii | CCNTS |
| Chromospheric Activity in the Hyades Cluster | | |
| Dr. T. Simon | U Hawaii | AFNTS |
| Chromospheric Activity in A and F Stars | | |
| Dr. E. Sion | Villanova University | CBNES |
| IUE Echelle Studies of the Very Luminous ROSAT EUV Source SFC1631+782 | | |
| Dr. E. Sion | Villanova University | CVNES |
| Evolutionary State of Helium Transfer Cataclysmics | | |
| Dr. M. Sitko | U Cincinnati | CSNMS |
| Variable Extinction in Hot Stars with Circumstellar Dust | | |
| Dr. E. Skillman | U Minnesota | EGNES |
| The Carbon Abundance in SBS 0335-052 and the Time Evolution of C/O | | |
| Dr. G. Smith | UC Santa Cruz | MGNGS |
| The Coevality of the HR 1614 Moving Group | | |
| Dr. T. Snow | U Colorado - CASA | PCNTS |
| UV Optical Study of Variability in the Wind from P Cygni | | |
| Dr. T. Snow | U Colorado - CASA | ISNTS |
| Studies of Dense Interstellar CLouds: Using IUE to Probe Shocked Regions | | |
| Dr. G. Sonneborn | NASA - GSFC | SNNGS |
| Continuing Ultraviolet Spectroscopy of SN 1987A | | |
| Dr. G. Sonneborn | NASA - GSFC | CVNGS |
| Outburst Studies of High Galactic Latitude Large-Amplitude Cataclysmic | | |
| Dr. S. Starrfield | Arizona State University | NBNSS |
| Coord. Multiwavelength Observations of Classical & Recurrent Novae in Outburst | | |
| Dr. S. Starrfield | Arizona State University | CVNSS |
| Coordinated Multiwavelength Observations of Late Stages in the Outburs | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. S. Starrfield | Arizona State University | NONSS |
| Target of Opportunity Observations of Galactic Novae in Outburst | | |
| Dr. R. Stencel | U Colorado - CASA | VVNRS |
| Ultraviolet Monitoring of VV Cephei | | |
| Dr. P. Szkody | U Washington | CVNPS |
| An IUE Study of Two Interesting New Novalikes | | |
| Dr. T. Teays | CSC - IUE Observatory | RRNTT |
| The Blazhko Effect | | |
| Dr. S. Torres-Peimbert | UNAM | PNNST |
| Carbon Abundances of Halo Planetary Nebulae | | |
| Dr. D. Turnshek | U Pittsburgh | QSNDT |
| UV Studies of Abundances in BAL QSOs | | |
| Dr. D. Turnshek | U Pittsburgh | LANDT |
| Damped Lyman-alpha Absorption From Low to Moderate Redshift Galaxies | | |
| Dr. B. Twarog | U Kansas | RGNBT |
| IUE Observations of Extremely Metal-Deficient Red Giants | | |
| Dr. C. Urry | ST ScI | BLNCU |
| Intensive Multifrequency Monitoring of PKS 2155-204 | | |
| Dr. S. Vennes | U Delaware | WDNSV |
| The Phase Variation of the Ultraviolet Spectrum of Feige 24 | | |
| Dr. D. Welty | U Chicago | EXNDW |
| UV Extinction in High Latitude Clouds. II | | |
| Dr. B. Whitney | Harvard CFA - SAO | RYNBW |
| The Role of Pulsational Shock Waves in the R CrB Behavior of RY Sgr | | |
| Dr. B. Whitney | Harvard CFA - SAO | RCNBW |
| Comprehensive Coverage of an R CrB Dust Ejection Cycle | | |
| Dr. D. Whittle | U Virginia | AGNDW |
| Anisotropic Continuum Emission in Seyferts | | |
| Dr. L. Willson | Iowa State University | RGNLW |
| Polarization and Dust Nucleation in Mass-losing Red Giants | | |
| Dr. C. Wu | CSC - ST ScI | SANCW |
| Augmentation of the IUE Ultraviolet Spectral Atlas | | |

APPENDIX C

ESA and SERC Approved IUE Programs
for the Fourteenth Year of Operation

ESA APPROVED IUE PROGRAMS FOR THE FOURTEENTH YEAR

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. Andreae | Bamberg | NI164 |
| MWC 560 - a Symbiotic Nova? | | |
| Dr. Anton | Heidelberg | NE033 |
| UV Spectroscopy of the Central Galaxy Of The Cooling-flow Cluster 2A 0335+096 | | |
| Dr. Ballester | Oxford | NS058 |
| IO's Atmosphere and Torus: East- West Asymmetries in Their UV Emissions | | |
| Dr. Ballester | Oxford | NS059 |
| Jupiter's Aurora: Correlative Studies of UV H2, H3 and Hydocarbon Emissions | | |
| Dr. Barlow | UCL London | NM159 |
| Carbon Abundances in Galactic Bulge Planetary Nebulae | | |
| Dr. Barstow | Leicester | NA087 |
| IUE Observations of DAB White Dwarfs | | |
| Dr. Barstow | Leicester | NA088 |
| Time Resolved High Resolution Observations of a Rare DA + DM Binary System | | |
| Dr. Bates | Belfast | NM003 |
| Interstellar Gas in the Fields of 4LAC and M22 | | |
| Dr. Bertola | Padova | NE057 |
| UV Detection of Ongoing Star Formation in Elliptical Galaxies | | |
| Dr. Beuermann | Berlin | NI136 |
| Heating of the White Dwarf in AM Herculis | | |
| Dr. Beust | Paris | NM095 |
| Planetary Perturbations in the Disc of Beta Pictoris | | |
| Dr. Bianchi | Torino | NA154 |
| Continuum and UV Extinction of OB Stars in M33 And M31 | | |
| Dr. Bianchi | Torino | NA155 |
| Study of Planetary Nebulae and Their Central Stars with IUE | | |
| Dr. Bianchi | Torino | NA157 |
| Observations of Novae and Related Objects with IUE, ROSAT and Optical Telescopes | | |
| Dr. Bianchi | Torino | NC156 |
| IUE Survey of X-ray Selected Late- Type M.s. and Evolved Stars | | |
| Dr. Bianchi | Torino | NI153 |
| New X-ray Sources in the LMC Discovered By ROSAT | | |
| Dr. Bomans | Bonn | NM021 |
| Physical State of the LMC High Velocity Gas Near SNR 0525-66.0 | | |
| Dr. Bomans | Bonn | NM079 |
| The Dynamics of the Supershell LMC 4 | | |
| Dr. Bromage | RAL | NC195 |
| Coordinated IUE/ROSAT and Rotational Mapping of a Short-period RS-CVn Binary | | |
| Dr. Bromage | RAL | NC196 |
| Coronal, Transition-Region, Chromospheric & B- Field Study of Stellar Flares | | |
| Dr. Bromage | RAL | NC198 |
| Spatially-resolved IUE/ROSAT Observations of the Close Double Flare Star | | |

| PI NAME/TITLE | INSTITUTION | | PROGID |
|---|---|---|---|
| Dr. Bromage | RAL | | NC199 |
| Relationships Between Magnetic Fields and Non-thermal Emission on the LMS | | | |
| Dr. Bromage | RAL | | NI200 |
| Test for Multi-waveband Correlation and Origin of Radio Emission in Ae Aquarii | | | |
| Dr. Brunner | Tubingen | | NQ063 |
| Big Blue Bump in Seyfert I Galaxies: Simultaneous IUE/ROSAT Observations | | | |
| Dr. Bues | Bamberg | | NC027 |
| Atmospheric Structure and Abundances of White Dwarfs in Binary Systems | | | |
| Dr. Buson | Padova | | NQ055 |
| A Search for a Line from the Radiative Decay of Dark Matter Tau Neutrinos | | | |
| Dr. Byrne | Armagh | | NC006 |
| Transition Region Densities in Active Late_Type Stars | | | |
| Dr. Cacciari | Bologna | | NA081 |
| UV-Bright Stars in M3 | | | |
| Dr. Capaccioli | Padova | | NE126 |
| An Observational Test of Evolutionary Models for Polar Ring Galaxies | | | |
| Dr. Capaccioli | Padova | | NE127 |
| The (UV-V, Mg2) Correlation for Early Type Galaxies | | | |
| Dr. Cassatella | VILSPA | | NA175 |
| Verification of the IUE Flux Scale Through Observations Of Two Hot DA White Dwarfs | | | |
| Dr. Cassatella | VILSPA | | NC176 |
| Search for Hot Component Companions To Late Type Supergiants | | | |
| Dr. Cassatella | VILSPA | | NE076 |
| The Stellar Content of the Populous Clusters of the Magellanic Clouds | | | |
| Dr. Cassatella | VILSPA | | NI074 |
| Observations of Faint Classical Novae | | | |
| Dr. Cassatella | VILSPA | | NI075 |
| The UV Luminosity and Mass Accretion Rate of Old Novae | | | |
| Dr. Cassatella | VILSPA | | NI173 |
| UV Monitoring of the Symbiotic Star Z Andromadae | | | |
| Dr. Castellani | Pisa | | NE099 |
| Massive Stars in the Young SMC Cluster NGC 330 | | | |
| Dr. Catala | Meudon | | NA188 |
| Cyclic Acitivity in PMS Herbig Ae Stars | | | |
| Dr. Catalano | Catania | | NC190 |
| Delimitation of the Lyman-alpha and Chromospheric Emission Between A and F Stars | | | |
| Dr. Clavel | VILSPA | 21.5 | NQ022 |
| International AGN Watch: Mapping the Broad-line Region in NGC 3783 | | | |
| Dr. Courvoisier | Geneve | 0 | NQ113 |
| UV Variability of the Quasar 3C 273 | | | |
| Dr. de Boer | Bonn | | NA013 |
| Physical Parameters of Subdwarfs Of Type SdOB and SdO | | | |
| Dr. de Boer | Bonn | | NA193 |
| Sorting Out Binarity in Hot Subdwarf Stars | | | |
| Dr. de Martino | VILSPA | | NI018 |
| Study of UV Orbital Variability in The Intermediate Polar 3A0729+103 = BG CMi | | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. de Martino | VILSPA | NI019 |
| Orbital Phase Resolved IUE Observations of E2003+225 | | |
| Dr. Dennefeld | IAP Paris | NM139 |
| Planetary Nebulae and Chemical Evolution in the Magellanic Clouds | | |
| Dr. Doazan | Paris | NA165 |
| The New Be Phase of Pleione | | |
| Dr. Doyle | Armagh | NC001 |
| Short Period Oscillations in Dwarf M Stars | | |
| Dr. Doyle | Armagh | NC002 |
| The Nature of M Dwarfs with a Zero H Alpha Flux | | |
| Dr. Doyle | Armagh | NC008 |
| Multiwavelength Observations of Stellar Flares | | |
| Dr. E. Terlevich | RGO | NE077 |
| The Carbon Abundance in SBS 0335- 052 and the Time Evolution of C/O | | |
| Dr. Elgaroy | Oslo | NC007 |
| Deviation from the Wilson-Bappu Relationship in Faint Red Dwarf Stars | | |
| Dr. Evans | Keele | NA050 |
| Ultraviolet Observations of PMS Stars in the Orion Region | | |
| Dr. Evans | Keele | NC049 |
| Ultraviolet Observations of RCB Stars | | |
| Dr. Evans | Keele | NI085 |
| Multi-Frequency Observations of Symbiotic Stars | | |
| Dr. Fabian | Cambridge | NQ020 |
| Cluster Environment Around Quasars | | |
| Dr. Faraggiana | Trieste | NA093 |
| Search for Lambda Boo Stars | | |
| Dr. Faraggiana | Trieste | NA098 |
| The Chemical Composition of the Lambda Boo Stars | | |
| Dr. Fernandez | Oxford | NC111 |
| Chromospheric Modelling of the Barium Star Cap (G4Ib) | | |
| Dr. Fernley | VILSPA | NA035 |
| Radii and Bolometric Luminosities of Pleiades Main Sequence Stars | | |
| Dr. Fricke | Gottingen | NE066 |
| UV Spectroscopy of Knots in Three Ring Galaxies | | |
| Dr. Fricke | Bonn | NS092 |
| Variability of the Lyman Alpha Emission from Jupiter, Saturn and Uranus | | |
| Dr. Friedjung | Paris | NI167 |
| Observation of Old Nova At Similar Time as with the HST | | |
| Dr. Glz-Riestra | VILSPA | NI014 |
| Monitoring of the Symbiotic Star SY Muscae in Low and High Resolution | | |
| Dr. Glz-Riestra | VILSPA | NI015 |
| BF Cygni in Outburst | | |
| Dr. Gondhalekar | RAL | NQ177 |
| Simultaneous Ultraviolet and Optical Monitoring of 3C446 | | |
| Dr. Harper | Oxford | NC115 |
| Active Regions, or Changes in Chromospheric Structure of "Hybrid" Bright Giants? | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|

Dr. Heber Kiel NA064
UV Spectrophotometry of Peculiar Hot Stars in the Hamburg Schmidt Survey

Dr. Heber Kiel NA128
High Resolution UV Spectroscopy of 3 Metal Weak Lined SdO Stars

Dr. Henrichs Muenchen NA044
Multiwavelength Observations of Rapid Variable Be-shell Stars

Dr. Henrichs Muenchen NA046
UV and Optical Covariability of O Star Winds

Dr. Howarth UCL London NA004
Spectrophotometry of Magellanic Cloud B Main Sequence Stars

Dr. Hunsch Hamburg NC091
Exploring the Onset of Cool Winds in K-type Giants Of Luminosity Class III

Dr. Jasniewicz Strasbourg NI189
The Binary Nucleus of the Planetary Nebula Abell 35

Dr. Joras Oslo NC140
Rapid Flux and Velocity Variations in Alpha Ori

Dr. Jordan Oxford NC114
A Magnitude-limited Survey of Single, Non-variable G Supergiants

Dr. Koubsky Ondrejov NA201
UV Spectra of the Cyclic Variable Shell Star HD 183656

Dr. Krautter Heidelberg NA048
Late Stages in the Outburst of Classical Novae

Dr. Krautter Heidelberg NA205
IUE Observations of the X-ray Nova Muscae GRS 1121-68

Dr. Maraschi Milan NE158
Intensive Multifrequency-monitoring of PKS 2155-304

Dr. Mason MSSL NQ142
The Ultraviolet Spectrum of Ultra- Soft X-ray AGN

Dr. Mathioudakis Armagh NC036
Circumstellar Material in the RS CVn System SZ Psc

Dr. Megessier Meudon NA202
Rotational and Short Time Scale Variations of Magnetic Pulsating Alpha Cir

Dr. Monier VILSPA NA026
Probing the Atmospheric Structure of 52 Her

Dr. Montesinos Oxford NC137
Flux-flux and Flux-rotation Relations in G-type Stars

Dr. Montesinos Oxford NC138
IUE Monitoring of the Post- Asymptotic Giant Branch Star FG Sge

Dr. Mouchet Meudon NI169
Ultraviolet Observations of Magnetic Cataclysmic Candidates

Dr. Munari Asiago NI122
Observations of Six High-ionization Symbiotic Stars

Dr. Naylor Cambridge NI016
How Common are UV Modulations in CVs?

Dr. Naylor Cambridge NI017
The Disk and Wind Structure of U Gem in Outburst

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. Panagia | Baltimore | NE061 |
| UV Observations of Supernovae | | |
| Dr. Panagia | Baltimore | NE062 |
| Observations of SN 1987A | | |
| Dr. Parthasarathy | Bangalore | NA192 |
| Ultraviolet Spectrum of Extremely Metal Poor Post AGB Star HD 52961 | | |
| Dr. Patriarchi | Firenze | NM073 |
| Winds in Central Stars of Planetary Nebulae | | |
| Dr. Piro | Frascati | NQ152 |
| Very Strong Soft X-ray Emission from the Seyfert 1 Galaxy E1615+061 | | |
| Dr. Pottasch | Groningen | NA094 |
| IUE Observations of New Proto- Planetary Nebulae from IRAS Survey | | |
| Dr. Pottasch | Groningen | NA108 |
| IUE Observations of Post AGB Stars Which Show Spectrum Variation | | |
| Dr. Prange | IAS | NS060 |
| Auroral and Planetary Emissions of Saturn. Origin And Variability | | |
| Dr. Prinja | UCL London | NA030 |
| Stellar Wind Variability in Mid-B Supergiants | | |
| Dr. Pye | Leicester | NC121 |
| Co-ordinated UV, XUV and X-ray Observations of the DMe Flare Star UV Ceti | | |
| Dr. Pye | Leicester | NC134 |
| Determination of the Nature Of The Bright EUV Source KW Aurigae | | |
| Dr. Querci, F. | Midi-Pyrenees | NC184 |
| Carbon Star Shell Extension and Past Mass-loss Deduced from the 2200 a Feature | | |
| Dr. Querci, M. | Midi Pyrenees | NC182 |
| MgII Emission from Shock Waves in Carbon Miras | | |
| Dr. Reimers | Hamburg | NC011 |
| Mass Loss of Alpha Her a from CS Lines in the Spectrum Of Alpha Her B | | |
| Dr. Reimers | Hamburg | NQ191 |
| UV Spectra of Bright New QSO Of the Hamburg Survey | | |
| Dr. Rodono | Catania | NC078 |
| Fifth Epoch Doppler Imaging Obser Vations of AR Lac | | |
| Dr. Rowe | Oxford | NC112 |
| Mg II H and K Lines as an Indicator of Magnetic Activity | | |
| Dr. Schmid | Zurich | NI031 |
| CNO Abundances in Symbiotic Stars | | |
| Dr. Schonberner | Kiel | NA009 |
| UV Study of the Closest Central Star of a Planetary Nebula (S216) | | |
| Dr. Seggewiss | Daun | NA038 |
| Study of the Spectroscopic Magnetic Binary Alpha Dra | | |
| Dr. Selvelli | Trieste | NI172 |
| The Imminent Outburst of the Recurrent Nova T Pyx | | |
| Dr. Solf | Heidelberg | NM037 |
| The Physical Structure of the Complex Herbig-Haro Object HH 2 | | |
| Dr. Solheim | Tromso | NA106 |
| Two Phase Ultraviolet Spectrometry of Pulsating White Dwarf Stars | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. Solheim | Tromso | NI107 |
| The Creation of a Helium Disk in V803 Cen | | |
| Dr. Stahl | Heidelberg | NA187 |
| Multifrequency Observations of the Outburst Phase Of The LMC - LBV R127 | | |
| Dr. Stickland | RAL | NC168 |
| Al Velorum, a New Zeta Aurigae-type Binary | | |
| Dr. Stickland | RAL | NI080 |
| Massive Binaries II | | |
| Dr. Talavera | VILSPA | NA186 |
| Stellar Winds and Mass Loss in A-type Supergiants | | |
| Dr. Tjin A Djie | Amsterdam | NA101 |
| Evolution of the Envelopes Of Herbig Ae/Be Stars | | |
| Dr. Tweedy | Leicester | NA132 |
| A Scan Across the Planetary Nebula NGC 4361 | | |
| Dr. Ulla | Tromso | NI090 |
| The Interactive Binary White Dwarfs System GP Com | | |
| Dr. Ulrich | ESO Garching | NQ148 |
| Observations of the Seyfert 1 Nucleus Of NGC 4151 | | |
| Dr. Ulrich | ESO Garching | NQ149 |
| IUE Observations of Quasars Simultaneous with ROSAT Pointed Observations | | |
| Dr. van der Hucht | Utrecht | NA170 |
| Colliding Winds and Dust Formation in the Variable WC7 Stars HD 192641 HD 193793 | | |
| Dr. Vauclair | Toulouse | NI052 |
| Evolutionary State of Helium Transfer Cataclysmics | | |
| Dr. Verbunt | Utrecht | NI120 |
| Structure of Winds from Cataclysmic Variable Accretion Disks | | |
| Dr. Vidal-Madjar | IAP Paris | NM096 |
| Ionization Near Beta Pictoris | | |
| Dr. Viotti | Frascati | NC151 |
| Study of the UV Spectrum Of The VV Cep Binary KQ Puppis | | |
| Dr. Vladilo | Trieste | NM124 |
| Nearby Molecular Clouds with IUE | | |
| Dr. Vogel | Zurich | NA118 |
| Atmospheres of the Hot Components in Symbiotic Systems | | |
| Dr. Vogel | Zurich | NC117 |
| Empirical Velocity Laws for Cool Giants | | |
| Dr. Vogel | Zurich | NI119 |
| The Symbiotic Nova HM Sge | | |
| Dr. Waelkens | Leuven | NC083 |
| UV Monitoring of Post-AGB Stars with Variable Extinction | | |
| Dr. Wamsteker | VILSPA | NE070 |
| Are the Starburst and Seyfert Phenomena Related? A Case Study of: NGC 1808 | | |
| Dr. Wamsteker | VILSPA | NE071 |
| A Study of the Stellar Population in Selected SO Galaxies | | |
| Dr. Wamsteker | VILSPA | NQ072 |
| Variability Probing of the Inner Parts Of The BLR in Various Seyfert I Nuclei | | |

| PI NAME/TITLE | INSTITUTION | PROGID |
|---|---|---|
| Dr. Weidemann | Kiel | NA032 |
| UV Spectroscopy of Selected White Dwarfs | | |
| Dr. Willis | UCL London | NA023 |
| High Resolution Spectroscopy of Magellanic Cloud WR Stars | | |
| Dr. Willis | UCL London | NA024 |
| Multi-Wavelength Studies of HD 50896 (WN5+?) | | |
| Dr. Willis | UCL London | NA141 |
| The Colliding Winds and Shocked Gas in Gamma Velorum (WC8+091) | | |
| Dr. Wolf | Heidelberg | NA040 |
| Chemical Abundances from B Stars in the Magellanic Clouds | | |
| Dr. Wolf | Heidelberg | NA041 |
| B[e] Supergiants of the Magellanic Clouds | | |

National Aeronautics and
Space Administration

**Goddard Space Flight Center**
Greenbelt, Maryland
20771

NASA

September 9, 1991

Dear Colleagues:

As a matter of policy NASA conducts periodical reviews of operating missions. In the spring of 1992, the Astrophysics Division at NASA Headquarters plans to conduct a comparative review of several programs, including the IUE, in order to assess the scientific results from each mission, adequacy of funding, and prospects for the continuing productivity of each mission. The outcome of this review will be used by NASA Headquarters to reaffirm the existing plans and budgets for continued operation of the mission, or it might result in increases or decreases in scope or budget. In view of the outstanding scientific accomplishments of the IUE, we would expect our project to receive strong support. On the other hand, the financial contraints and uncertainties at NASA could impose additional strain on IUE resources. I therefore ask you to keep these circumstances in mind as you prepare proposals for the fifteenth episode. For example, should you have an important program requiring a large number of IUE shifts, I would recommend strongly that you consider proposing it. Of course, as always, the selection process, particularly the peer review, will be based on the scientific merit of the proposed research.

Best wishes,

Yoji Kondo
NASA IUE Project Scientist