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# INTERNATIONAL ULTRAVIOLET EXPLORER OBSERVATORY OPERATIONS

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## FINAL REPORT

Prepared for  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
Goddard Space Flight Center  
Greenbelt, Maryland

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# CSC

COMPUTER SCIENCES CORPORATION

INTERNATIONAL ULTRAVIOLET EXPLORER

OBSERVATORY OPERATIONS

CONTRACT NAS5-27295

FINAL REPORT

Prepared for

GODDARD SPACE FLIGHT CENTER

By

COMPUTER SCIENCES CORPORATION

Under

Contract NAS5-27295

## PREFACE

This volume contains the Final Report for the International Ultraviolet Explorer (IUE) Observatory Operations contract, NAS5-27295. The report summarizes the activities of the IUE Observatory over the 37-month period from October 1982 through October 1985 and is arranged in sections according to the functions specified in the Work Breakdown Structure of the contract. Routine activities have been summarized briefly wherever possible; statistical compilations, reports, and more lengthy supplementary material are contained in the Appendices.

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LIST OF ABBREVIATIONS

AAS	-	American Astronomical Society
ABG	-	Gyro Body Angles
AIPS	-	Astronomical Image Processing System
ATR	-	Assistant Technical Representative
C&SA	-	Calibration and Systems Analysis
CCIL	-	Control Center Interactive Language
CDMS	-	Command and Data Management System (UIT)
CP-R	-	Control Program for Realtime (Sigma-9 operating system)
CPU	-	Central Processing Unit
CRAB	-	Computer Resources Advisory Board
CSC	-	Computer Sciences Corporation
CTR	-	Contractor Task Report (projects cost estimates for the task)
CU	-	University of Colorado
DASS	-	Data Accounting Software Support
DBMS	-	Data Base Management System
DEC	-	Digital Equipment Corporation
DEP	-	Dedicated Experiment Processor (UIT)
DMC	-	Data Management Center
DN	-	Data Number (digital pixel value from camera)
DOC	-	Data Operations and Control
DR	-	GSFC Discrepancy Report
DTUTF	-	Digital Tape Unit Test Facility
ECOS	-	Experiment Computer Operating System (UIT)

EDS - Experiment Display System  
 EPROM - Erasable Programmable Read Only Memory (UIT)  
 ESA - European Space Agency  
 ETC - Eastern Training Center  
 FAX - Telefacsimile  
 FES - Fine Error Sensor  
 FITS - Flexible Image Transport System  
 FN - Flux Number (photometrically corrected digital pixel value)  
 FPM - Flux Particle Monitor  
 FSS - Fine Digital Sun Sensors (ACS)  
 FUSE - Far Ultraviolet Spectroscopic Explorer  
 GBF - GSFC Browse File  
 GMT - Greenwich Mean Time  
 GO - Guest Observer  
 GOTL - Guest Observer Target List  
 GSA - General Services Administration  
 GSFC - Goddard Space Flight Center  
 IADAF - Interactive Astronomical Data Analysis Facility  
 IDL - Interactive Data Language  
 IGSE - Instrument Ground Support Equipment (UIT)  
 I/O - Input/Output  
 IPC - Image Processing Center  
 IPL - Image Processing Log  
 IPS - Image Processing Support, or Image Processing Specialist  
 IRAS - Infrared Astronomical Satellite

ITF - Intensity Transfer Function  
 IUE - International Ultraviolet Explorer  
 IUEAIMS - IUE Automated Information Management System  
 IUEPROP - IUE Proposer Data Base System  
 IUESIPS - IUE Spectral Image Processing System  
 JCL - Job Control Language  
 JPL - Jet Propulsion Laboratory  
 JSC - Johnson Space Center  
 KSC - Kennedy Space Center  
 LASP - Laboratory for Astronomy and Solar Physics  
 LBLS - Line-by-line Spatially Resolved Spectral File  
 LED - Light-emitting Diode  
 LWLA - Long Wavelength Large Aperture  
 LWP - Long Wavelength Prime Camera  
 LWR - Long Wavelength Redundant Camera  
 LWSA - Long Wavelength Small Aperture  
 MEHI - Merged High Dispersion Spectral File  
 MELO - Merged Low Dispersion Spectral File  
 MSFC - Marshall Space Flight Center  
 NASA - National Aeronautics and Space Administration  
 NOAO - National Optical Astronomy Observatory  
 NRAO - National Radio Astronomy Observatory  
 NSESCC - NASA Space & Earth Sciences Computing Center  
 NSSDC - National Space Science Data Center  
 OBC - On-board Computer  
 OCC - Operations Control Center

OD - Operations Director (GSFC)  
 ODD - Optical Data Digitizer (Finder Fields)  
 PBI - Photometrically Corrected Byte Image  
 PDL - Program Design Language  
 PHCAL - Photometric Calibration Program Identification  
 PI - Principal Investigator, or Photometrically  
       Corrected Halfword Image  
 POD - Project Operations Director  
 POT - Preplanned Operations Tape  
 PPMR - Production Processing Modification Report  
 PROC - Procedure  
 PROM - Programmable Read Only Memory (UIT)  
 PS - Payload Specialist  
 Pt-Ne - Platinum-Neon (wavelength calibration lamp)  
 PW - Photowrite  
 QC - Quality-Control  
 RA - Resident Astronomer  
 RAD - Rapid Access Device (disk on Sigma computers)  
 RDAF - Regional Data Analysis Facility  
 RI - Raw IUE Image (Unprocessed)  
 S/C - Spacecraft  
 SCAMA - Switching, Conferencing, and Monitoring Arrangement  
 SCF - Scientific Computing Facility  
 SCRIPTS - Observing Specifications  
 SEC - Secondary Emission Conduction Vidicon Tube (Camera)  
 SEID - Spacelab Experiment Interface Device (UIT)  
 SERC - Science and Engineering Research Council of the UK

SI - Scientific Instrument  
 S/N - Signal to Noise Ratio  
 SOC - Science Operations Center  
 STScI - Space Telescope Science Institute  
 SWLA - Short Wavelength Large Aperture  
 SWP - Short Wavelength Prime (Camera)  
 SWR - Short Wavelength Redundant (Camera)  
 SWSA - Short Wavelength Small Aperture  
 TC - Transfer Characteristic  
 TFLOOD - Tungsten-flood  
 THDA - Camera Head Amplifier Temperature  
 TCC - Telescope Operations Center  
 TS&O - Telescope Scheduling and Operations  
 TSSF - Tape Staging and Storage Facility  
 UC - Users' Committee  
 UIT - Ultraviolet Imaging Telescope  
 US1 - NASA IUE Observing Shift 1  
 US2 - NASA IUE Observing Shift 2  
 UV - Ultraviolet  
 UVC - UV Image Converter (Camera)  
 UVF - UV Flood Lamp  
 UVFLOOD - UV Flood Lamp  
 VILSPA - Villafranca del Castillo, Spain  
 VIPS - VILSPA Image Preprocessing System  
 WNRC - Washington National Records Center  
 XDS - Xerox Data Systems

## INTRODUCTION

The fundamental operational objective of the International Ultraviolet Explorer (IUE) program is to translate competitively selected observing programs into IUE observations, to reduce these observations into meaningful scientific data, and then to present these data to the Guest Observer in a form amenable to the pursuit of scientific research. The IUE Observatory is key to this objective since it is the central control and support facility for all science operations functions within the IUE Project.

In carrying out the operation of this facility, CSC coordinated and provided a number of complex functions beginning with telescope scheduling and operation, proceeding to data processing, and ending with data distribution and scientific data analysis. In support of these critical-path functions, a number of other significant activities were also provided, including scientific instrument calibration, systems analysis, and software support.

The contract period was from October 1, 1982 to October 31, 1985. The work performed constitutes the ongoing activities of the IUE Observatory and is currently being continued under the follow-on IUE Observatory Operation contract NAS5-28787.

## SECTION 1 - IUE DATA MANAGEMENT CENTER

The IUE Data Management Center (DMC) managed, monitored, and distributed the scientific output products of the IUE astronomical observatory and provided support for the IUE proposal review process. The DMC also provided user support in the form of Guest Observer travel reimbursement, and travel, logistical, and technical support for meetings of IUE advisory groups. Through the IUE Hardcopy Facility (HCF) it provided the management, production, and quality control functions required for the creation of the IUE scientific film products.

### 1.1 MANAGEMENT

The DMC, HCF, and user-support task leaders and technical supervisors established and implemented formal and informal interface channels and procedures to ensure efficient and effective working relationships and overall coordination of effort relating to the data management Work Breakdown Structure (WBS) element. This included the creation and distribution of the weekly data status graphs and tables and regular attendance by the CSC IUE Deputy Project Manager or his representative at the weekly NASA/CSC IUE Project meetings. Additional reports and meetings were accommodated on an as-needed basis.

### 1.2 DATA PRODUCTS

A compilation of IUE data production statistics is contained in Appendix A.

IUE data tapes were received, entered into the appropriate log books, and distributed to their assigned areas. Both quick-look (raw image) and processed photowrite film products were generated in a coordinated fashion using Photowrite Systems 1,2, or 3. VILSPA raw image photowrites were generated beginning in November, 1984. Additionally, photowrite contact prints were generated using the Miller-Holzwarth printing equipment beginning in April, 1984.

CalComp plots were logged in and distributed after plotting and quality control checking were performed by image processing support personnel. Magnetic tapes and corresponding listings containing the standard IUE Observatory logs were generated and distributed according to an approved milestone schedule. Photowrite film prints were mounted in viewgraph frames, labeled, and, when releasable, placed in the Observatory Browse File. Nearly 200 volumes of the IUE observing scripts were photocopied, sent for microfiching, and indexed.

### 1.3 IUE DATA BASE

Daily entry and quality control of observation information, image processing information, and product completion dates were performed. These data were merged into the IUE data base twice a week. MARK IV reports using the IUE data base were generated for use by CSC and GSFC personnel.

### 1.4 DATA DISTRIBUTION

Packages containing GO data products were shipped weekly. Archive tapes, photowrite film sheets, and MARK IV listings were staged and delivered to NSSDC. Completed observatory log products were sent to ESA and SERC, and copies of the standard GSFC PHCAL data products were sent to the ESA Observatory Controller. Boxes of tapes were sent to, or recalled from, storage at the WNRC as necessary.

### 1.5 MAINTENANCE AND SUPPLIES

The observatory petty cash fund was used to obtain GSFC-authorized supplies for the IUE Observatory. Scheduled preventive maintenance and nonscheduled remedial maintenance support was provided for the three Photowrite systems, the contact printing equipment, the photolab hardware systems, and the Lektriever Browse File equipment. As necessary, photowrite system software recommendations were coordinated with other operational areas of the observatory.

## 1.6 USER SUPPORT

Travel reimbursement support for limited numbers of authorized Guest Observers was provided. Travel support for the IUE Users' Committee and Peer Review panel members was provided, as was meeting support for the IUE Users' Committee meetings, IUE Three-Agency meetings, IUE Long-Range Planning Committee meetings, and IUE Peer Review meetings held at GSFC. For the Users' Committee meetings, technical minutes were recorded and published; for the Three-Agency meetings, meeting records were compiled and published; and for the IUE Peer Review meetings, clerical support was provided. In support of the Peer Review process, the computerized data base of proposers was maintained, with updates added at each new observing episode. MARK IV reports using this data base were generated for use by project personnel. Statistical reports summarizing institutional and principal investigator involvement with IUE by episode are contained in Appendices B and C.

## SECTION 2 - SI CALIBRATION AND SYSTEMS ANALYSIS

The SI Calibration and Systems Analysis group provided support in the calibration of, development of control procedures for, and analysis of the scientific instruments on board the IUE. It also provided IUE experience in science operations, data analysis, software development, and hardware support to the design, operation, and analysis of current and future space astronomy missions.

### 2.1 MANAGEMENT

The task leaders and technical supervisors established and implemented formal and informal interface channels and procedures to ensure efficient and effective working relationships and overall coordination of effort relating to the calibration and systems analysis WBS element. This included the regular attendance by the CSC IUE Deputy Project Manager or his representative at the weekly NASA/CSC IUE Project meetings and participation by technical personnel in IUE Three-Agency meetings, Calibration Coordination Committee meetings, and IUE Users' Committee meetings.

### 2.2 CALIBRATION

Observations were planned, conducted, and analyzed to perform the photometric calibration of the scientific instrument. These included data for obtaining new ITFs for all three operational cameras (SWP, LWR, LWP) and spectra for monitoring the sensitivities and absolute calibrations of these cameras. Observations were also planned, conducted, and analyzed to perform the calibrations relating to wavelength determination and target acquisition. Data bases on the variation of dispersion constants, on records of wavelength calibration data products, and on maneuvering, maneuver errors, and telescope focus were updated and maintained.

### 2.3 SI CONTROL PROCEDURES SUPPORT

Support was provided for the procedures for control and calibration of the IUE telescope, spectrographs, cameras, and FES. Continuing efforts were made to identify areas of possible improvement to enhance efficiency and reliability. Continuing support was provided for the maintenance, analysis, and enhancement of the scientific data handling system and the EDS, including the identification of the existence and impact of system software deficiencies.

### 2.4 SI SYSTEMS ANALYSIS

Records of maneuvers and monthly analysis of maneuver errors were provided. Gyro scale factors were redetermined as necessary. Extensive development and testing of a two-gyro plus FSS control system were provided, and in August 1985 this control system was implemented operationally when IUE's Gyro 3 failed. The performance of the components of the scientific instrument (telescope, FES, spectrographs, and cameras) was analyzed. Statistics on daily peak radiation levels were compiled. Scientific analyses of data and operations were provided as appropriate.

### 2.5 OPERATIONS ANALYSIS

Support was provided to ongoing and future space astronomy experiments through IUE experience in spacecraft operations, data analysis, and software and hardware development. Specific areas supported include UIT software/hardware development and payload operation training, IRAS data analysis, Starlab and FUSE ground-system requirements analysis, gamma-ray astronomy mission planning and data analysis, infrared-source cataloging, GSFC DBMS feasibility studies, and IUE long-range planning activities.

## SECTION 3 - TELESCOPE SCHEDULING AND OPERATION

The Telescope Scheduling and Operation group provided the planning and scheduling of IUE observations and the operation of the IUE scientific instrument in support of Guest Observer science programs. It also provided expert technical advice to the IUE project in the analysis of the feasibility of Guest Observer proposals and special requests.

### 3.1 MANAGEMENT

The task leader and technical supervisor established and implemented formal and informal interface channels and procedures to ensure efficient and effective working relationships and overall coordination of efforts relating to the telescope scheduling and operation WBS element. This included the regular attendance by the CSC IUE Deputy Project Manager or his representative at the weekly NASA/CSC IUE Project meetings and participation by technical personnel in IUE Three-Agency meetings, IUE Users' Committee meetings, and meetings with the GSFC IUE Project Operations Director and with Operations Control Center personnel. Additional reports and meetings were accommodated on an as-needed basis.

### 3.2 TELESCOPE SCHEDULING

Extensive pre-visit planning and consultation with Guest Observers was provided in order to develop efficient telescope-time schedules. This activity became increasingly more difficult as spacecraft constraints become tighter and observing programs more complex. Target lists were maintained, and skymaps and Preplanned Operation Tapes were prepared regularly in support of the planning activities.

Technical feasibility reviews were provided to the IUE Project for all observing and archival research proposals, including the many hundreds received in response to the annual announcements of

opportunity and the discretionary time proposals received at other times. Additional reviews were provided as special circumstances arose, due to more restrictive power-negative operations and LWR camera use.

### 3.3 TELESCOPE OPERATIONS

The TOCC was operated by Resident Astronomers and Telescope Operators in support of Guest Observer programs, discretionary time programs, and calibration, maintenance, and engineering test programs. As necessary, the scientific instrument was operated during VILSPA shifts which ESA was unable to support due to contingency situations. This included large blocks of time in November 1983 and March 1984 when VILSPA was changing ground-station computers. Continuing efforts were provided to assist Guest Observers in interpreting their data by explaining the details of the spacecraft instrumentation and data analysis procedures.

Continuing efforts were made to minimize time losses to science operations and to upgrade telescope operations. Guidelines were drawn up for both Service Observing and Remote Observing modes, and operational implementation of these modes was supported. Beginning in August 1985, operational implementation of the two-gyro plus FSS control mode was provided when one of the three remaining IUE gyros failed. This successful recovery was made possible by several years of extensive prior development and testing of this contingency mode.

A statistical summary of IUE science observation efficiency is contained in Appendix D.

### 3.4 QUALITY ASSURANCE

Quality assurance and verification were provided for all TOC records and logs, including observing schedules, observing scripts, manual entries to image header records, maneuver records, handover records, observing logs, and other critical information items.

## SECTION 4 - IMAGE PROCESSING AND SOFTWARE SUPPORT

The Image Processing and Software Support group operated the IUE Image Processing Control Center and provided maintenance, enhancement, and configuration control for IUE Observatory software including the IUE Spectral Image Processing System, the IUE Automated Information Management System, and the IUE Observatory Scheduling Software. It also provided scientific analysis, image-processing related support to Guest Observers, and coordination of data exchange among the NASA, ESA, and SERC IUE Projects and the NSSDC.

### 4.1 MANAGEMENT

The task leaders and technical supervisors established and implemented formal and informal interface channels and procedures to ensure efficient and effective working relationships and overall coordination of efforts relating to the image processing and software support WBS element. This included the regular attendance by the CSC IUE Deputy Manager or his representative at the weekly NASA/CSC IUE Project meetings and participation by technical personnel in IUE Three-Agency meetings and IUE Users' Committee meetings. Additional reports and meetings were accommodated on an as-needed basis.

### 4.2 IMAGE PROCESSING

The Image Processing Center was operated to provide routine production processing of current IUE images, approved archival-image reprocessing, reprocessing of images affected by operational problems, and special tests for IPC and other observatory areas. Support was also provided for processing of VILSPA images during a period when their computer was being replaced in November 1983.

Routine quality assurance operations were performed on all image processing output products, including CalComp plots, Guest Observer and archive tapes, and all hand-kept records within the IPC. The impact of approved observing programs on image processing activities was assessed as necessary, and priority processing was coordinated as appropriate.

#### 4.3 SOFTWARE SUPPORT

Maintenance, enhancement, and change control were provided for the IUESIPS software, the IUE Observatory scheduling software, and the IUEAIMS software, and general software support was provided to other areas of the observatory as needed. For example, support was provided to GSFC for the development of the IUE Condensed Data Archives software and request activity reporting. Procedures and software were developed to provide archive reprocessing capability, to generate VILSPA raw-image photowrite tapes, to convert the target request cross-reference software to run on the IBM computer, and to automate the NASA/ESA data exchange discrepancy list. Extensive interfaces were maintained with ESA and SERC to support data exchange activities.

#### 4.4 GUEST OBSERVER SUPPORT

Guest Observer support was provided through the preparation and distribution of documentation describing image processing software and standard procedures, consultation with Guest Observers, and special processing services as approved by GSFC. The IUE Image Processing Information Manual, Version 2.0 was completed, published, and distributed.

#### 4.5 ANALYSIS AND DEVELOPMENT

Scientific analysis of IUE data and the development of new techniques designed to improve the usefulness of reduced data were provided. Specific areas of accomplishment include the development of ITF analysis techniques, advances in understanding reseau motion and spectral format registration errors, and progress toward the correction of high-dispersion order overlap. Interfaces with other areas of the IUE Observatory and with VILSPA were maintained and utilized to coordinate activities.

## SECTION 5 - THE REGIONAL DATA ANALYSIS FACILITY (RDAF)

The Regional Data Analysis Facility was operated to provide IUE users ready access to reliable, uniform software and procedures for analyzing IUE data. The RDAF group provided user assistance and consultation, software maintenance, analysis and software development, and hardware maintenance support.

### 5.1 MANAGEMENT

The task leader and technical supervisor established and implemented formal and informal interface channels and procedures to ensure efficient and effective working relationships and overall coordination of efforts relating to the RDAF WBS element. This included the regular attendance by the CSC IUE Deputy Project Manager or his representative at the weekly NASA/CSC IUE Project meetings and participation by technical personnel in IUE Users' Committee meetings. Additional reports and meetings were accommodated on an as-needed basis.

### 5.2 OPERATIONS

Normal scheduling of users was provided on a continuing basis as requests were received, with careful coordination of the visitors' schedules and need for terminal time, disk storage space, tape input/output, instruction and advice. User support in the form of training, supervision, advice, scientific consultation, software development, and data input/output operations was provided to close to 200 different users, involving more than 300 visits by non-local scientists. More than 11,000 spectra were retrieved from the Condensed Data Archives for users. Special assistance was provided to several long-term visitors, and support for the development and implementation of remote usage was provided. The remote mode has been used successfully by a number of users. RDAF documentation was expanded considerably, with a large number of revisions and completely new user-oriented documents developed.

### 5.3 SOFTWARE MAINTENANCE

Maintenance and change control of RDAF software and data bases were provided according to established procedures involving the RDAF User Problem Reports, Software Modification Reports, and Software Review Meetings. These activities encompassed user-generated software, facility-generated software, software provided by the RDAF at the University of Colorado, and access to the IUE Condensed Data Archives and merged log.

### 5.4 ANALYSIS AND SOFTWARE DEVELOPMENT

Analysis and development of new software, procedures, and data bases to extend the capabilities of the RDAF were provided by the RDAF staff. This included installation of more than 125 new procedures (nearly half of which were provided by the CU RDAF), more than 40 improved procedures, and data bases of Kurucz flux models, the IUE UV Flux Catalog, the IUE Standard Star Atlas, the IUESIPS configuration control entries, an IUE data analysis reference list, and various IUE calibration tables. Work was initiated on conversion of IUESIPS routines to the VAX computer.

## SECTION 6 - IUE OBSERVATORY PROJECT MANAGEMENT

CSC IUE Observatory Project Management provided the overall project control and administration necessary to operate, coordinate, and monitor the diverse elements of the IUE Observatory, including both onsite technical activities and offsite financial management and reporting activities.

### 6.1 INTERFACES AND PROCEDURES

Project management established, implemented, and maintained interfaces and the procedures governing them in the areas of CSC interfacing with NASA, CSC interfacing with Guest Observers and other scientists, CSC interfacing with external agencies and enterprises as they relate to the project, and CSC internal interfacing.

### 6.2 OBSERVATORY STATUS REPORTING PROCEDURES

Project management established and implemented all necessary reporting procedures and compiled, produced and distributed the monthly project progress reports. Project management approved all financial reports issued by CSC in relation to the project, coordinated the generation of unscheduled (as-needed) reports, and compiled the contract Final Report. A compilation of contract highlights taken from the monthly progress report transmittal letters is contained in Appendix E.

### 6.3 PARTICIPATION IN MEETINGS

Project management participated in regularly scheduled and as-needed formal and informal meetings relating to the project work. The CSC IUE Deputy Project Manager or his representative participated in the weekly NASA/CSC IUE Project meetings, and project management coordinated the participation by technical personnel in those and other meetings, such as the IUE Three-Agency meetings and IUE Users' Committee meetings.

#### 6.4 OVERALL COORDINATION

Project management provided the overall coordination required to ensure the maintenance of smooth interfaces and efficient working relationships among the various elements of the CSC IUE Project by means of biweekly staff meetings and frequent informal contact.

A compilation of commendations received by CSC IUE project personnel is contained in Appendix F.

SECTION 7 - NEW TECHNOLOGY

There were no reportable items developed under the new technology clause of this contract.

APPENDIX A - IUE DATA PRODUCTS SUMMARY

APPENDIX A - IUE DATA PRODUCTS SUMMARY

In the following tabular data, summary statistics of IUE image acquisition and processing are presented as calculated by the IUEAIMS program ACT. For this compilation, Period 1 is defined as the date of launch (January 26, 1978) through September 30, 1982. Period 2 covers the period of this contract, starting with October 1, 1982. Total numbers are the sum of Period 1 and Period 2 and hence are cumulative since launch.

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ACCOUNTING SUMMARY

PERIOD 1-78/ 26 TO 82/273  
PERIOD 2-82/274 TO 85/503

LONG WAVELENGTH SPECTRA AND IMAGES TAKEN  
HIGH DISPERSION

PERIOD	NO. SPECTRA				NO. IMAGES						
	TAKEN	CRI	DNP	LOST	REQ	CRI	DNP	LOST	DOUBLE	TAKEN	REQ
PERIOD 1	3996	232	0	2	3994	230	0	2	3	3993	3991
PERIOD 2	2493	1	0	0	2493	1	0	0	1	2492	2492
TOTAL	6489	233	0	2	6487	231	0	2	4	6485	6483

SHORT WAVELENGTH SPECTRA AND IMAGES TAKEN  
HIGH DISPERSION

PERIOD	NO. SPECTRA				NO. IMAGES						
	TAKEN	CRI	DNP	LOST	REQ	CRI	DNP	LOST	DOUBLE	TAKEN	REQ
PERIOD 1	4127	202	0	1	4126	196	0	1	6	4121	4120
PERIOD 2	2031	1	0	1	2030	1	0	1	0	2031	2030
TOTAL	6158	203	0	2	6156	197	0	2	6	6152	6150

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SHORT WAVELENGTH SPECTRA AND IMAGES TAKEN  
LOW DISPERSION

PERIOD	NO. SPECTRA				NO. IMAGES						
	TAKEN	CRI	DNP	LOST	REQ	CRI	DNP	LOST	DOUBLE	TAKEN	REQ
PERIOD 1	7988	151	0	11	7977	140	0	10	1317	6671	6661
PERIOD 2	4745	11	0	1	4744	11	0	1	385	4360	4359
TOTAL	12733	162	0	12	12721	151	0	11	1702	11031	11020

LONG WAVELENGTH SPECTRA AND IMAGES TAKEN  
LOW DISPERSION

PERIOD	NO. SPECTRA				NO. IMAGES						
	TAKEN	CRI	DNP	LOST	REQ	CRI	DNP	LOST	DOUBLE	TAKEN	REQ
PERIOD 1	7148	123	0	15	7133	116	0	11	1374	5774	5763
PERIOD 2	4486	9	0	0	4486	9	0	0	496	3990	3990
TOTAL	11634	132	0	15	11619	125	0	11	1870	9764	9753

PERIOD	TOTAL SPECTRA TAKEN													
	ALL SPECTRA			CRI			DNP			LOST				
	LONG	SHORT	HI	LOM	HI+LOM	HI	LOM	HI+LOM	HI	LOM	HI+LOM	HI	LOM	HI+LOM
PERIOD 1	11144	12115	8123	15156	25259	434	274	708	0	0	0	3	26	29
PERIOD 2	6979	6776	4524	9231	13755	2	20	22	0	0	0	1	1	2
TOTAL	18123	18891	12647	24387	37014	436	294	730	0	0	0	4	27	31

PERIOD	TOTAL IMAGES TAKEN														
	ALL IMAGES			CRI			DNP			LOST					
	FES DOUBLE	HI	LOM	HI+LOM	FES	HI	LOM	HI+LOM	HI	LOM	HI+LOM	HI	LOM	HI+LOM	
PERIOD 1	355	2700	8114	12445	20559	20914	426	256	682	0	0	0	3	21	24
PERIOD 2	166	882	4523	8350	12873	13039	2	20	22	0	0	0	1	1	2
TOTAL	521	3582	12637	20795	33432	33953	428	276	704	0	0	0	4	22	26

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TOTAL COMPUTER PROCESSING REQUIREMENTS

PERIOD	SPECTRA				IMAGES								
	CRI	HI	LOM	HI+LOM	SHORT	LONG	CRI	HI	LOM	HI+LOM	SHORT	LONG	FES
PERIOD 1	708	8120	15110	23230	12103	11127	682	8111	12424	20535	10781	9754	341
PERIOD 2	22	4523	9230	13753	6774	6979	22	4522	8349	12871	6389	6482	166
TOTAL	730	12643	24340	36983	18877	18106	704	12633	20773	33406	17170	16236	507

TOTAL COMPUTER PROCESSING COMPLETED  
LOW DISPERSION

PERIOD	SPECTRA				REDO COMP		IMAGES	
	CRI	SHORT	LONG	PROC	REDO COMP	DOUBLES	TOTAL PROC	
PERIOD 1	239	7909	7063	14972	839	2665	12307	
PERIOD 2	55	4807	4540	9347	303	899	8446	
TOTAL	294	12716	11603	24319	1234	3564	20755	

NOTE THAT ALL REDO TOTALS USE ACTUAL VALUES FROM DATA BASE HOWEVER, REDO C FOR PERIODS 1 AND 2 ARE A MAXIMUM OF ONE PER SPECTRA

TOTAL COMPUTER PROCESSING COMPLETED  
HIGH DISPERSION

PERIOD	SPECTRA				REDO COMP		IMAGES	
	CRI	SHORT	LONG	PROC	REDO COMP	DOUBLES	PROCESSED	
PERIOD 1	97	3851	3703	7554	1691	2	7552	
PERIOD 2	339	2300	2752	5052	417	8	5044	
TOTAL	436	6151	6455	12606	2320	10	12596	

TOTAL COMPUTER PROCESSING COMPLETED

PERIOD	SPECTRA				REDO C	IMAGES				
	CRI	HIGH	LOW	SHORT		LONG	HI+LOW	DOUBL	HI+LOW	FES
PERIOD 1	536	7534	14972	11760	10766	22526	2530	2667	19859	339
PERIOD 2	394	5052	9347	7107	7292	14399	720	907	13492	167
TOTAL	730	12606	24319	18867	18058	36925	3574	5574	33351	506

COMPUTER PROCESSING BACKLOGS

PERIOD	SPECTRA				REDO	IMAGES				
	HIGH	LOW	SHORT	LONG		HI+LOW	CRI	HI	LOW	FES
PERIOD 1	566	138	343	361	704	372	559	117	2	678
PERIOD 2	-529	-117	-333	-513	-646	-372	-522	-99	-1	-622
TOTAL	37	21	10	48	58	0	37	18	1	56

DATA PRODUCTS SUMMARY

PERIOD 1=78/26 TO 82/273  
 PERIOD 2=82/274 TO 85/303

PHOTODUPLICATION PRODUCTS (IMAGES)

PERIOD	TAKEN		NOT REQ		REQ		PROCESSED		PRODUCT COMPLETED		BACKLOGS (HI+LOW)	
	HI+LOW	D+C+L	HI+LOW	MAHI	MALOW	HI	LOW	HI+LOW	HI	LOW	REQ-PC	PC-COM REQ-COM
PERIOD 1	20559	706	19853			7456	12083	19539	7353	11998	19351	314 188 502
PERIOD 2	12673	24	12699			4712	8396	13108	4697	8330	13027	-259 81 -178
TOTAL	33432	730	32702			12168	20479	32647	12050	20328	32378	55 269 324

CALCOMP PRODUCTS (SPECTRA)

PERIOD	TAKEN		NOT REQ		REQ		PROCESSED		PRODUCT COMPLETED		BACKLOGS (HI+LOW)	
	HI+LOW	D+C+L	MAHI	MALOW	HI+LOW	HI	LOW	HI+LOW	HI	LOW	REQ-PC	PC-COM REQ-COM
PERIOD 1	23259	737	2461	1886	10175	5304	12937	18261	5296	12938	18234	-66 7 -59
PERIOD 2	13755	24	2809	5180	5742	1684	4031	5715	1692	4021	5713	27 2 29
TOTAL	37014	761	5270	7066	23917	6988	16968	23956	6988	16959	23947	-39 9 -30

OO TAPE PRODUCTS (SPECTRA)

PERIOD	TAKEN		NOT REQ		REQUIRED		PROCESSED		PRODUCTS COMPLETED		BACKLOGS (TOTAL)	
	HI+LOW	FES	D+L	MAHI	MALOW	FES	LOW	HI+LOW	FES	LOW	HI	REQ-PC PC-COM REQ-COM
PERIOD 1	23259	355	23614	29	23230	341	23571	22526	339	22865	7544	16970 341 22855 706 10 716
PERIOD 2	13755	166	13921	2	13753	166	13919	14399	167	14566	5060	9343 165 14568 -647 -2 -649
TOTAL	37014	521	37535	31	36983	507	37490	36925	506	37431	12604	24313 506 37423 59 8 67

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SPECTRAL PACKAGES

PERIOD	TAKEN		NOT REQ		REQUIRED		PROCESSED			PRODUCTS COMPLETED			BACKLOGS (TOTAL)				
	HI+LOW	FES	HI+LOW	D+L	HI+LOW	FES	HI+LOW	FES	TOTAL	HI	LOW	FES	TOTAL	RQ-PC	PC-COM	RQ-COM	
PERIOD 1	23259	355	23614	29	23230	341	25571	22526	339	22865	7446	14887	341	22674	706	191	897
PERIOD 2	13755	166	13921	2	13753	166	13919	14399	167	14566	5043	9281	165	14489	-647	77	-370
TOTAL	37014	521	37535	31	36983	507	37490	36925	506	37431	12489	24168	506	37163	59	268	327

ARCHIVE TAPE PRODUCTS (SPECTRA)

PERIOD	TAKEN		NOT REQ		REQUIRED		PROCESSED			PRODUCTS COMPLETED			BACKLOGS (TOTAL)				
	HI+LOW	FES	HI+LOW	D+L	HI+LOW	FES	HI+LOW	FES	TOTAL	HI	LOW	FES	TOTAL	RQ-PC	PC-COM	RQ-COM	
PERIOD 1	23259	355	23614	29	23230	341	25571	22526	339	22865	7456	14855	339	22652	706	213	919
PERIOD 2	13755	166	13921	2	13753	166	13919	14399	167	14566	5078	9361	165	14604	-647	-58	-885
TOTAL	37014	521	37535	31	36983	507	37490	36925	506	37431	12536	24216	504	37256	59	175	234

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OF POOR QUALITY

APPENDIX B - IUE RESEARCH INSTITUTION  
STATISTICS FROM PROPOSER  
DATA BASE

APPENDIX B - IUE RESEARCH INSTITUTION STATISTICS FROM  
PROPOSER DATA BASE

The following tables list all previous and current institutional sponsors of IUE Principal Investigators. The first table is arranged in alphabetical order by institution name; the second table is arranged according to the IUE episode (nominally April of one year through March of the next) in which the institution was first involved in a regular IUE research program. In the second table, the last section lists those institutions which have been involved in only Project Scientist's Discretionary Time programs.

Each of the tables presents the following data:

- o Institution name
- o Number of approved programs belonging to PIs from the institution. For regular programs, this is given for each episode. For Project Scientist's Discretionary Time programs, no differentiation by episode is made; the total number of such programs is listed under the heading "OD."
- o Total number of approved programs belonging to PIs from the institution.

Occasionally, an institution's only IUE involvement is via a scientist who has moved to that institution from another where he/she was previously an IUE PI. These cases are marked with an asterisk (\*). The specific cases are:

SIXTH EPISODE

J. H. Hecht - from NASA/GSFC to Aerospace Corp.  
G. A. Wegner - from Penn. State to Dartmouth College  
M. S. Giampapa - from CFA-SAO to NOAO-NSO

SEVENTH EPISODE

J. B. Holberg - from USC-Arizona to Arizona LPL  
F. C. Bruhweiler - from CSC to Catholic University

INSTITUTIONS - LISTED ALPHABETICALLY

PAGE 1

ALL EPISODES	(4/78-3/86)	EPISODE:	1	2	3	4	5	6	7	8	OD	TOTALS
*AEROSPACE CORP.								1				1
AIR FORCE SPACE DIVISION				1				1				2
ANGLO-AUSTRALIAN OBS., AUSTRALIA	1											1
APPLIED RESEARCH AND SYSTEMS			1									1
APPLIED RESEARCH CORP.									2	2		4
ARECIBO OBS.									1	1		2
*ARIZONA - LPL									2	2		4
ARIZONA STATE UNIVERSITY			1	1			1	1	2			8
BOSTON UNIVERSITY	1										1	1
BOWLING GREEN UNIVERSITY			1				1	1				6
BRIGHAM YOUNG UNIVERSITY			1									1
C. I. D. A. VENEZUELA							1					1
CALIFORNIA INSTITUTE OF TECHNOLOGY	2	8	5	5	5		5	6	1	1	1	34
CARNEGIE INSTITUTION, WASHINGTON, D.C.				1								1
CASE-WESTERN RESERVE UNIVERSITY				1			2	1				4
*CATHOLIC UNIVERSITY									4	6	2	12
CFA - HARVARD	2		1	1	1		1	15	18	13	8	55
CFA - SAO	1	9	9	12	15		15	15			2	100
CFA - S&T CHINA							1	2	1			3
CHICAGO-YERKES OBSERVATORY							1					1
CLEMSON UNIVERSITY							1					1
COLUMBIA UNIVERSITY	1											1
COMPUTER SCIENCES CORPORATION		5	6	10	14		22	15	15	19	29	120
*DARTMOUTH COLLEGE								1	1	2		4
DOMINION ASTROPHYSICAL OBS., CANADA	2	1	2	1	1		1	1	1	1	3	13
ELECTRO-MAGNETIC APPLICATIONS, INC.												1
FRANKLIN AND MARSHALL COLLEGE				1			1	3	1		3	9
GEORGE MASON UNIVERSITY				1			1	1	1			3
GEORGIA STATE UNIVERSITY												1
HALE OBSERVATORIES	1											1
HAO-NCAR									1			1
HERZBERG INST. OF ASTROPHYSICS											1	1
HOWARD UNIVERSITY	1	1	1	1						4		8
I.A.F.E., ARGENTINA	1											2
I.A.R., ARGENTINA												2
IMAD-AD-DEAN, INC.									1	2		4
INDIANA UNIVERSITY										6	1	13
IOWA STATE UNIVERSITY												1
JET PROPULSION LABORATORY	1	3	4	4	3	4	1	1	1	3	2	22
JOHNS HOPKINS UNIVERSITY	1	6	4	3	4	1	1	4	6	7	1	36
LEHIGH UNIVERSITY			1	1	1	1	1	3	1	1	1	8
LOCKHEED CORPORATION	1											1
LOS ALAMOS, NEW MEXICO												9
LOUISIANA STATE UNIVERSITY												7
												11

INSTITUTIONS - LISTED ALPHABETICALLY

PAGE 2

ALL EPISODES	(4/78-3/86)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
MASSACHUSETTS INSTITUTE TECH.				2	2	1	1			2	8
MICHIGAN STATE UNIVERSITY								1		1	2
MT. WILSON & LAS CAMPANAS OBS.								1			1
NASA - AMES RESEARCH CENTER								1			1
NASA - GODDARD SPACE FLIGHT CENTER	16	10	12	12	12	12	15	14	11	36	138
NASA - JOHNSON SPACE CENTER	2								2		2
NASA - MARSHALL SPACE FLIGHT CENTER							1	1	2		3
NAVAL RESEARCH LABORATORY		2					1	1	1		3
NEW MEXICO INST. OF MINING AND TECH.				2	2	2	2	2	2	3	15
NEW YORK UNIVERSITY		1	1				1	1	2	1	9
NOAO - KPNO											5
*NOAO - NSO											1
NORTHWESTERN UNIVERSITY	1						1			1	3
NRAO	1										1
OHIO STATE UNIVERSITY	2	1		4	1		2			1	11
PENN STATE UNIVERSITY				2	2	3	3	2	2	2	15
PRINCETON UNIVERSITY	1	1	2	3	2	1	1	1	1		12
RICE UNIVERSITY		1	1	1	1	2	1	2	2		9
RUTGERS UNIVERSITY				1	1				1		2
S M SYSTEMS, INC.				1	1		1				3
SPACE RESEARCH INST., U. S. S. R.		1							1		1
SPACE TELESCOPE SCIENCE INST.				1	1			2	3	1	6
ST. MARY'S UNIVERSITY, NOVA SCOTIA		1	1								2
STANFORD UNIVERSITY				1	1						2
STRUVE ASTRO. OBS., U.S.S.R.	1					1	3	1	3	2	14
SUNY, STONY BROOK	1			1	1						2
SYSTEMS AND APPLIED SCIENCES CORP.				1	1		1				3
TATA INST. OF FUND. RESEARCH, INDIA								2	1	1	4
THE CITADEL		1			1		1				3
TOKYO ASTRON. OBS., JAPAN	1							1	1	1	4
TUFTS UNIVERSITY							1	1	1		3
U. N. A. DE MEXICO	1	1	2	3	4	4	7	2	5	4	31
UNIVERSITY CALIFORNIA BERKELEY	1	2	3	3	3	2	2	4	4	2	23
UNIVERSITY CALIFORNIA LOS ANGELES				2	3	3	2	1	1	1	12
UNIVERSITY CALIFORNIA SAN DIEGO				2	3	3	1	1	1	2	12
UNIVERSITY CALIFORNIA SANTA CRUZ	1	1	4	4	5	3	6	3	4	3	31
UNIVERSITY OF ARIZONA				4	5	3	2	4	7	2	31
UNIVERSITY OF CHICAGO				1	1	2	1	3	3	2	15
UNIVERSITY OF COLORADO				4	6	5	9	12	12	6	68
UNIVERSITY OF COLORADO-JILA	2	2	6	6	5	9	14	12	12	4	59
UNIVERSITY OF COLORADO-LASP				2	6	6	10	15	15	3	10
UNIVERSITY OF DELAWARE		1	1	2	1		3	1			8
UNIVERSITY OF DENVER		1	1	1	1						4
UNIVERSITY OF FLORIDA				1	1			1		1	4
UNIVERSITY OF GEORGIA				1	1			1			3

INSTITUTIONS - LISTED ALPHABETICALLY

PAGE 3

ALL EPISODES	(4/78-3/86)	EPISODE:	1	2	3	4	5	6	7	8	OD	TOTALS
UNIVERSITY OF HAWAII	1											19
UNIVERSITY OF ILLINOIS			1			2	5	3	4	3	1	3
UNIVERSITY OF KENTUCKY						1	2	2	1			10
UNIVERSITY OF KYOTO, KYOTO, JAPAN						1	1	1	1	1		4
UNIVERSITY OF MARYLAND			4	2	3	3	3	2	3	4		21
UNIVERSITY OF MASSACHUSETTS												1
UNIVERSITY OF MICHIGAN			1	1	2	3	2	3	1	1	3	11
UNIVERSITY OF MINNESOTA	1		1	2	3	3	3	2	2	1		15
UNIVERSITY OF MISSOURI - ST. LOUIS			1	1	1	1	1	1	1			5
UNIVERSITY OF MONTREAL, CANADA			1	1					2	2		4
UNIVERSITY OF NEBRASKA			1	1			1					3
UNIVERSITY OF NEW MEXICO											1	1
UNIVERSITY OF NORTH CAROLINA									1			1
UNIVERSITY OF OKLAHOMA											1	1
UNIVERSITY OF PENNSYLVANIA			1	1	1	1	1	1	1	1	3	4
UNIVERSITY OF PITTSBURGH												6
UNIVERSITY OF ROCHESTER			2	2	1	1	2	2	2	3	1	9
UNIVERSITY OF SOUTHERN CALIFORNIA			1	3	2	3	4	2	1	3	3	8
UNIVERSITY OF SOUTHERN CALIFORNIA, AZ			4	2	2	2	2	2	2	2		22
UNIVERSITY OF TEL AVIV, ISRAEL			1	2	2	2	2	2	2	2	3	19
UNIVERSITY OF TEXAS			1	1	1	1	1	1	1	1	1	6
UNIVERSITY OF TOLEDO			1	1	1	1	1	1	1	1	1	1
UNIVERSITY OF TORONTO			1	1	1	1	1	1	1	1	1	1
UNIVERSITY OF TORONTO-SCARBOROUGH C.			1	1	1	1	1	1	1	1	1	1
UNIVERSITY OF TORONTO-ERINDALE COLL.			1	1	1	1	1	1	1	1	1	1
UNIVERSITY OF VICTORIA, CANADA			2	2	2	2	2	2	2	2	2	14
UNIVERSITY OF VIENNA, AUSTRIA			1	1	1	1	1	1	1	1	1	3
UNIVERSITY OF VIRGINIA			1	1	1	1	1	1	1	1	1	3
UNIVERSITY OF W. ONTARIO, CANADA			1	1	1	1	1	1	1	1	1	5
UNIVERSITY OF WASHINGTON	1		3	4	4	4	8	13	11	9	8	61
UNIVERSITY OF WISCONSIN	1		7	4	4	3	7	6	6	5	1	38
VANDERBILT UNIVERSITY			1	1	2	2	1	4	1	1	2	5
VILLANOVA UNIVERSITY			1	1	1	1	1	1	1	3	2	13
W. CONNECTICUT STATE UNIVERSITY			1	1	1	1	1	1	1	1	1	1
WASHINGTON STATE UNIVERSITY			1	1	1	1	1	1	1	1	1	4
WELLESLEY COLLEGE												1
WESLEYAN UNIVERSITY												1
WESTERN KENTUCKY UNIVERSITY	1		1	1	1	1	1	1	1	1	3	7
WHEATON COLLEGE			1	1	1	1	1	1	1	1	1	6
YALE UNIVERSITY												1
YORK UNIVERSITY, CANADA			1	1	1	1	1	1	1	1	1	1

INSTITUTIONS - LISTED BY EPISODE OF FIRST IUE INVOLVEMENT PAGE 1

FIRST EPISODE	(4/78-3/79)	EPISODE:	1	2	3	4	5	6	7	8	OD	TOTALS
ANGLO-AUSTRALIAN OBS., AUSTRALIA	1											1
BOSTON UNIVERSITY	1											1
CALIFORNIA INSTITUTE OF TECHNOLOGY	2	8	5	5	5	6	1	1	1	1	1	34
CFA - HARVARD	1	9	12	15	15	15	18	13	8	8	8	100
CFA - SAO	1											1
COLUMBIA UNIVERSITY	1	2	1	1	1	1	1	1	1	1	3	13
DOMINION ASTROPHYSICAL OBS., CANADA	1											1
HALE OBSERVATORIES	1	1	1	1						4		8
HOWARD UNIVERSITY	1											1
I.A.F.E., ARGENTINA	1											1
JET PROPULSION LABORATORY	1	3	4	4	3	1	1	3			1	22
JOHNS HOPKINS UNIVERSITY	1	6	4	4	4	4	6	7	1	1	1	36
LOCKHEED CORPORATION	1											1
NASA - GODDARD SPACE FLIGHT CENTER	16	10	12	12	12	15	14	11			36	138
NASA - JOHNSON SPACE CENTER	2											2
NORTHWESTERN UNIVERSITY	1											1
NRAO	1											1
OHIO STATE UNIVERSITY	1											1
PRINCETON UNIVERSITY	2	1	4	1	1	2	1	1	1	1	1	11
STRUVE ASTRO. OBS., U.S.S.R.	1	1	2	3	2	1	1	1				12
SUNY, STONY BROOK	1	1	1	1	1	3	1	1	3	3	2	14
TOKYO ASTRON. OBS., JAPAN	1											1
U. N. A. DE MEXICO	1	1	1	1	1	1	1	1	1	1	1	6
UNIVERSITY CALIFORNIA LOS ANGELES	1	2	3	3	2	2	4	4	4	2	2	23
UNIVERSITY OF ARIZONA	1	2	4	5	3	6	3	4	4	3	3	31
UNIVERSITY OF COLORADO-JILA	2	2	6	5	9	14	12	12	12	6	6	68
UNIVERSITY OF HAWAII	1	1	2	5	5	3	4	3			1	19
UNIVERSITY OF MINNESOTA	1	1	2	3	3	2	2	1	1	1	1	15
UNIVERSITY OF TEXAS	4	3	3	3	4	2	2	1	3	2	3	22
UNIVERSITY OF TOLEDO	1	2	2	2	3	2	2	2	2	2	1	19
UNIVERSITY OF TORONTO	1											1
UNIVERSITY OF TORONTO-SCARBOROUGH C.	1											1
UNIVERSITY OF WASHINGTON	1	3	4	4	8	13	11	9	8	8	8	61
UNIVERSITY OF WISCONSIN	1	7	4	4	3	7	6	5	1	5	1	38
WESTERN KENTUCKY UNIVERSITY	1	1	1	1	1	1	1	1	1	1	1	7

INSTITUTIONS - LISTED BY EPISODE OF FIRST IUE INVOLVEMENT PAGE 2

SECOND EPISODE	(4/79-3/80)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
AIR FORCE SPACE DIVISION		1					1				2
COMPUTER SCIENCES CORPORATION		5			10	14	22	15	19	29	120
LEHIGH UNIVERSITY		1		1	1	1	1	1	1	1	8
NAVAL RESEARCH LABORATORY		2					1				3
NOAO - KPNO		1		1		2	1	2	3	1	9
RICE UNIVERSITY		1		1			1	2	2		9
SPACE RESEARCH INST., U. S. S. R.		1									1
ST. MARY'S UNIVERSITY, NOVA SCOTIA		1		1							2
STANFORD UNIVERSITY		1		1							3
THE CITADEL		1			1		1	2	1	1	7
UNIVERSITY CALIFORNIA BERKELEY		1		3	4	4	7	2	5	4	31
UNIVERSITY CALIFORNIA SANTA CRUZ		2			3		1	1	2		8
UNIVERSITY OF CHICAGO		1		1	3		2	4	7	2	15
UNIVERSITY OF COLORADO		1		4	6	2	1	3	3	2	22
UNIVERSITY OF COLORADO-LASP		1		2	6	6	10	15	15	4	59
UNIVERSITY OF DELAWARE		1		1	1		3	1	3		10
UNIVERSITY OF DENVER		1									1
UNIVERSITY OF ILLINOIS		1			1	2	2	1	1	3	10
UNIVERSITY OF MARYLAND		4		2	3	3	2	3	4		21
UNIVERSITY OF MICHIGAN		1		1	2	2	3	1	1	3	11
UNIVERSITY OF MISSOURI - ST. LOUIS		1		1		1	1	1			5
UNIVERSITY OF NEBRASKA		1		1		1	1	1			5
UNIVERSITY OF PITTSBURGH		1		1		1	1	1	1	1	6
UNIVERSITY OF SOUTHERN CALIFORNIA		1		1		1	1	2		1	9
UNIVERSITY OF TEL AVIV, ISRAEL		2			2		2				6
UNIVERSITY OF TORONTO-ERINDALE COLL.		1									1
UNIVERSITY OF VICTORIA, CANADA		1									1
UNIVERSITY OF VIENNA, AUSTRIA		1		2	1	1	2	1	3	1	8
UNIVERSITY OF W. ONTARIO, CANADA		1		1	1	1	4	1		2	13
VILLANOVA UNIVERSITY		1		1	1	1	1	1	1		6
WASHINGTON STATE UNIVERSITY		1		1	1	1	1	1	1		6
WHEATON COLLEGE		1		1	1	1	1	1	1		6
YORK UNIVERSITY, CANADA		1		1	1	1	1	1	1		6

INSTITUTIONS - LISTED BY EPISODE OF FIRST IUE INVOLVEMENT PAGE 3

THIRD EPISODE (4/80-3/81)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
ARIZONA STATE UNIVERSITY	1			1	1	1	2	2		8
BOWLING GREEN UNIVERSITY	1			1	1	1	2		1	6
BRIGHAM YOUNG UNIVERSITY	1			1						1
LOS ALAMOS, NEW MEXICO	1			1	1	3	2	1	1	11
LOUISIANA STATE UNIVERSITY	1			2	1	1	2			8
MASSACHUSETTS INSTITUTE TECH.	2			2	2	2	2	2	3	15
NEW YORK UNIVERSITY	2			2	2	3	2	2	2	15
PENN STATE UNIVERSITY	1			1						2
RUTGERS UNIVERSITY	1			1						2
SYSTEMS AND APPLIED SCIENCES CORP.	2			3	3	2	1		1	12
UNIVERSITY OF CALIFORNIA SAN DIEGO	1			2					3	4
UNIVERSITY OF PENNSYLVANIA	1			1			1		1	5
UNIVERSITY OF ROCHESTER	2			2	1				1	5
UNIVERSITY OF VIRGINIA	1			1	2		2			5

FOURTH EPISODE (4/81-3/82)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
APPLIED RESEARCH AND SYSTEMS	1			1						1
CARNEGIE INSTITUTION, WASHINGTON, D.C.	1			1	2	1				4
CASE-WESTERN RESERVE UNIVERSITY	1			1						1
ELECTRO-MAGNETIC APPLICATIONS, INC.	1			1	1	3	1		3	9
GEORGE MASON UNIVERSITY	1			1	1	2	2	6	1	13
INDIANA UNIVERSITY	1			1	1					3
IOWA STATE UNIVERSITY	1			1	1	1				3
S M SYSTEMS, INC.	1			1	1	1				3
VANDERBILT UNIVERSITY	2			2	1		1	1		5

FIFTH EPISODE (4/82-3/83)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
C. I. D. A. VENEZUELA	1									1
CHICAGO-YERKES OBSERVATORY	1				1	2	1			4
CLEMSON UNIVERSITY	1				1	1				1
GEORGIA STATE UNIVERSITY	1				1	1	1			3
UNIVERSITY OF GEORGIA	1				1	1	1		1	4
UNIVERSITY OF KENTUCKY	1				1	1	1	1		4
UNIVERSITY OF KYOTO, KYOTO, JAPAN	1				1					1

INSTITUTIONS - LISTED BY EPISODE OF FIRST IUE INVOLVEMENT PAGE 4

SIXTH EPISODE (4/83-3/84)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
*AEROSPACE CORP.	1									1
CFA-S&T CHINA	1								2	3
*DARTMOUTH COLLEGE	1					1		2		4
IMAD-AD-DEAN, INC.	1					1			2	4
*NOAO - NSO	1					1		2	1	5
TATA INST. OF FUND. RESEARCH, INDIA	1					1				1
UNIVERSITY OF SOUTHERN CALIFORNIA, AZ	2					2		3	1	8
W. CONNECTICUT STATE UNIVERSITY	1					1				1
YALE UNIVERSITY	1					1				1

SEVENTH EPISODE (4/84-3/85)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
APPLIED RESEARCH CORP.	2									4
ARECIBO OBS.	1							1		2
*ARIZONA - LPL	2							2		4
*CATHOLIC UNIVERSITY	4							6	2	12
FRANKLIN AND MARSHALL COLLEGE	1									1
HAO-NCAR	1								1	1
MICHIGAN STATE UNIVERSITY	1									1
MT. WILSON & LAS CAMPANAS OBS.	1									1
NASA - AMES RESEARCH CENTER	1									1
NASA - MARSHALL SPACE FLIGHT CENTER	1							2		3
NEW MEXICO INST. OF MINING AND TECH.	1							1		2
SPACE TELESCOPE SCIENCE INST.	2							3	1	6
TUFTS UNIVERSITY	1							1		2
UNIVERSITY OF MONTREAL, CANADA	1									1
UNIVERSITY OF NORTH CAROLINA	1									1
WELLESLEY COLLEGE	1									1
WESLEYAN UNIVERSITY	1									1

EIGHTH EPISODE (4/85-3/86)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
UNIVERSITY OF MASSACHUSETTS									1	1

OD PROPOSALS ONLY(4/78-3/85)	EPISODE: 1	2	3	4	5	6	7	8	OD	TOTALS
HERZBERG INST. OF ASTROPHYSICS									1	1
J.A.R. ARGENTINA									2	2
UNIVERSITY OF FLORIDA									1	1
UNIVERSITY OF NEW MEXICO									1	1
UNIVERSITY OF OKLAHOMA									1	1

APPENDIX C - IUE PRINCIPAL INVESTIGATOR STATISTICS  
FROM PROPOSER DATA BASE

APPENDIX C - IUE PRINCIPAL INVESTIGATOR STATISTICS  
FROM PROPOSER DATA BASE

The following table lists statistics concerning the number of accepted proposals for all previous and current IUE Principal Investigators. The table is arranged in alphabetical order by PI name and presents the following data:

- o PI name
- o PI home institution (more than one if the PI moved)
- o Number of approved programs for the PI (at each institution). For regular programs, this is given for each episode. For Project Scientist's Discretionary Time programs, no differentiation by episode is made; the total number of end programs is listed under the heading "OD."
- o Total number of approved programs for the PI.

Each PI who has changed institutions has multiple entries which show the PI's IUE programs as a function of institution and episode. Such cases are highlighted by asterisks (\*).

PRINCIPAL INVESTIGATORS - LISTED ALPHABETICALLY

PAGE 1

ALL EPISODES (4/78 THRU 3/86)	EPISODE: 1 2 3 4 5 6 7 8 OD TOTALS																		
A'HEARN, MICHAEL F.											1	1	1	2	2	2	2	2	12
ABBOTT, DAVID C.																			1
ADELMAN, SAUL J.											1	1	1	1	2	1	1	1	7
AGRAMAL, PRAHLAD C.																			1
AHMAD, IMAD A.																			1
AIKIN, A. C.																			4
AKE, THOMAS B. III																			1
ALLER, LAWRENCE H.											1	1	1	2	1	3	3	10	10
ALTNER, BRUCE M.																			6
AUER, LARRY H.																			2
AUER, LARRY H.																			2
AYRES, THOMAS R.											3	3	3	3	5	4	4	2	19
BAAN, WILLIAM A.																			1
BAIRD, SCOTT R.																			1
BALIUNAS, SALLIE L.																			1
BARKER, PAUL K.																			7
BARKER, TIMOTHY																			4
BARRY, DON C.																			6
BASRI, GIBOR S.																			2
BEAVERS, WILLET I.																			3
BEGELMAN, MITCHELL C.											1	1	1	1	1	1	2	1	11
BELL, ROGER A.																			3
BELTON, MICHAEL J. S.																			1
BERGSTRAHL, JAY T.																			1
BERNAT, ANDREW																			1
BLACK, JOHN H.																			1
BLAIR, GUY N.																			1
BLAIR, WILLIAM P.																			1
BLAIR, WILLIAM P.																			6
BLESS, ROBERT C.																			1
BOGGESS, ALBERT																			16
BOHLIN, RALPH C.											2	3	1	3	2	1	1	1	13
BOHM, KARL-HEINZ																			7
BOHM-VITENSE, ERIKA											1	1	1	1	3	6	2	6	24
BOLTON, C. THOMAS																			1
BOND, HOWARD E.																			8
BOND, HOWARD E.																			6
BOPP, BERNARD W. D.																			1
BOWYER, C. STUART																			18
BOWYER, C. STUART																			1
BREGMAN, JOEL																			2
BREGMAN, JOEL																			5
BROWN, DOUGLAS N.																			1
BROWN, ROBERT L.																			3
BRUGEL, EDWARD W.																			1
BRUHWEILER, FREDERICK C.																			1

PRINCIPAL INVESTIGATORS - LISTED ALPHABETICALLY

ALL EPISODES (4/78 THRU 3/86)	1	2	3	4	5	6	7	8	OD	TOTALS
BRUHWEILER, FREDERICK C.							4	6	2	19
BRUZUAL, GUSTAVO A.					1					1
BURSTEIN, DAVID								1		1
CALDWELL, JOHN J.		1	1	1	1	3	1	2	2	12
CARNEY, BRUCE W.							1			1
CARRASCO, LUIS		1								1
CASH, WEBSTER C., JR.				1						1
CASSINELLI, JOSEPH P.							1			1
CHAPMAN, ROBERT D.	1				1	1	2	1	3	8
CHENG, FU-ZHEN										1
CHU, YOU-HINA			1							1
CLARKE, JOHN T.										1
CLARKE, JOHN T.										1
CLAYTON, GEOFFREY C.										1
CODE, ARTHUR D.		2	2	1	1	1				8
COHEN, JUDITH G.										1
COHEN, MARTIN			1	1	2		1			6
COHEN, MARTIN										1
COHEN, ROSS D.										1
CONTI, PETER S.		1	1	1	1	2	1	1	1	8
CORDOVA, FRANCE A.										1
COWIE, LENNOX L.										1
COWIE, LENNOX L.										1
COWLEY, ANNE P.					1					1
COWLEY, ANNE P.										1
COWLEY, CHARLES R.										1
CZYZAK, STANLEY J.										1
DALGARNO, ALEXANDER										1
DALTABUIT, ENRIQUE		1								1
DAVIDSEN, ARTHUR F.										1
DAVIDSON, KRIS		1	2	1	1	1				6
DAWSON, DENNIS W.										1
DE BOER, KLAUS S.							1			1
DE ROBERTIS, MICHAEL										1
DEAN, CHARLES A.									1	1
DELSEMME, ARMAND H.										1
DOHERTY, LOWELL R.	1									1
DOHERTY, LOWELL R.	1									1
DOHERTY, LOWELL R.										1
DONN, BERTRAM D.										1
DOSCHKE, GEORGE A.										1
DOWNES, RONALD A.										1
DRILLING, JOHN S.										1
DUFOUR, REGINALD J.		1	1	1	1	1	1	2	2	9
DUNCAN, DOUGLAS K.										1
DUPREE, ANDREA K.										1
DUPREE, ANDREA K.	2	4	7	4	2	2	3	3	3	30
DURRANCE, SAMUEL T.										1

ALL EPISODES (4/78 THRU 3/86)	1	2	3	4	5	6	7	8	OD	TOTALS
EATON, JOEL A.				2	1					
*VANDERBILT UNIVERSITY										
*INDIANA UNIVERSITY							1	3		7
EATON, JOEL A.							1			1
EBBETS, DENNIS C.										1
SPACE TELESCOPE SCIENCE INST.										1
ECHEVARRIA, JUAN										1
U. N. A. DE MEXICO										1
ELVIS, MARTIN S.										1
CFA - SAO										1
EVANS, NANCY R.				1			2	2	5	10
*UNIVERSITY OF TORONTO										2
*COMPUTER SCIENCES CORPORATION										1
CFA - SAO		1								1
UNIVERSITY CALIFORNIA SANTA CRUZ							1			1
FABER, SANDRA M.				1						1
FANG, LI ZHI						1				1
CFA-S&T CHINA										1
FEIBELMAN, WALTER A.				1			3	2	3	11
NASA - GODDARD SPACE FLIGHT CENTER										2
FEKEL, FRANCIS C., JR.				1						1
NASA - GODDARD SPACE FLIGHT CENTER										1
FEKEL, FRANCIS C., JR.										1
*VANDERBILT UNIVERSITY										1
JOHNS HOPKINS UNIVERSITY		2	2	1	1	1	1	1	1	14
UNIVERSITY OF KENTUCKY										1
*NASA - GODDARD SPACE FLIGHT CENTER										1
*UNIVERSITY OF COLORADO-LASP										1
UNIVERSITY OF WASHINGTON							4	2		8
NASA - GODDARD SPACE FLIGHT CENTER										1
NASA - GODDARD SPACE FLIGHT CENTER	1									1
UNIVERSITY OF COLORADO - JILA										1
UNIVERSITY OF CHICAGO		1	1							3
UNIVERSITY OF ILLINOIS		1								2
UNIVERSITY OF COLORADO						1	2	3		6
UNIVERSITY OF TORONTO										1
GARRISON, ROBERT F.	1									1
GELLER, MARGARET J.										1
*CFA - SAO										1
*CFA - HARVARD				1						1
*UNIVERSITY OF ARIZONA										1
GIAMPAPA, MARK S.										1
*CFA - SAO				2	1					3
GIAMPAPA, MARK S.										1
*CFA - SAO										1
GIAMPAPA, MARK S.										1
*CFA - SAO										1
GILRA, DAYA P.										1
NEW MEXICO INST. OF MINING AND TECH.										1
S. M. SYSTEMS, INC.										1
NEW YORK UNIVERSITY										1
UNIVERSITY CALIFORNIA SANTA CRUZ										1
COMPUTER SCIENCES CORPORATION										1
UNIVERSITY CALIFORNIA LOS ANGELES										1
*CALIFORNIA INSTITUTE OF TECHNOLOGY										1
*UNIVERSITY OF ARIZONA		1	1	2	2	3	1	1	1	12
*UNIVERSITY OF ARIZONA										1
*CFA - SAO										1
CALIFORNIA INSTITUTE OF TECHNOLOGY	1	1								2
BOWLING GREEN UNIVERSITY										1
CFA - HARVARD										1
VILLANOVA UNIVERSITY										1
NASA - GODDARD SPACE FLIGHT CENTER				1		1	1	1	2	6
PRINCETON UNIVERSITY										1
CFA - SAO										1
WESTERN KENTUCKY UNIVERSITY										1
HACKNEY, KAREN R.H.										1
HACKNEY, RICHARD L.										1



PRINCIPAL INVESTIGATORS - LISTED ALPHABETICALLY

ALL EPISODES (4/78 THRU 3/86)	1	2	3	4	5	6	7	8	OD	TOTALS
JUGAKU, JUN	1									5
JURA, MICHAEL		1		1	1	1	1	1		1
KAFATOS, MINAS				1	1	3	1		3	9
KALER, JAMES B.				1	1	1			1	4
KALLMAN, TIMOTHY R.				1					1	4
KALLMAN, TIMOTHY R.								2		4
KAMP, LUCAS W.	1									1
KEEL, WILLIAM C.					1					1
KENYON, SCOTT								2	1	3
KIPLINGER, ALAN L.				1						1
KIRSHNER, ROBERT P.		1			1	1	1		1	5
KLINGLESMTIH, DANIEL	3									3
KOCH, ROBERT H.	1		1						3	4
KONDO, YOJI		1	1	1	1	1	1	1	2	10
KONDO, YOJI						1				1
KRISS, GERARD A.								1		1
KRON, RICHARD G.			1		1					2
KUHI, LEONARD V.										1
KURT, V. G.										1
KWOK, M. S.		1							1	2
LAMB, SUSAN A.		1	1							2
LAMB, SUSAN A.				2	2	1	1	1	1	8
LAMBERT, DAVID L.		1	1							2
LANDSTREET, JOHN D.		1	1							2
LANDSTREET, JOHN D.				1						1
LANE, ARTHUR L.	1	1	2	1	1				1	7
LANG, KENNETH R.							1	1		2
LECKRONE, DAVID S.	2									2
LEIBOWITZ, ELIA		1								1
LESH, JANET ROUNTREE		1	2							3
LESTER, JOHN B.				1	1					2
LIEBERT, JAMES W.						1	2	1	1	4
LIEN, DAVID J.										1
LINSKY, JEFFREY L.		1	5	4	8	9	10	10	3	50
LITTLE-MARENIN, IRENE										1
LUTZ, JULIE H.		1	1				1	1		4
MACALPINE, GORDON M.										1
MACCACCARO, TOMMASO					1				1	1
MADORE, BARRY F.										1
MALKAN, MATTHEW A.							1			1
MALKAN, MATTHEW A.								2		2
MARAN, STEPHEN P.		1		1	1	1	1	1	1	6
MARGON, BRUCE						2	1	1		5
MARLBOROUGH, J. MICHAEL		1	1							2
MASSEY, PHILIP L.				1	1	1	1			4
MASSEY, PHILIP L.		1	1	1	1	1	1	1	1	8
MATHIS, JOHN S.										1

PRINCIPAL INVESTIGATORS - LISTED ALPHABETICALLY

ALL EPISODES (4/78 THRU 3/86)	1	2	3	4	5	6	7	8	OD	TOTALS
MATILSKY, TERRY A.			1	1						2
MATSON, DENNIS L.			2	2	2					8
MCCLINTOCK, JEFFREY E.		2	2							4
MCCLINTOCK, JEFFREY E.									1	1
MCCLUSKEY, GEORGE E.		1	1	1	1	1	1	1		8
MCNAMARA, D. HAROLD			1							1
MEYER, DAVID L.		1	1							2
METZGER, A.			1							1
MICHALITZANDS, ANDREW G.		1	1	1	1	1	2	2		9
MILLER, H. RICHARD					1	1	1			3
MILLER, JOSEPH S.					1	1				2
MOORE, RICHARD L.					2	2				4
MOOS, H. WARREN	1	3	2	2	3	3	3	3	1	20
MORRISON, NANCY D.		1	1		1	2				6
MORTON, DONALD C.				1						1
MULLAN, DERMOTT J.		1	1	1	1	1	3			7
NELSON, JERRY E.		1								1
NELSON, ROBERT M.				1	1	1	1	1		5
NICHOLAS, KENNETH R.		1								1
NOMOTO, K.									1	1
NOUSEK, JOHN A.				1	1	2	1	1		6
NOYES, ROBERT W.									1	1
O'CONNELL, ROBERT W.										1
OKE, JOHN BEVERLY	1	2	1		1	1	1	2	1	8
OKE, JOHN BEVERLY					1	1	1			3
OLIVERSEN, NANCY A.					1	1	1	2	1	5
OLSON, EDWARD C.					1					1
OMEN, TOBIAS	1									1
PAGE, THORNTON	1									1
PANEK, ROBERT J.										1
PANEK, ROBERT J.			1	2	1	3		2		9
PARISE, RONALD A.					1	1				2
PARSONS, SIDNEY B.										1
PARSONS, SIDNEY B.	1		1		1	3	1	1	2	11
PARSONS, SIDNEY B.					1	1				2
PATTERSON, JOSEPH						1				1
PEIMBERT, MANUEL										1
PEERY, BENJAMIN F. JR.		1	1							2
PENNINGTON, ROBERT L.								1	1	2
PERRY, PETER		1	1	2						4
PETERS, GERALDINE J.							1	1	1	3
PHILIP, A. G. DAVIS							1			1
PITTS, RONALD E.								1	1	2
PLAVEC, MIREK J.								1	1	2
POLIDAN, RONALD S.			2	1	1	1	3	1	1	11
PRAVDO, STEVEN H.	1		2	1	1	1	2	3	1	11
PTAK, ROGER L.							1			1

PRINCIPAL INVESTIGATORS - LISTED ALPHABETICALLY

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ALL EPISODES (4/78 THRU 3/86)	1	2	3	4	5	6	7	8	OD	TOTALS
PUETTER, RICHARD C.					1	2				3
PURTON, CHRISTOPHER R.		1								1
RAHE, JURGEN			1						1	2
RAKOS, KARL D.		1								2
RAMSEY, LAWRENCE W.				1						1
RAYMOND, JOHN C.			3	2	5	5	1			20
REICHERT, GAIL A.					1					1
REICHERT, GAIL A.						1				1
RIEGLER, GUENTHER A.							1			1
ROEDER, ROBERT C.	1									1
ROMANISHIN, WILLIAM						2	1		1	3
RUDY, RICHARD J.										1
RUMPL, WILLIAM M.			1							1
RUMPL, WILLIAM M.					1					1
SAHADE, JORGE										1
SAHADE, JORGE										1
SANNER, F.									2	2
SAPAR, A.		1								1
SARGENT, WALLACE L.M.	1									1
SAVAGE, BLAIR D.		2	1	1	1	3	5	4		8
SAVEDOFF, MALCOLM P.	1	2	2	3	3	6	5	4		26
SCHIFFER, FRANCIS H. III		1								1
SCHILD, RUDOLPH E.	W	1							1	2
SCHMIDT, EDWARD G.										1
SCHMIDT, EDWARD G.		1	1		1					3
SCHMIDT, GARY D.								1		1
SCHMIDT, MAARTEN										1
SCHWARTZ, RICHARD D.	1				1	1	1	1		3
SHAW, J. SCOTT					1	1	1	1		4
SHEMANSKY, DONALD E.										1
SHIPMAN, HARRY L.										1
SHORE, STEVEN N.					1	1	1			3
SHORE, STEVEN N.										1
SHULL, J. MICHAEL		1	1	1	2					6
SHULL, J. MICHAEL										1
SHULL, J. MICHAEL										1
SILK, JOSEPH						3	4	5		18
SIMON, THEODORE										1
SIMON, THEODORE										1
SION, EDWARD M.			1	2	5	3	4	3	1	19
SITKO, MICHAEL L.				1	1	3	2			7
SITKO, MICHAEL L.				1	2	1	2	1		7
SITKO, MICHAEL L.										1
SKUMANICH, ANDREW										1
SLETTEBAK, ARNE										1
SMITH, ANDREW M.	1		1	1	1	1				4
SMITH, GRAEME										1
SMITH, HARDING E.										1
SMITH, CHRISTOPHER		1	1	1	1					4
SNEDEN, CHRISTOPHER										1
UNIVERSITY CALIFORNIA SAN DIEGO										1
YORK UNIVERSITY, CANADA										1
NASA - GODDARD SPACE FLIGHT CENTER										1
UNIVERSITY OF VIENNA, AUSTRIA										1
PENN STATE UNIVERSITY										1
CFA - SAO										1
*NASA - GODDARD SPACE FLIGHT CENTER										1
*COMPUTER SCIENCES CORPORATION										1
JET PROPULSION LABORATORY										1
UNIVERSITY OF TORONTO-SCARBOROUGH C.										1
NASA - GODDARD SPACE FLIGHT CENTER										1
UNIVERSITY OF ARIZONA										1
*NASA - GODDARD SPACE FLIGHT CENTER										1
*COMPUTER SCIENCES CORPORATION										1
*I.A.F.E., ARGENTINA										1
*I.A.R., ARGENTINA										1
UNIVERSITY OF TEXAS										1
STRUVE ASTRO. OBS., U.S.S.R.										1
CALIFORNIA INSTITUTE OF TECHNOLOGY										1
UNIVERSITY OF WISCONSIN										1
UNIVERSITY OF ROCHESTER										1
COMPUTER SCIENCES CORPORATION										1
CFA - SAO										1
UNIVERSITY OF NEBRASKA										1
UNIVERSITY OF ARIZONA										1
CALIFORNIA INSTITUTE OF TECHNOLOGY										1
UNIVERSITY OF MISSOURI - ST. LOUIS										1
UNIVERSITY OF GEORGIA										1
UNIVERSITY OF ARIZONA										1
UNIVERSITY OF DELAWARE										1
*CASE-WESTERN RESERVE UNIVERSITY										1
*COMPUTER SCIENCES CORPORATION										1
*UNIVERSITY OF COLORADO										1
*UNIVERSITY OF COLORADO-JILA										1
*UNIVERSITY OF COLORADO-LASP										1
UNIVERSITY CALIFORNIA BERKELEY										1
UNIVERSITY OF COLORADO										1
*UNIVERSITY OF HAWAII										1
VILLANOVA UNIVERSITY										1
*UNIVERSITY OF MINNESOTA										1
*NDAO - KPNO										1
HAO-NCAR										1
OHIO STATE UNIVERSITY										1
NASA - GODDARD SPACE FLIGHT CENTER										1
CFA - SAO										1
UNIVERSITY CALIFORNIA SAN DIEGO										1
UNIVERSITY OF TEXAS										1



PRINCIPAL INVESTIGATORS - LISTED ALPHABETICALLY

PAGE 9

ALL EPISODES (4/78 THRU 3/86)	EPISODE:										TOTALS
	1	2	3	4	5	6	7	8	OD		
WEGNER, GARY A.					1		1	2			9
WEISS, WERNER W.											1
WELCH, GARY A.		1	1								2
WESEMAEL, FRANCOIS						2	2				4
WEST, DONALD K.	1		1								1
WILLIAMS, ROBERT E.		1			2	1	2				6
WILLS, BEVERLEY J.					1		1				2
WILLSON, LEE ANNE			1	1							2
WILSON, ANDREW S.		1	2	2							5
WING, ROBERT F.		1	1								2
WITT, ADOLF N.		1									1
WOLFE, ARTHUR M.		1									1
WOLFF, ROBERT S.	1		1								2
WOOD, FRANK B.											1
WOODGATE, BRUCE E.											1
WOODWARD, CHARLES E.							1				1
WOOTEN, H. ALWYN											1
WORDEN, SIMON P.		1									1
WORRALL, DIANA M.				1	1	1					4
WRAY, JAMES D.	1										1
WU, CHI-CHAO		2	2	3	4	5	2	3	4		25
YORK, DONALD G.		1	1	2	1						6
YORK, DONALD G.											1
ZINN, ROBERT											1
ZOLCINSKI, MARIE-CHRISTIN											1
ZUCKERMAN, BENJAMIN M.								1			1

APPENDIX D - IUE SCIENCE EFFICIENCY

## APPENDIX D - IUE SCIENCE EFFICIENCY

Presented herein are plots of the GSFC IUE "observational efficiency" expressed in terms of the percentage of the available GSFC IUE time each week actually used to obtain exposures. Each plotted point represents the sum of the individual GSFC exposure times for a given week, divided by the total amount of IUE time available to GSFC for the week (112 hours), and has been smoothed such that each data point is an average of the previous two weeks, the current week, and the following two weeks.

The smoothed weekly efficiencies are plotted separately for each episode. The data for the beginning of the first episode were influenced, because of the smoothing, by data from the last several weeks of the Commissioning Period (for which the data are incomplete). The eighth episode is only complete through October 27 (week 30). The amount of any parallel exposure time (overlapping exposures of two cameras) is not shown on the plots.

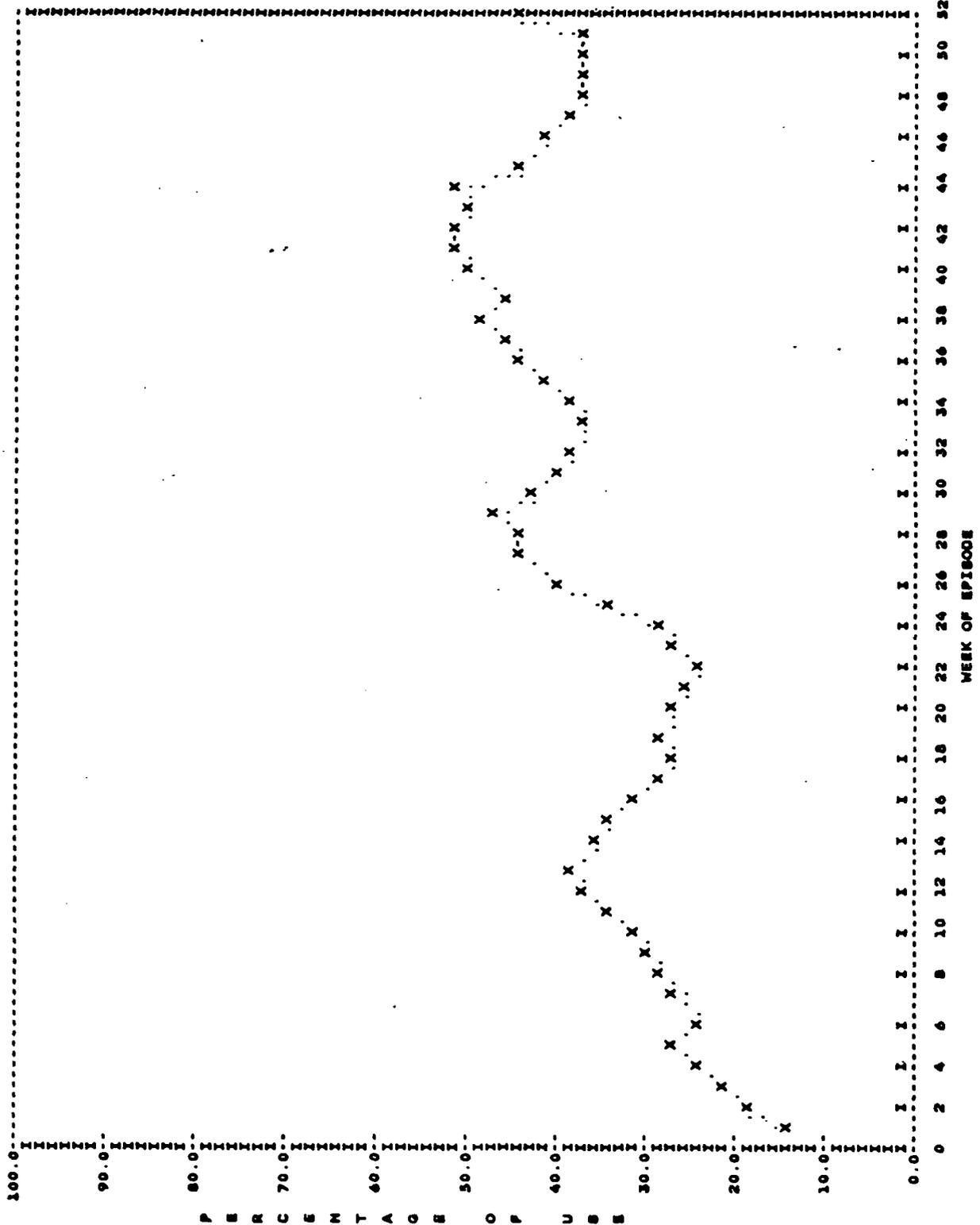
The following factors may affect the accuracy and interpretation of the statistics:

- o There may be missing or incorrect exposure times in the accounting data base from which the information has been drawn.
- o Multiple exposures may imply an exposure stop time which was too early.
- o True durations of long exposures may not have been added correctly (the data base contains 999 minutes for exposures longer than or equal to 1000 minutes)

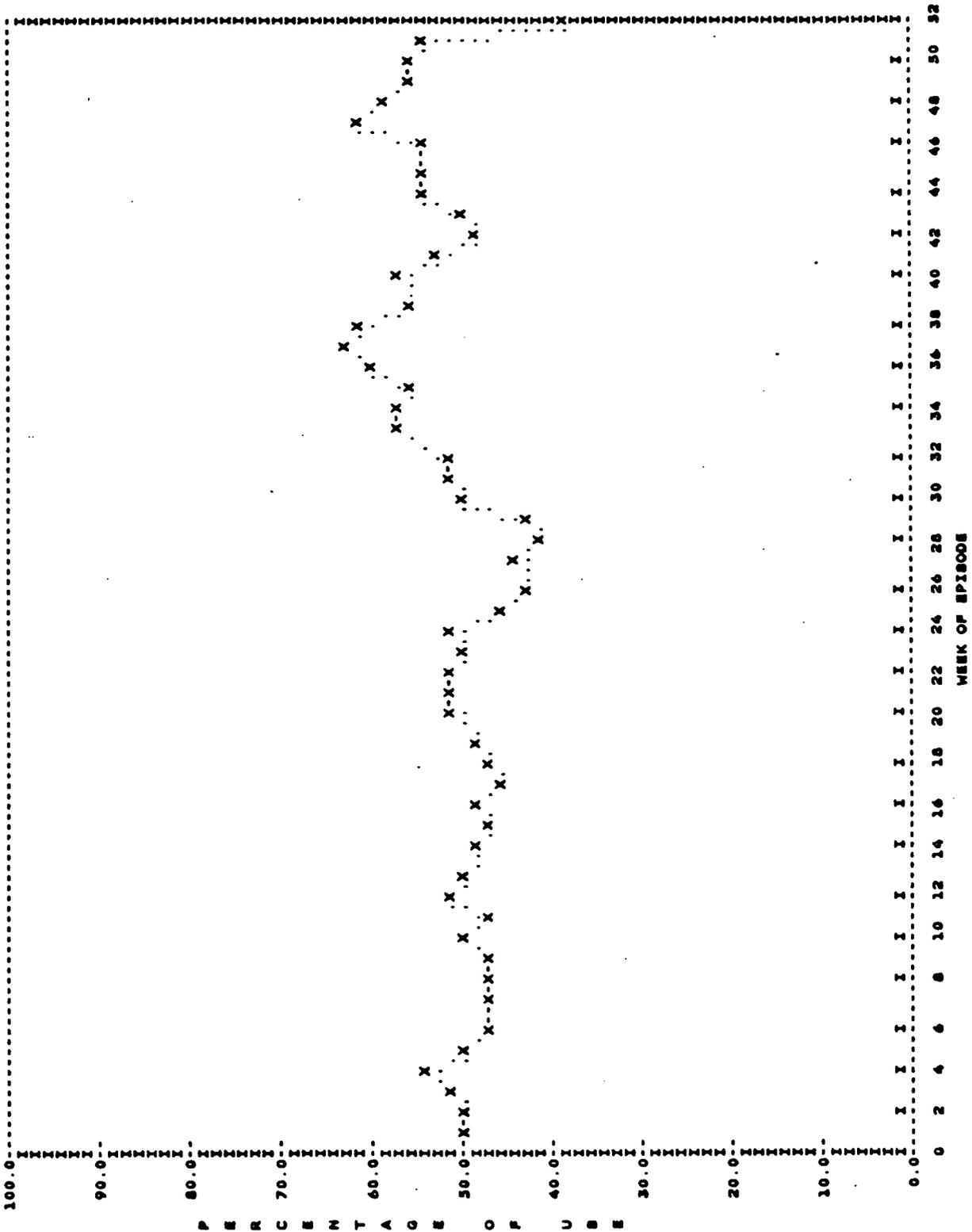
Note: The lower percentage of use around week 22 of the eighth episode was caused by the loss of a stabilizing gyro on the satellite. The plot shows that normal scientific usage was quickly regained following implementation of the two-gyro/Fine Sun Sensor control system.

WEEK	DAYS USED	X
1	71643	50
2	15851	49
3	15000	49
4	11792	49
5	11433	49
6	11226	49
7	11077	49
8	10940	49
9	10804	49
10	10670	49
11	10537	49
12	10404	49
13	10271	49
14	10137	49
15	10004	49
16	9871	49
17	9737	49
18	9604	49
19	9471	49
20	9337	49
21	9204	49
22	9071	49
23	8937	49
24	8804	49
25	8671	49
26	8537	49
27	8404	49
28	8271	49
29	8137	49
30	8004	49
31	7871	49
32	7737	49
33	7604	49
34	7471	49
35	7337	49
36	7204	49
37	7071	49
38	6937	49
39	6804	49
40	6671	49
41	6537	49
42	6404	49
43	6271	49
44	6137	49
45	6004	49
46	5871	49
47	5737	49
48	5604	49
49	5471	49
50	5337	49
51	5204	49
52	5071	49

FIRST EPISODE OF SCIENCE USAGE (SMOOTHED)

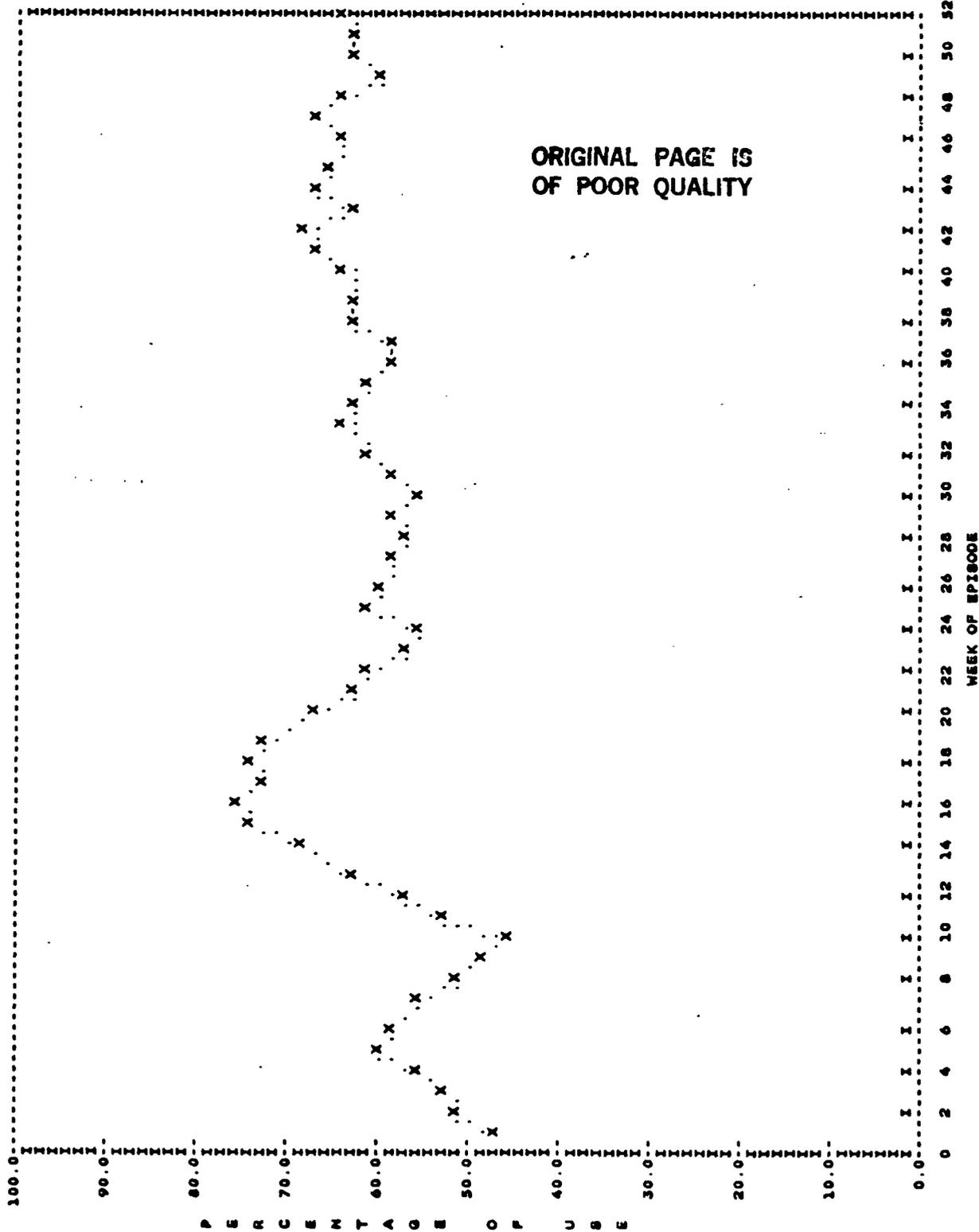


SECOND EPISODE GSFC IUE SCIENCE USAGE (SMOOTHED)



WEEK	DAYS USED	X
1	1633	49.64
2	12219	49.07
3	323001	53.72
4	50701	49.96
5	22437	46.54
6	22340	47.86
7	22000	47.79
8	11033	49.72
9	11061	47.13
10	11033	49.01
11	11024	50.44
12	11033	49.03
13	11033	49.03
14	11033	49.03
15	11033	49.03
16	11033	49.03
17	11033	49.03
18	11033	49.03
19	11033	49.03
20	11033	49.03
21	11033	49.03
22	11033	49.03
23	11033	49.03
24	11033	49.03
25	11033	49.03
26	11033	49.03
27	11033	49.03
28	11033	49.03
29	11033	49.03
30	11033	49.03
31	11033	49.03
32	11033	49.03
33	11033	49.03
34	11033	49.03
35	11033	49.03
36	11033	49.03
37	11033	49.03
38	11033	49.03
39	11033	49.03
40	11033	49.03
41	11033	49.03
42	11033	49.03
43	11033	49.03
44	11033	49.03
45	11033	49.03
46	11033	49.03
47	11033	49.03
48	11033	49.03
49	11033	49.03
50	11033	49.03
51	11033	49.03
52	11033	49.03

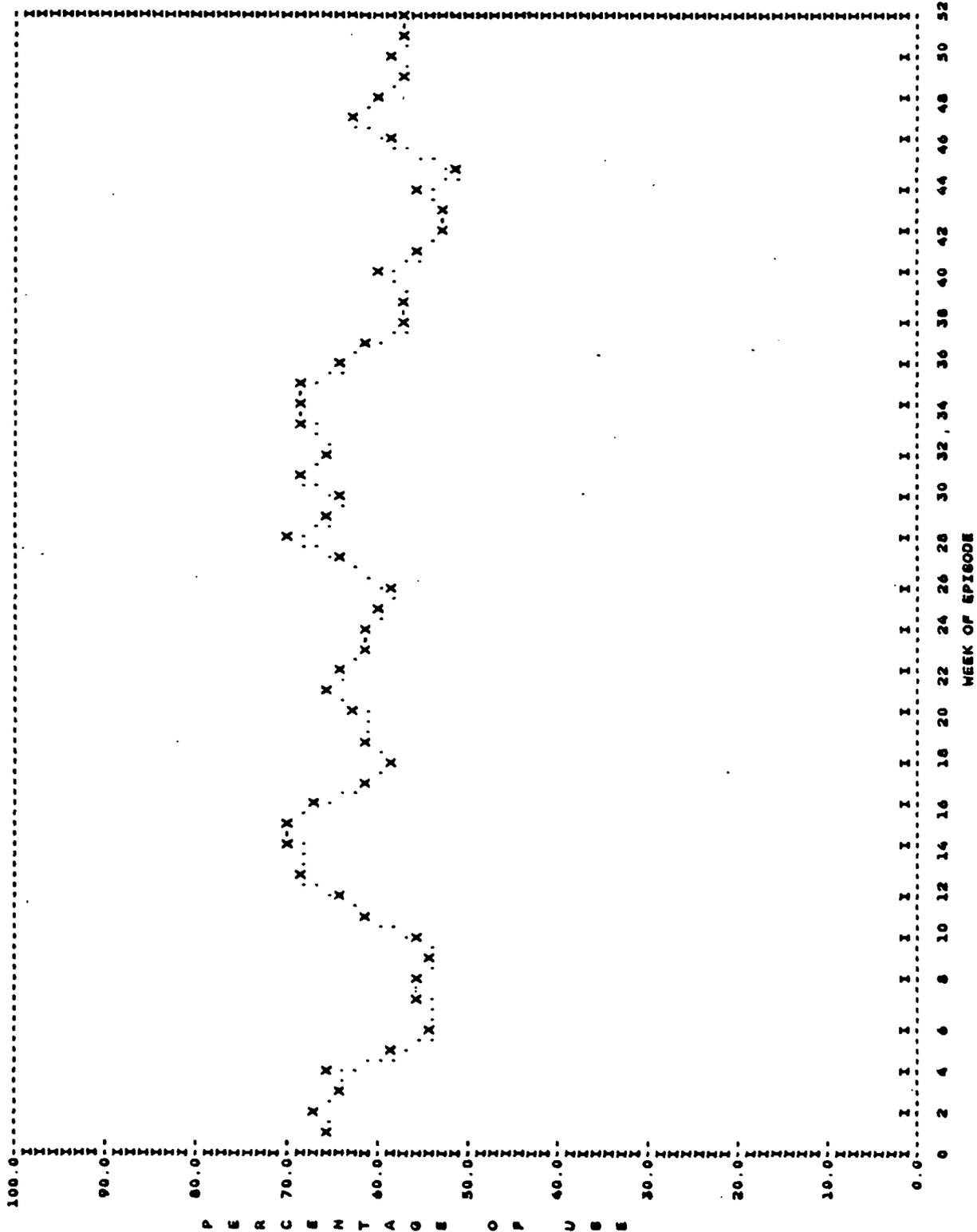
THIRD EPISODE GSFC IUE SCIENCE USAGE (SMOOTHED)



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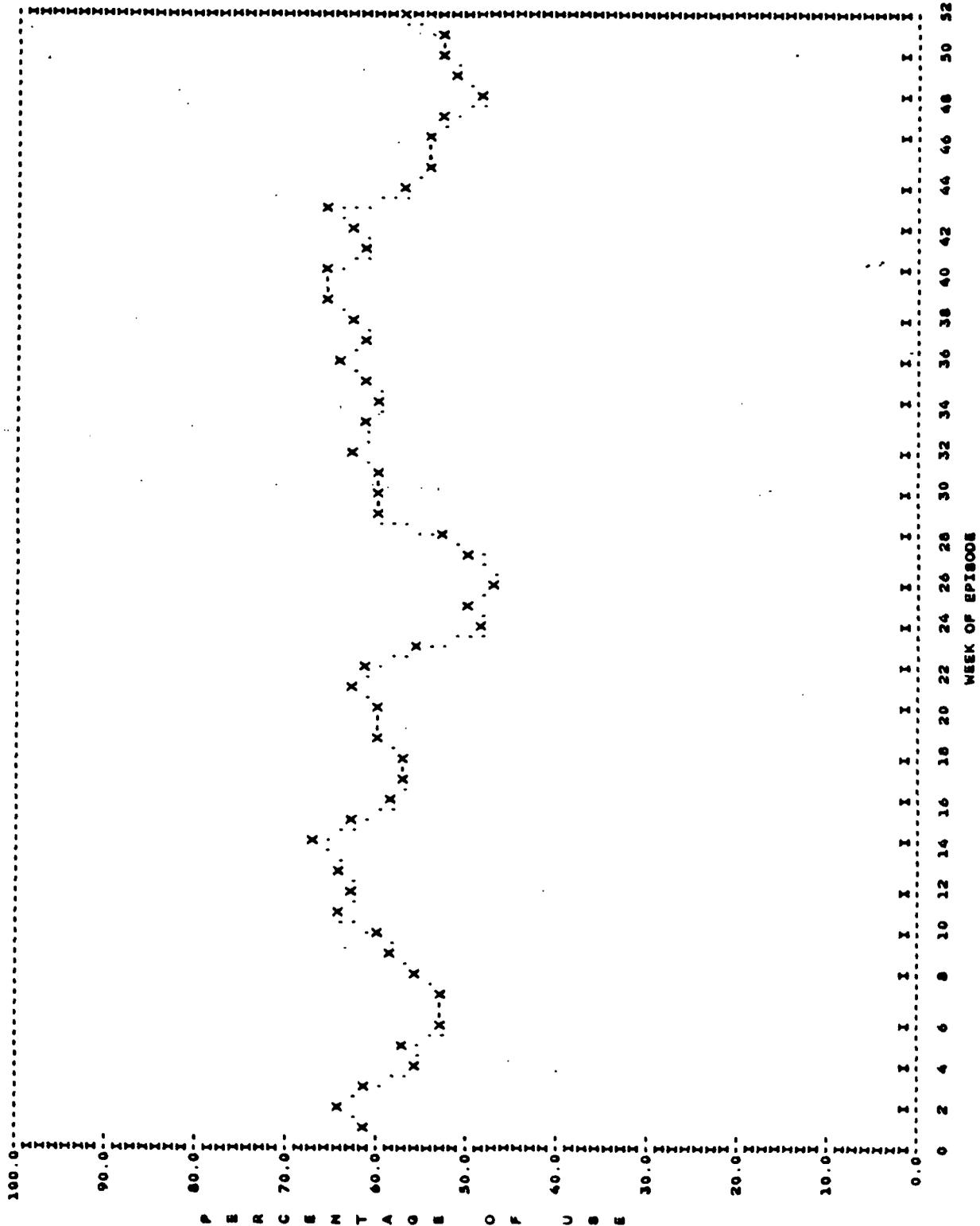
WEEK	DAYS USED	X
1	19680	47.178
2	14491	52.01
3	61395	55.056
4	77947	55.19
5	73260	55.180
6	57336	46.80
7	28139	42.10
8	15077	52.21
9	43371	52.22
10	94883	68.25
11	19947	72.27
12	41880	72.27
13	49880	72.27
14	36782	72.27
15	41922	72.27
16	36111	72.27
17	19921	62.08
18	84521	62.08
19	61740	62.08
20	82237	62.08
21	49447	62.08
22	67400	62.08
23	49004	62.08
24	70275	62.08
25	42180	62.08
26	71800	62.08
27	63000	62.08
28	92200	62.08
29	87300	62.08
30	73824	62.08
31	91224	62.08
32	97224	62.08
33	12880	62.08
34	89200	62.08
35	93601	62.08
36	90016	62.08
37	99201	62.08
38	82323	62.08
39	93424	62.08
40	94244	62.08
41	94244	62.08
42	94244	62.08
43	94244	62.08
44	94244	62.08
45	94244	62.08
46	94244	62.08
47	94244	62.08
48	94244	62.08
49	94244	62.08
50	94244	62.08
51	94244	62.08
52	94244	62.08

FOURTH EPISODE GSFC IUE SCIENCE USAGE (SMOOTHED)



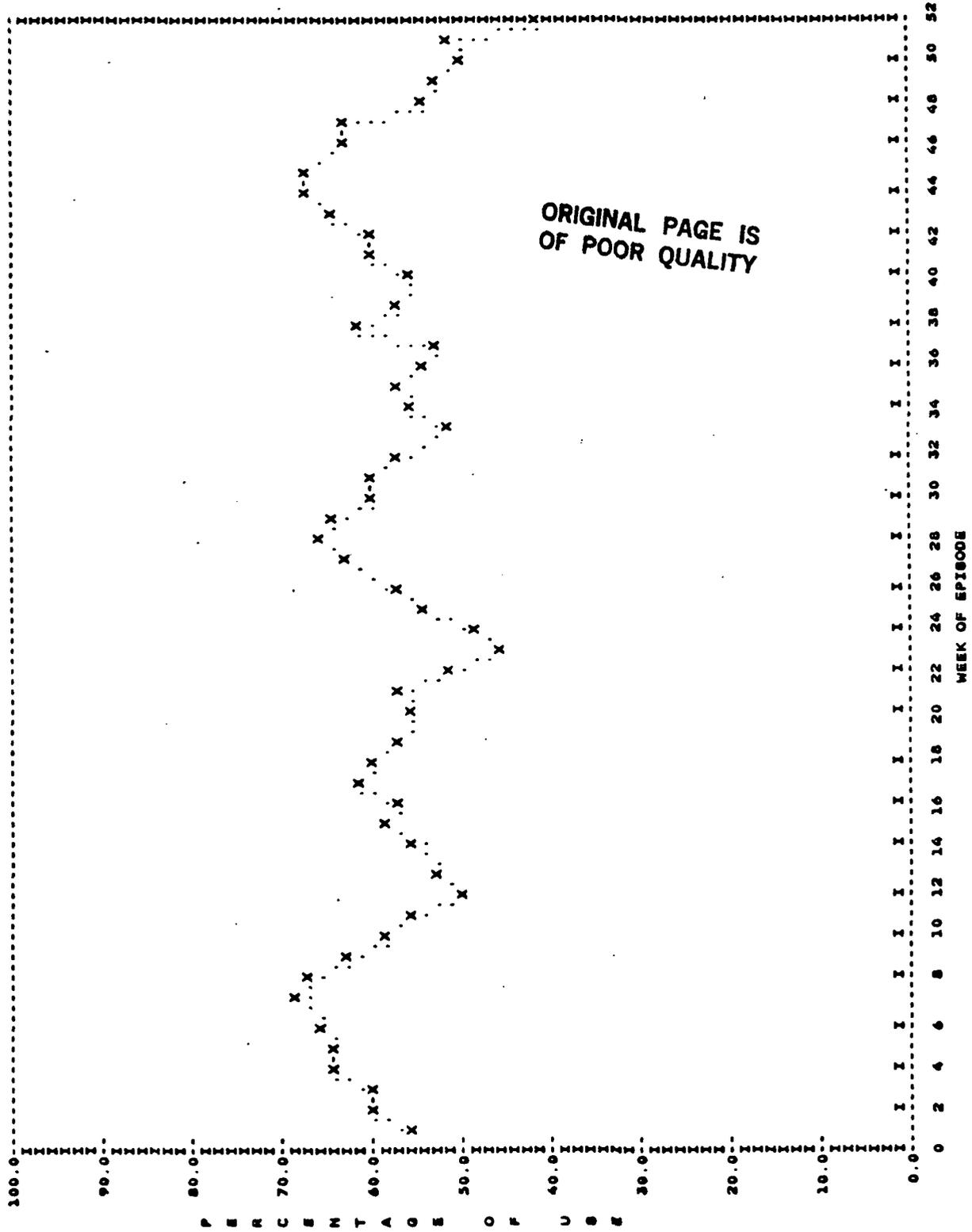
WEEK	DAYS USED	X
1	082854	04
2	11844	04
3	1102721	04
4	0222222	04
5	0222222	04
6	0222222	04
7	0222222	04
8	0222222	04
9	0222222	04
10	0222222	04
11	0222222	04
12	0222222	04
13	0222222	04
14	0222222	04
15	0222222	04
16	0222222	04
17	0222222	04
18	0222222	04
19	0222222	04
20	0222222	04
21	0222222	04
22	0222222	04
23	0222222	04
24	0222222	04
25	0222222	04
26	0222222	04
27	0222222	04
28	0222222	04
29	0222222	04
30	0222222	04
31	0222222	04
32	0222222	04
33	0222222	04
34	0222222	04
35	0222222	04
36	0222222	04
37	0222222	04
38	0222222	04
39	0222222	04
40	0222222	04
41	0222222	04
42	0222222	04
43	0222222	04
44	0222222	04
45	0222222	04
46	0222222	04
47	0222222	04
48	0222222	04
49	0222222	04
50	0222222	04
51	0222222	04
52	0222222	04

FIFTH EPISODE GBFC IUE SCIENCE USAGE (SMOOTHED)



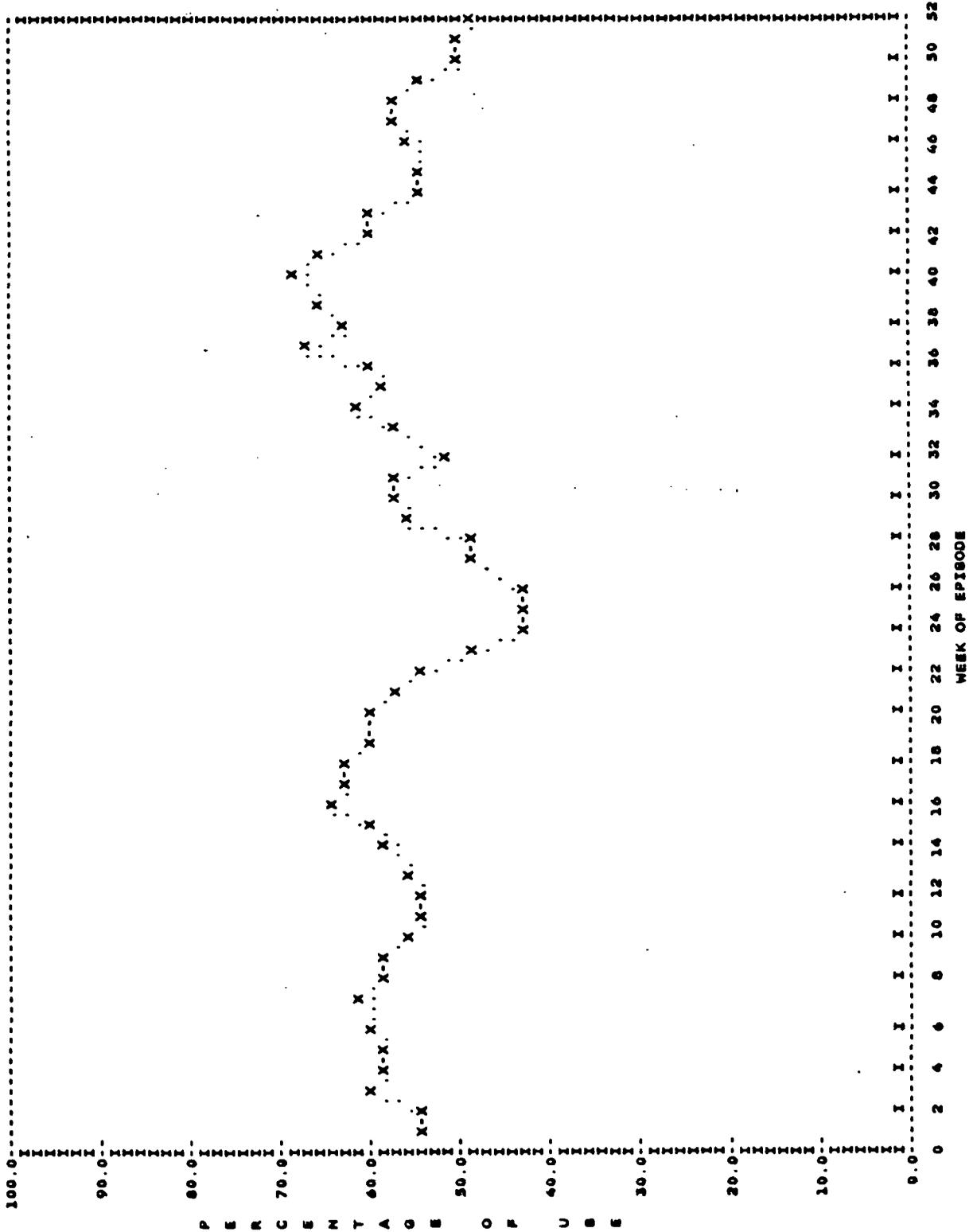
WEEK	DAYS USED	%
1	86359	61.36
2	101578	64.85
3	183968	60.85
4	161491	59.30
5	167395	57.97
6	147198	53.42
7	160449	53.42
8	171781	58.81
9	177700	58.24
10	167700	53.70
11	161491	62.56
12	110573	62.49
13	108409	62.54
14	108409	62.54
15	108409	62.54
16	108409	62.54
17	108409	62.54
18	108409	62.54
19	108409	62.54
20	108409	62.54
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36	108409	62.54
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41	108409	62.54
42	108409	62.54
43	108409	62.54
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48	108409	62.54
49	108409	62.54
50	108409	62.54
51	108409	62.54
52	108409	62.54

SIXTH EPISODE GSFC IUE SCIENCE USAGE (SMOOTHED)



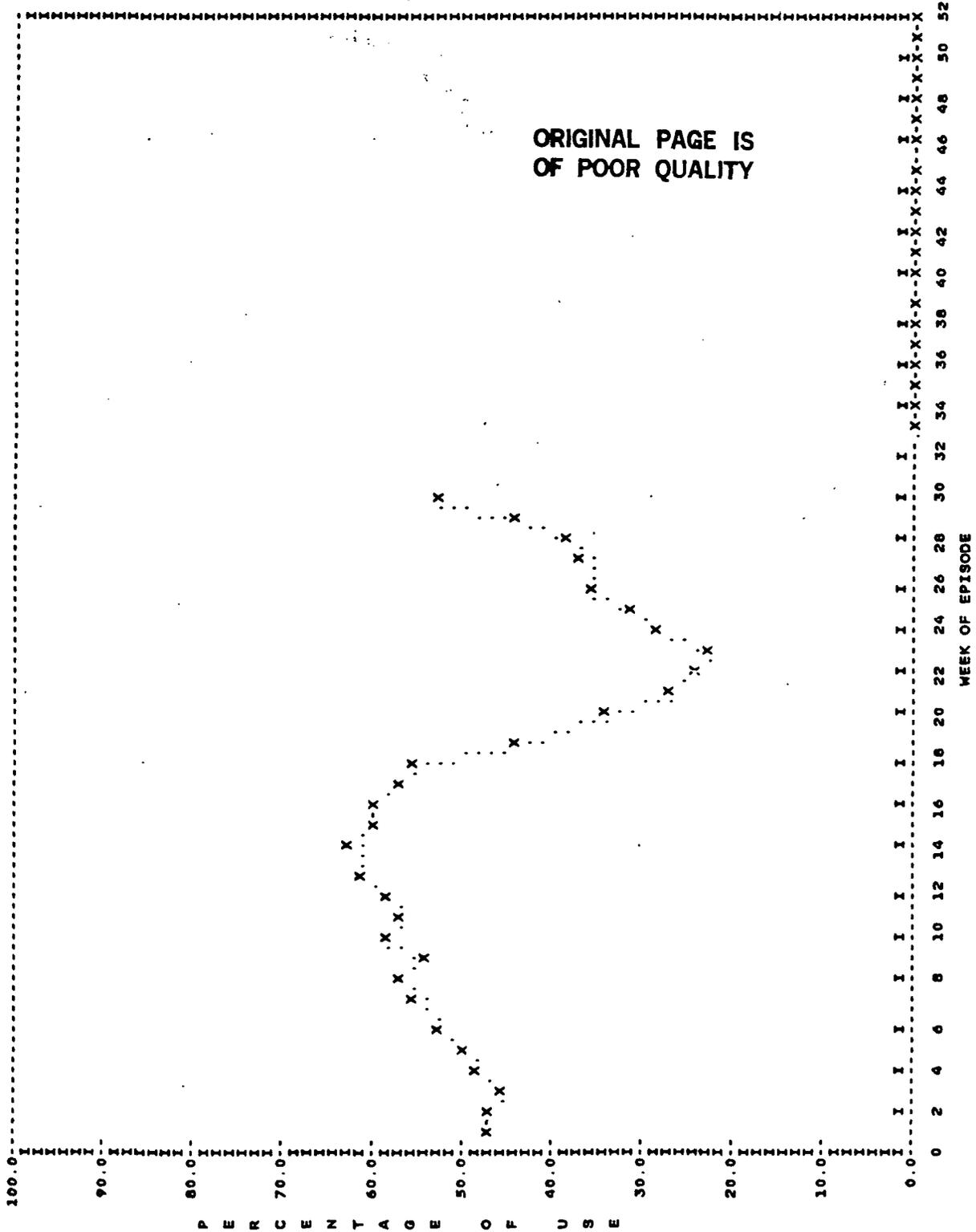
WEEK	DAYS USED	X
1	59272	55.40
2	57707	59.22
3	61031	63.97
4	98549	63.60
5	96779	65.74
6	06600	67.52
7	10447	62.59
8	92065	68.44
9	72824	62.22
10	34571	62.22
11	42321	62.22
12	70221	62.22
13	63870	62.22
14	64690	62.22
15	80220	62.22
16	58122	62.22
17	58222	62.22
18	42222	62.22
19	14000	62.22
20	23008	62.22
21	92746	62.22
22	98502	62.22
23	08222	62.22
24	98700	62.22
25	77200	62.22
26	44222	62.22
27	47102	62.22
28	47102	62.22
29	52200	62.22
30	20000	62.22
31	60022	62.22
32	70022	62.22
33	70022	62.22
34	70022	62.22
35	70022	62.22
36	70022	62.22
37	70022	62.22
38	70022	62.22
39	70022	62.22
40	70022	62.22
41	70022	62.22
42	70022	62.22
43	70022	62.22
44	70022	62.22
45	70022	62.22
46	70022	62.22
47	70022	62.22
48	70022	62.22
49	70022	62.22
50	70022	62.22
51	70022	62.22
52	70022	62.22

SEVENTH EPISODE OSFC IUE SCIENCE USAGE (SMOOTHED)



WEEK	DAYS USED	X
1	50	5
2	50	5
3	50	5
4	50	5
5	50	5
6	50	5
7	50	5
8	50	5
9	50	5
10	50	5
11	50	5
12	50	5
13	50	5
14	50	5
15	50	5
16	50	5
17	50	5
18	50	5
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36	50	5
37	50	5
38	50	5
39	50	5
40	50	5
41	50	5
42	50	5
43	50	5
44	50	5
45	50	5
46	50	5
47	50	5
48	50	5
49	50	5
50	50	5
51	50	5
52	50	5

EIGHTH EPISODE GSFC IUE SCIENCE USAGE (SMOOTHED)



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WEEK	DAYS USED	X
1	102840	46.78
2	117927	46.66
3	128156	46.80
4	200284	46.30
5	450284	46.50
6	504480	46.57
7	504480	46.51
8	504480	46.71
9	504480	46.22
10	504480	46.52
11	608804	46.72
12	608804	46.52
13	608804	46.52
14	608804	46.52
15	608804	46.52
16	608804	46.52
17	608804	46.52
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37	608804	46.52
38	608804	46.52
39	608804	46.52
40	608804	46.52
41	608804	46.52
42	608804	46.52
43	608804	46.52
44	608804	46.52
45	608804	46.52
46	608804	46.52
47	608804	46.52
48	608804	46.52
49	608804	46.52
50	608804	46.52
51	608804	46.52
52	608804	46.52

APPENDIX E - MONTHLY PROGRESS REPORT  
TRANSMITTAL LETTERS

APPENDIX E - MONTHLY PROGRESS REPORT TRANSMITTAL LETTERS

Contained herein are copies of the transmittal letters which accompanied the submission of the Monthly Progress Reports for the contract, beginning with the report for the month of May 1983. These are reproduced in order to present as a unified set the contract highlights appearing in the letters. Transmittal letters submitted prior to that date did not contain highlights and hence are not included.

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLTSVILLE ROAD • SILVER SPRING, MARYLAND 20910

June 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for May 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. Task 202 personnel assisted the Technical Officer in establishing preliminary plans for a feasibility study and evaluation of data base management systems for the mass storage capability being acquired for the IBM 3081 by the SACC as they apply to IUE data.

On Task 301, CSC supported the scheduling, acquisition and observations of Comet IRAS-Araki-Alcock with only a one-week notice. Due to the comet's close passage to the Earth, task members needed to calculate and uplink differential gyro drift rates every 10 minutes during the observations to keep the comet in the spectrograph aperture. The following day task personnel identified FES and spectral images thought to be of interest to the general public for a photographic session with a NASA photographer. This action allowed NASA to make a timely response to the public media on the IUE observations of this comet.

CSC performed demonstrations of IUE for the NASA Space Sciences Board and a group of European Space Agency spacecraft engineers.

Task 301 personnel prevented a Guest Observer from losing a 3 hour exposure when they found he had given the wrong coordinates just prior to a blind offset maneuver. Another GO was assisted in finding a 16th magnitude object whose coordinates were in error by 30 arcseconds.

Two new telescope operators have completed their training period and have begun supporting shift operations.

to Dr. Donald K. West from Dr. Peter M. Perry date June 15, 1983  
subject Contract NAS5-27295 page 2

On Task 401, CSC management coordinated the staffing of an additional 3 hours of image processing time from 9:00 p.m. till midnight without disruption of existing Image Processing Center shift schedules. The selected staffing method permitted supervisory contact with all Image Processing Center staff members.

There have been no significant problems to report this month other than scheduled cutbacks in computer time on the Sigma-9 which affect Task 402 progress.

If any questions arise concerning this delivery, please contact me.

Very truly yours,

COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

July 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for June 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. Task 201 personnel completed off-line testing of the new procedure file OPSPRC40 for three-gyro control. CSC created detailed tests of 15 new two-gyro procedures in the procedure set OPS2PR01. Sixty-nine tests of normal options and several expected error conditions were produced.

On Task 202, the main program loop for the UIT DEP has been designed using structured Program Design Language (PDL). The PDL design will allow easy review of the UIT operational logic by UIT project personnel.

On Task 301, recognition of a problem by task members has saved two collaborative exposures taken during VILSPA-US1 shifts when VILSPA allowed the spacecraft to roll too far.

Task 401 personnel partially automated the record keeping associated with lists of log discrepancies exchanged with VILSPA personnel. This automation will make the investigation process more efficient and will create computer-printed lists of discrepancies for delivery to VILSPA.

On Task 501, the procedures originating from the RDAF at the University of Colorado were installed at GSFC, where they are now available for staff review and trial use by experienced users. This is the first step toward the complete standardization of software at the two RDAFs.

to Dr. Donald K. West from Dr. Peter M. Perry date July 15, 1983

subject Contract NAS5-27295

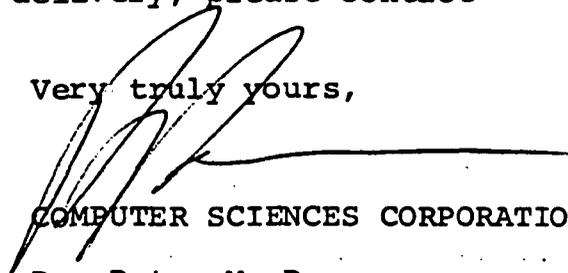
page 2

Task 501 task members made significant progress in the gathering of information on potential user DBMS feature requirements. After initial discussions and a brief presentation, task personnel met with four user groups to discuss their current and projected (up to 5 years) data handling requirements so they can be correlated with generic DBMS features.

There have been no significant problems to report this month other than scheduled cutbacks in computer time on the Sigma-9 which affect Task 402 progress.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD - SILVER SPRING, MARYLAND 20910

August 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for July 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 201, a task member presented a report on science operations procedure changes, simulator tests, and expected scientific impact of the new two-gyro plus FSS control mode at the Design/Operational Readiness Review meeting on July 18. The report aided the Review Committee in evaluating the design and recommending a policy for spacecraft testing of the new control mode.

Task 201 personnel also designed 66 off-line tests of the two gyro maneuver processor, including a wide variety of normal maneuvers and constraints. Task members performed 54 of the tests on the BIT simulator and command computer. Preliminary results were communicated to the POD. Two major errors were found by CSC. Incorrect data is used to determine the spacecraft deviation from optimum roll and the final attitude for a yaw slew is incorrectly computed.

On Task 202, a paper entitled "Design and Operational Features of the Ultraviolet Imaging Telescope" has been prepared by task personnel for presentation at the Society of Photo-Optical Instrumentation Engineers Conference on Instrumentation in Astronomy scheduled for September 1983 in London, England.

Task members on Task 301 saved 11.5 hours of observing for Guest Observers. A 9 hour VILSPA/GSFC collaborative exposure was saved when a task member re-setup the observation after recognizing that VILSPA had let the target roll to the edge of the spectrograph aperture.

to Dr. Donald K. West from Dr. Peter M. Perry date August 15, 1983

subject Contract NAS5-27295

page 2

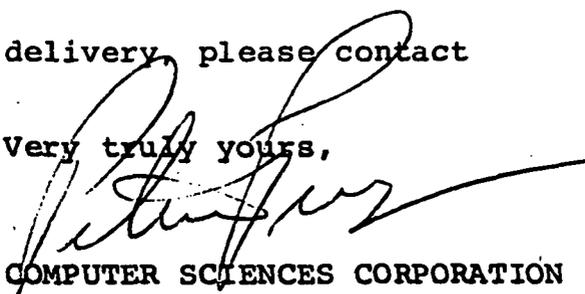
Also, on Task 301 CSC supported testing of remote observing equipment for D. York at Yerkes Observatory. Task personnel found that the telephone loudspeaker setup was unacceptable for operations unless the local voice echo was eliminated.

On Task 502, task personnel contacted commercial DBMS vendors with IBM-compatible products; printed material has currently been received from most of these vendors. Vendors were also contacted, when appropriate, concerning specific details not addressed in the printed material. Using this information in conjunction with the DBMS feature-requirements information gathered under Subtask 2, work was initiated on a Viable Candidate List and on a DBMS features analysis.

There have been no significant problems to report this month other than scheduled cutbacks in computer time on the Sigma-9 which affect Task 402 progress.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC

E-7

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD.. SILVER SPRING, MARYLAND 20910

September 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for August 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 101, task personnel were able to respond quickly in coordination with NASA/IUE Project personnel in developing guidelines for recycling a large number of IUE magnetic tapes currently in storage through the WNRC, thereby eliminating any need to obtain special permission for extending the storage periods or to pay additional storage costs.

Task 201 personnel analyzed the dispersion relations obtained for SWP wavelength calibration images using reduced exposure times. No improvement was found using the current line library of platinum lines.

Task members on Task 201 also detected a problem with the telemetry quality flags, which may affect the quality of spectral data read down with the flags set to zero. As a result of this analysis, the POD directed that the quality flags be set to one for all real-time operations. Because telemetry history tapes are routinely recycled 30 days after they are recorded, most images affected by this error will never be identified.

On Task 301, a task member noticed that a spectral image appeared to have had quality data inserted without the reconstruction processor flagging the fact. An inquiry has begun to determine if the current practice of setting the software minor frame data quality check flags to zero eliminates the flagging of bad data in the image.

to Dr. Donald K. West from Dr. Peter M. Perry date September 15, 1983

subject Contract NAS5-27295

page 2

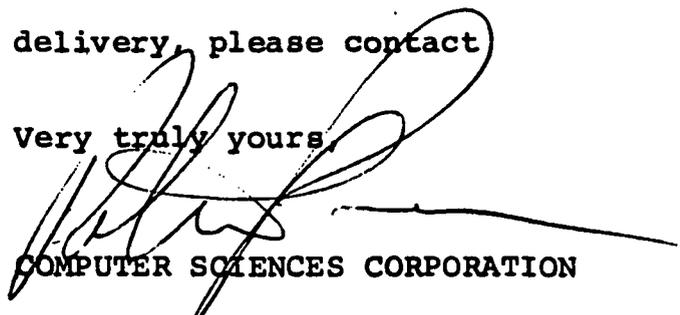
A major reprocessing effort was initiated on Task 401 to determine which images had been corrupted by Sigma-9 disk drive read errors and to reprocess affected images for the GOs and the NSSDC archives. Monitoring and progress reporting procedures were established based on criteria set by task management in consultation with the ATR. MARK IV reports were generated and run to aid task personnel in setting up and monitoring the reprocessing effort. The SOC archive tapes and NSSDC archive tapes containing the potentially corrupted images were retrieved from storage facilities and the NSSDC. Task management coordinated the staffing of additional shifts added to accommodate the required image reprocessing and error determination procedures.

As a result of personal injury to a task member, task management on Task 502 arranged for the services of an additional CSC DBMS consultant to ensure that task efforts not fall behind schedule. This was done at no additional cost to the task, as expenditure of manhours was rearranged to accommodate the new situation. At this stage of the evaluation, the access to additional expertise is particularly valuable and will actually enhance task efforts.

There have been no significant problems affecting task progress to report this month.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

October 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for September 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 201, task members discovered the existence of a bright spot at the edge of the LWR camera faceplate during real-time operations. Preliminary analysis of the characteristics of the bright spot indicates that it is a flare in the UVC section of the camera. The bright spot affects the longer wavelength portion of high dispersion LWR spectra. The increasing intensity of the spot is expected to affect standard camera use.

At the request of the POD, Task 201 personnel completed high priority off-line tests of System 18 in a small amount of available time. A task member created a checklist to facilitate the testing effort. CSC reported two errors in the system to the POD. It incorrectly stores the S/C attitude in the science header. In addition, the center of the FES field is marked instead of the requested center of the target finder field. CSC performed S/C testing of System 18 before final off-line tests were completed, also at the request of the POD. No major problems were encountered with the new system during the S/C tests.

On Task 202, a CSC representative attended the Society of Photo-Optical Instrumentation Engineers (SPIE) conference on Instrumentation in Astronomy which was held in London, England on September 5-9, 1983. The purpose of attendance at this meeting was to present a paper entitled "Design and Operational Features of the Ultraviolet Imaging Telescope Flight and Ground Software" which described UIT software development work.

to Dr. Donald K. West from Dr. Peter M. Perry date October 15, 1983

subject Contract NAS5-27295

page 2

A task member on Task 301 discovered a flare anomaly in the LWR camera. A study of archival images was conducted showing that the flare first appeared in early April 1983. CSC informed the SERC camera team of the anomaly. It is still under study, and task personnel continue to monitor its development.

Also on Task 301, new restrictions on IUE battery usage prompted a study into the impact on previously scheduled GO programs. Task members advised GOs about the new beta angle limits and of ways to reduce power requirements to permit observations at marginal betas.

On Task 402, the study of the accuracy of wavelength assignments in high-dispersion spectra indicates that special wavelength calibration processing allows more accurate wavelength assignments for most emission lines in WAVECAL images, but the degree of improvement may be order-dependent. This study has also provided empirical proof that the time and temperature corrections employed in standard processing improve the wavelength assignments.

Also on Task 402, a West German exchange student, Immo Holvan, worked on the study of the accuracy of wavelength assignments for part of this month and did a major portion of the analysis under an arrangement coordinated through the NASA International Summer Student Program.

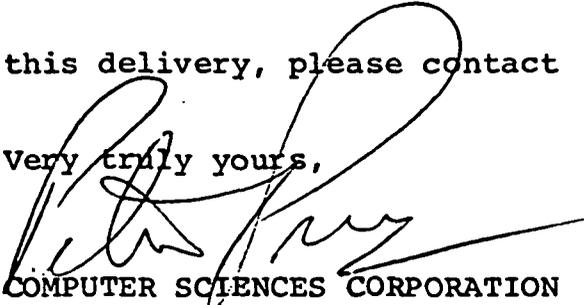
On Task 501, presentations were given at the IUE Users' Committee meeting describing the status of the RDAF. Data was presented which described RDAF usage by non-local visitors.

On several occasions, task personnel on Task 501 worked nonstandard hours in order to assist users whose schedules were constrained by observing runs. Eighty-four hours of support were provided outside normal working hours.

Also on Task 501, CSC responded to two urgent requests to retrieve spectra from the Condensed Data Archives to provide exposure time estimates for an ongoing observing session.

There have been no significant problems affecting task progress to report this month.

If any questions arise concerning this delivery, please contact me.

Very truly yours,  
  
COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC  
E-11

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

November 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for October 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 101, DMC personnel processed approximately 290 IUE proposals in preparation for the seventh episode Peer Review. As proposals arrived they were numbered and logged in, the number of copies received was verified, postcards indicating receipts of the proposals were sent, and information was prepared for entry into the proposal data base. The efficient DMC contribution made it possible for the proposal processing to be completed rapidly.

Analysis of the LWR bright spot, first noted by task members on Task 201, indicates that the brightness of the flare is increasing with time and may affect the quantum efficiency of the camera. As a result, several actions were taken by the Three Agencies. A switch from the LWR to the LWP camera as the standard operational camera was made on October 16. Plans for a new ITF for the LWR camera were accelerated; operations have been scheduled for November. The usage of the LWR camera will be limited to less than 25 percent of its previous level.

CSC personnel on Task 201 also developed a more efficient method for locating the reseaux in wavelength calibration images. Reseau positions are now determined from the low resolution platinum lamp images instead of tungsten flood lamp images, with no apparent loss in accuracy. The new method, adopted by the Three Agencies, results in about a 20 percent reduction in the spacecraft time required for the wavelength calibration observations.

to Dr. Donald K. West from Dr. Peter M. Perry date November 15, 1983

subject Contract NAS5-27295

page 2

CSC task personnel on Task 202 are providing support to the UIT engineering staff in preparation for the environmental testing of the UIT Low Voltage Power Supply Subsystem. This support includes composing command sequences to be executed by the Spacelab Experiment Interface Device, and writing associated software for a host computer to allow semi-automated testing of the power supply. Task personnel are also preparing a test document which will serve as a guide for conducting the test as well as a vehicle for reporting the results of the test. This test is being conducted on the engineering model of the Low Voltage Power Supply Subsystem and will be repeated on the flight versions when they are completed.

Task 301 personnel presented several reports to the NASA IUE Users' Committee Meeting at the end of September 1983 and to the Three-Agency Meeting in early October 1983. In particular, CSC gave presentations on the operation and impact to science operations of the 2-gyro + FSS control system.

Also on Task 301, CSC supported both Remote and Service Observing modes during the period. In an IUE Project experiment, a GO conducted his two US1 shifts from Yerkes Observatory in Wisconsin. This particular program was in collaboration with another GO at VILSPA. Task personnel also supported Service Observing shifts. Although originally scheduled as one shift, a second shift was quickly arranged by task members when a previously scheduled program could not use the time because of the new battery discharge constraints. During the second GO shift a task member discovered that the GO had selected an SAO star with incorrect coordinates. The task member quickly chose a second SAO star, thus saving the GO from exposing on a blank sky for 6 hours.

In order to enhance accountability, task management and the Technical Supervisor on Task 401, reorganized the reporting structure for software-related aspects of the Proposer Data Base and observation log production. Software-related functions in these areas previously done under the supervision of the DMC will now be done by DMC personnel reporting directly to the software support group. This new reporting structure will centralize responsibility for the work.

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

December 15, 1983

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for November 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211, CSC planned and performed the observations required to generate a new LWR ITF, as agreed upon by the Three Agencies. Meetings, planning documents, new forms, and informal discussions were employed to plan and coordinate the overall effort. Observational procedures previously proposed by CSC were followed to insure the highest quality for the final ITF. These included use of exposure meter images, use of the ping avoidance technique, null sensitivity tests, avoidance of radiation background contamination, and extensive record keeping. By establishing work-around procedures, CSC minimized the impact of long-wave-length ultraviolet flood lamp failures. Thus the full complement of at least four high quality images per level were obtained for the new ITF.

A task member on Task 212 was asked to sit on the technical review team for the Critical Design Review (CDR) of the ASTRO-1 Software Requirements Document. The document has been reviewed and a total of six Discrepancy Notices (DNs) have been generated which pertain to UIT commands and displays. These DN's have been forwarded to the review team leader and a task member will attend the pre-board review on December 5-9, 1983.

to Dr. Donald K. West from Dr. Peter M. Perry date December 15, 1983

subject Contract NAS5-27295

page 2

CSC's assistance and advanced planning on Task 311 made possible the smooth operation of the VILSPA shift from GSFC on November 22-30, 1983. The shifts were operated from GSFC while a new ground computer system was being installed at VILSPA. CSC provided Telescope Operators for each VILSPA shift. CSC Resident Astronomers helped the VILSPA RA adjust to IUE operations at GSFC. They also provided him with direct assistance to recover from ground computer crashes on several occasions, thereby saving spacecraft time and scientific data.

Task personnel on Task 311 also supported science operations at a high beta angle ( $\beta=131^\circ$ ) to obtain spectra of a binary star system in eclipse. Task members monitored the S/C battery performance and managed the S/C power load so that all desired spectra were obtained without draining the batteries past their 22.5 volt limit, even though IUE Project approval had been obtained to do so.

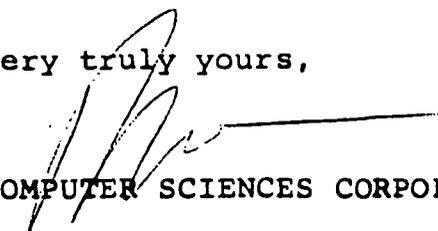
On Task 413, task personnel provided support during a period of coverage of VILSPA shifts at GSFC. The coverage was necessitated by a computer changeover at VILSPA. Numerous VILSPA images from collaborative programs were processed for VILSPA and the output products duplicated for the GSFC collaborator. This eliminated a long wait on the part of the GSFC collaborator which would have been necessary had the images been sent to VILSPA for processing. For those VILSPA images not processed at GSFC, IPC personnel duplicated the SOC archive tapes to insure successful image archival.

Because of the two weeks of computer downtime, the RDAF staff on Task 511 made special arrangements to perform special processing requests for two users who were unable to complete their analysis on their own.

There have been no significant problems to report this month other than that RDAF users and staff were severely impacted by the two weeks of computer downtime. It is not clear at this time whether the hardware problems have been completely solved. The ATR is aware of the problem.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

January 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for December 1983, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211, CSC continued to progress with the extensive analysis required to generate the new ITF for the LWR camera. Correlations between DN and reseau position were formed so that the null images may be geometrically corrected. Statistics on 119 images were compiled for the computation of the effective exposure time appropriate for each level of the ITF. Methods of correcting the data for the presence of bright spots were investigated.

A task representative on Task 212 was asked to sit on the review team for the ASTRO-1 Software Requirements Document. The review team met at the Marshall Space Flight Center on December 4-7, 1983. Task personnel identified six discrepancy items which were submitted at the team meeting. These discrepancies resulted in a general agreement that the UIT on-board display formats should be re-worked by the UIT team. This has been done and the new display formats have been submitted to the ASTRO-1 software development team at MSFC.

to Dr. Donald K. West from Dr. Peter M. Perry date January 15, 1984  
subject Contract NAS5-27295 page 2

On December 10-11, 1983 a gyro failure occurred on board the spacecraft, which resulted in gyro assembly temperature changes and large maneuver errors (the gyro was no longer being used in the control loop). Until reconfiguration of the gyro heaters restabilized the system on December 12, CSC personnel on Task 311 modified normal operations to minimize impact to GO programs and avoid loss of spacecraft attitude.

On Task 413, a new task member was hired for the CalComp plotting support, which was scheduled to begin production activity in January 1984. A personnel training plan was developed and implemented, and production plotting capability was achieved ahead of schedule, on December 29, 1983. Additional measures were taken due to the fact that the new task member is severely hearing impaired. The GSFC Health, Safety and Security Office was contacted in regard to potential safety measures. Task management spoke with J. H. Letourneau from the GSFC Fire Protection Office concerning the possibility of wiring the corridor lights into the fire alarm system.

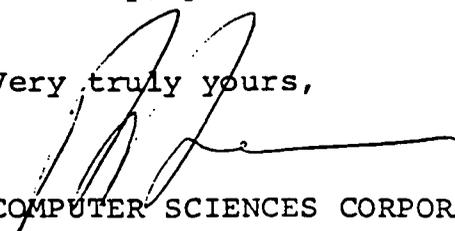
In preparation for the seventh IUE episode, task personnel on Task 414 used the IUEAIMS and IUEPROP data bases to generate cross-reference lists of proposed targets and previous IUE observations. The lists needed only about 60 percent of the Sigma-9 computer time required to generate similar lists for the previous episode. Although there were several factors involved, this improvement is thought to be primarily due to the new blocking of the Sigma-9 IUEAIMS data base tape.

Because of the 20 hours of computer downtime, the RDAF staff on Task 511 made special arrangements to perform special processing requests for two users who were unable to complete their analysis on their own.

There have been no significant problems to report this month other than that personnel on Task 412 and Task 511 were severely impacted by the considerable amount of computer downtime.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

February 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for January 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 113, CSC accommodated 12 Peer Group travelers stranded due to inclement weather by rapidly making additional motel and car reservations on the evening of Tuesday, January 24, 1984. The cancelled evening flights were changed to departures on the next morning. CSC also changed approximately ten additional Peer Group travelers' flights to a later time of departure on January 24.

Task personnel on Task 114 provided exceptional support during the IUE Peer Review Meeting by preparing transcriptions of approximately 290 sets of evaluative notes in a timely manner. Overtime effort allowed the completion of the majority of the notes in time for review by the chairmen of the Peer Review Committees on the last meeting day.

CSC continued the extensive analysis required for the creation of a new ITF for the LWR camera on Task 211. A task member compiled statistics on the DN levels for each of the 111 ITF images, required for the derivation of the effective exposure times for each ITF level. CSC carefully evaluated the impact of bright spots in the ITF images and possible correction methods.

to Dr. Donald K. West from Dr. Peter M. Perry date February 15, 1984  
subject Contract NAS5-27295 page 2

Task members on Task 211 also determined that the bright spots should be "cleaned" from the individual images, using the BSPOT routine, in order to best eliminate the effects of the spots without requiring a major revision of existing ITF software. This approach will allow a significant improvement to the ITF generation technique yet require little additional time for the creation of the new LWR ITF.

On January 11-12, 1984, a routine correction to the IUE orbit was aborted when the OBC crashed during the main burn. After working with OCC staff as they brought the S/C under control, CSC personnel on Task 311 reestablished the S/C attitude by performing a beta-zero attitude recovery. Careful management of the S/C power requirements extended the time available at the anti-sun position for the attitude recovery. Due to the difficulty of identifying the star field at the beta-zero region and the lack of catalog stars there, the recovery took 6 hours to perform.

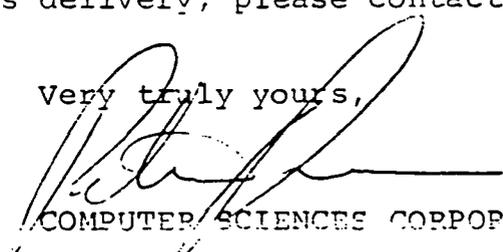
In preparation for the seventh-year IUE Proposal Peer Review, task personnel on Task 414 created a special cross-reference listing of individuals who were PIs on at least one proposal. Seventy copies of this special listing were provided to the ATR in a timely fashion.

On Task 511, the implementation of several experimental routines along with new procedures for software configuration control represent significant advances in the management and operation of the facility. In addition, discussions between the task leader and the IADAF staff were instrumental in acquiring laboratory approval for purchasing a tri-density tape drive, a 500-magabyte disk drive and a VAX 11/750 minicomputer, which should greatly improve the reliability and performance of the RDAF.

There have been no significant problems to report this month other than that personnel on Task 511 were impacted by approximately 20 hours of computer downtime.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

March 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for February 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 111, the transition plan for transferring duties and responsibilities to new task personnel was successfully implemented. All DMC functions were performed without interruption during the transition period.

CSC discovered an anomalous motion in the geometric format of the LWP camera on Task 211. The shift of over 2 pixels appears to occur sporadically. Task members demonstrated that the reseau shift is usually found on images read down after the LWP has experienced bad scan starts. The images in the wavelength calibration data base are being evaluated so that affected data may be omitted from analysis.

Also on Task 211, CSC analyzed maneuvers in December and January following the failure of Gyro 1. Task members recommended to the POD that new scale factors be uplinked to the spacecraft to improve maneuver accuracy. In consultation with the OCC, CSC agreed to small changes in the scale factors for Gyros 3 and 5. These changes were implemented on February 16. Preliminary analysis indicates that the maneuver accuracy has improved.

to Dr. Donald K. West from Dr. Peter M. Perry date March 15, 1984

subject Contract NAS5-27295

page 2

CSC personnel on Task 311 staffed 48 hours of VILSPA science operations to cover 6 shifts which were operated from GSFC while VILSPA performed tests on their new ground computer. An RA and telescope operator were provided for each shift.

Task members also on Task 311 made last-minute GO schedule changes to satisfy S/C requirements in preparation for a Delta-V burn. Following the burn, task members recovered S/C attitude in less than an hour after receiving command from the OCC.

Due to the very thorough and timely evaluation of the bright spot detection software on Task 412, construction of the LWR ITF will be delayed by less than two weeks as a consequence of the request by the Calibration and Systems Analysis Task to evaluate and implement the removal of bright spots from the raw UVFLOOD images.

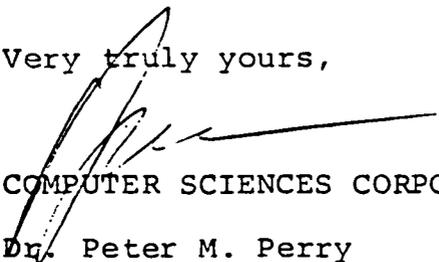
On Task 413, the GOs who had extracted spectral data corrupted by the computer disk-drive problems in early 1983 have been sent information concerning the extent and distribution of the resulting contamination. This completes the communication with these GOs concerning this situation, exclusive of responses to future inquiries or requests for plots.

On several occasions this month, the staff on Task 511 made special arrangements to assist users who wished to work during non-supported RDAF hours. The assistance involved not only filling short-notice SACC requests but also preparing specialized routines for several hours.

There have been no significant problems to report this month other than that personnel on Task 511 were impacted by approximately 20 hours of computer downtime.

If any questions arise concerning this delivery, please contact me.

Very truly yours,



COMPUTER SCIENCES CORPORATION

Dr. Peter M. Perry  
Project Manager

PMP:jaj  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

April 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for March 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211 CSC has completed the analysis required for the creation of the new LWR ITF. The optimum thresholds required for the BSPOT program were slightly revised, based on an analysis of the image noise properties, and finalized. Task members made the final choice of images to be included in the ITF and merged the images for each of the twelve levels. The effective exposure time for each level was determined from a careful analysis of the UVFLOOD lamp degradation and null level changes due to previous exposure level. Thus, analysis of the new ITF characteristics may be completed in time for presentation to the Three Agencies in May.

The DEP software module that controls the operation of the UIT suboptical assembly for Task 212 has been verified on the flight hardware. This verification procedure was witnessed by the Principal Investigator and senior project staff members.

CSC's assistance and advanced planning on Task 311 made possible the smooth operation of the VILSPA shift from GSFC on March 12-21, 1984. The shifts were operated from GSFC while a new ground computer system was being installed at VILSPA. CSC provided a Telescope Operator for each VILSPA shift. Task members also gave the visiting VILSPA RAs an informal orientation to GSFC IUE operations.

Letter to Dr. Donald K. West

from Dr. Peter M. Perry

Subject: Contract NAS5-27295

April 15, 1984

page 2

Task 311 personnel conducted two Service Observing shifts for one GO program. Spectra were successfully obtained of extragalactic objects in coordination with EXOSAT.

For Task 412 a thorough analysis, both empirical and theoretical, was performed on the procedure of removing bright spots from flat-field images with BSPOT. This is the first analysis of this kind using IUE data.

CSC personnel on Task 414, as part of an ongoing effort to provide a complete and accurate data base of all IUE images, made several hundred corrections and additions to the entries of Commissioning Period images.

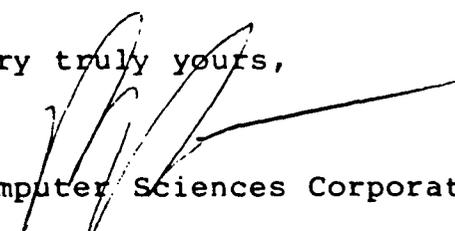
Also on Task 414, at CSC's initiative new subsorts were added to IUEAIMS observation log programs to better organize the data when it is printed. Also, CSC made recommendations on how to logically divide each log into two volumes.

On several occasions this month, the staff on Task 511 made special arrangements to accommodate users who requested data on short notice. In one case the data analysis assistants worked several extra hours to obtain recent data from the NSSDC for a PI whose GO tapes were unavailable.

There have been no significant problems to report this month.

If any questions arise concerning this delivery, please contact me.

Very truly yours,

  
Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

May 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for April 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211 CSC has completed the creation of the new ITF for the LWR camera. Preliminary evaluations indicate that it represents a significant improvement over the current ITF. The pixel-to-pixel noise in flat field images is reduced by about 10 percent with the new ITF. The deviation from perfect flatness is about 1 percent or less for UVFLOOD images processed with the new ITF. Underexposed low dispersion spectra exhibit noticeably smaller linearity errors than the same spectra processed with the current ITF. The improvement in linearity is seen for spectra obtained as early as November 1978. Thus application of the new ITF to LWR spectra should significantly enhance the accuracy of the IUE long-wavelength data.

A problem with the Ultraviolet Imaging Telescope DEP CPU reset action was noted when the program EPROMs were removed to an external memory board. Task 212 personnel studied and identified the cause and took appropriate action to resolve the problem.

On Task 311, CSC supported observations of Comet Encke as it emerged from the solar avoidance zone. Task members closely monitored S/C battery voltages and power loads to ensure that these highly time-critical observations were obtained before the batteries discharged to operational limits.

CSC Task 311 personnel provided emergency observing assistance for two US1 shifts and one US2 shift when a GO's flight to the Washington area was cancelled and the Denver airport closed due to a blizzard. Task members, in telephone communication with the GO during the shifts, performed target acquisitions and the quick-look image evaluation needed to plan subsequent observations.

to Dr. Donald K. West from Dr. Peter M. Perry date May 15, 1984

subject Contract NAS5-27295

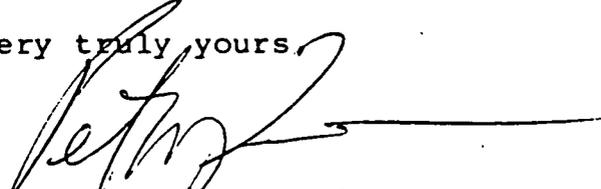
page 2

Task 413 personnel set up and ran special processing schemes for the evaluation of the new ITF for the LWR camera. Special schemes were also developed to test the integrity of the LWP ITF. This work was performed in a timely fashion to permit personnel from the Data Reduction Enhancements and C&SA tasks to analyze the results for presentations to be given at the Three-Agency Coordination meeting in May. This was accomplished within the constraints of maintaining the current image processing flow and numerous interruptions due to tape drive problems and the resulting maintenance work.

At CSC's initiative on Task 414, programs were modified and created to divide the printed cumulative merged IUE Logs of Observation into multiple volumes. Such a division will be mandatory in the near future because of physical limitations on the size of volumes that can be produced in the bound Xerox-output format.

Task 511 data analysis assistants worked extra hours to accommodate the unusually large number of visitors who were using the facility in conjunction with their attending the GSFC IUE Symposium. Data were loaded and assistance was provided for the more than 10 users who all came during the first week in April.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

June 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for May 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 111 DMC personnel produced an enhanced index of the microfiche copy of the NASA observing scripts. For each microfiche volume and page, the index lists beginning and ending observation dates and sequence numbers for each camera. The enhanced index is undergoing independent accuracy checking and will be complete in June.

CSC provided analysis and recommendations that formed the basis of several important Three-Agency agreements on Task 211. CSC proposed that observations be obtained for new ITF calibrations on the LWP and SWP cameras. A primary concern is the inadequacy of the current LWP ITF, due to changes in the camera over time and due to deficiencies in the original calibration. A secondary consideration is the significant improvement, as evident in the new LWR ITF, that can be obtained using the techniques defined and recommended by CSC. Finally, all calibration observations that may be needed should be planned now, given the finite lifetime of the satellite.

On the same task CSC analyzed the development of the flare in the LWR camera in relation to the usage of the camera. Although the flare has continued to brighten, the occasional periods of low camera usage indicate that the flare development may be curtailed if the camera is not used. Based on this analysis, the Three Agencies agreed to continue the use of the camera for Guest Observer programs but at a somewhat reduced level. This agreement provides an important compromise between the Project's need to support GO science objectives and the need to limit the degradation of the camera's performance.

to D. West from P Perry

date June 15, 1984

subject Progress Report

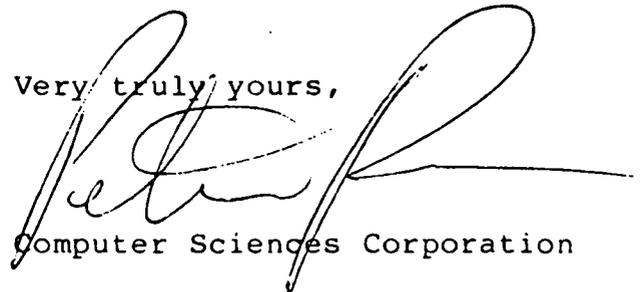
page 2

On Task 311 CSC worked to minimize the impact to GOs of a thirteen-day period when the TOC EDS was inoperative due to a disk drive failure. Task members performed emergency Service Observing when a scheduled Remote Observing run was cancelled due to the equipment problems. On other days science operations were performed with either the IPC or OCC EDS.

Presentations at the IUE Three-Agency Coordination Meeting concerning the construction and evaluation of the new LWR ITF were instrumental in the Three-Agency decision to obtain new ITFs for the LWP and SWP cameras. A very productive collaborative effort between members of Task 412 and Task 211 enabled the creation of a new ITF which is of high quality and is regarded as the best obtainable with the instrument.

Task 511 data analysis assistants generated seventeen specialized routines to perform such processing activities as binning low dispersion IUE data, extracting specific wavelength regions from high dispersion spectra, comparing stellar spectra with standard-star spectra and blackbody curves, and correcting for residual curvature in the LBLs files.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mr  
Enclosure

CSC

E-27

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

July 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for June 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211 CSC performed off-line and real-time testing of System 19. The new ground system includes the new offset target capability requested by VILSPA and a correction to the computation of the roll drift. One minor problem was found with computing maneuvers to an offset target. Since the problem does not affect the safety of the spacecraft, CSC concurred with the Project Operations Director that the new system be implemented. System 19 became the operational ground system on June 27.

A great deal of effort was made by Task 212 personnel and UIT project to track down a mysterious fault in the flight DEP system. In the end the problem resolved itself though the cause was never determined.

Personnel on Task 214 adapted the AIPS software to drive the new Model 75 International Imaging Systems (IIS) image processor, allowing display and analysis of IRAS data with nearly the complete capabilities of AIPS. The interactive Tektronix plotting ability of AIPS was implemented remotely from GSFC Code 600 facilities in Building 2, thus making available the rest of the AIPS capabilities needed for IRAS data handling. A demonstration to the ATR confirmed the usefulness of AIPS for IRAS data, showing that the AIPS package is superior to that presently available at JPL. The demonstration also suggested the value of using AIPS as a basis for analysis packages for future missions.

to D. West from P. Perry date July 15, 1984  
subject Progress Report page 2

On Task 311 CSC reviewed twelve proposals for technical feasibility. The proposals included requests for discretionary observing time, service observing support, use of the LWR camera, and permission to discharge the S/C batteries. Some requests were found to contain serious problems. All reviews were forwarded to the Project Scientist for his consideration and approval.

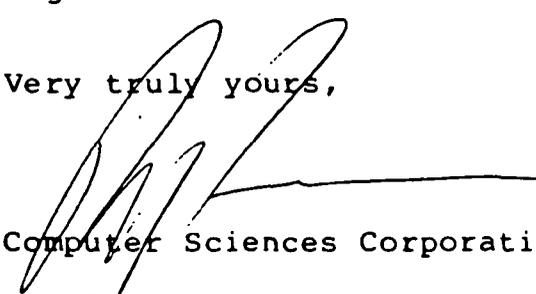
Task 412 personnel discovered that the fixed-pattern noise present in high-dispersion extracted spectra is essentially identical when processed with the old and the new ITF. An implication of this result is that the geometrical correction procedures developed by CSC are remarkably accurate, allowing alignment of the individual ITF images at the level of one pixel.

New mean dispersion constant files and correlation coefficients for applying THDA and second-order time corrections for LWR and SWP were implemented on Task 413. In tests using the wavelength calibration procedures, these changes have been shown to produce initial wavelength assignments which were closer to the final fitted values than those resulting from the old means and corrections.

In a timely and efficient manner under Task 414, CSC is preparing for the inclusion of FES counts and mode in the IUEAIMS data bases. About 10,000 sets of FES counts and mode have been hand entered onto a disk data set and 30 programs have been identified as requiring modifications. A new log format was also developed.

The data analysis assistants on Task 511 generated twelve specialized routines while assisting an unusually large number of RDAF users. The data analysis assistants also helped a large number of local users who are working at GSFC for the summer.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

August 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30.

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for July 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 111 DMC personnel prepared and mailed four thousand envelopes with address labels and announcement of opportunity letters in less than one working day. CSC received a letter of commendation from the ATR recognizing the special assistance of five task members in this effort.

On Task 211 CSC submitted to the POD on an extensive set of changes to the operations and camera procedure files. Two of the changes were requested by VILSPA, the transfer of the G1 cut-off read procedure from the camera to the operations procedure file and the capability of bypassing the bad scan logic when doing G1 cut-off reads. Other changes were made to add several exposure levels to the UVITF procedure and to improve the documentation of the global variables used in the procedure files.

Task 214 personnel prepared complete false-color documentation of all four bands of IRAS data for the sky field centered on 13 hours 00 minutes right ascension, 0 degrees declination. Statistical analysis and cross-sectional plots were included to support the imaged hard copy. The gradient of the zodiacal light towards the ecliptic plane and the lack of a color gradient were immediately apparent.

Personnel on Task 215 exhibited exceptional initiative in rapidly planning the Starlab task activities and acquiring the documents necessary for their review from a variety of sources.

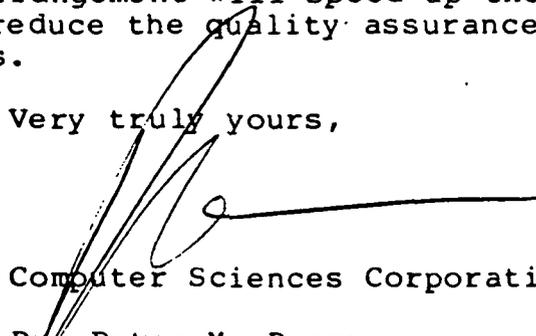
to D. West from P. Perry date August 15, 1984  
subject Progress Report page 2

On Task 311 CSC planned and successfully carried out observations of the Galilean satellites at opposition. Task members worked with the GOs for several months to arrive at an observing plan which met the program's scientific objectives and simultaneously satisfied numerous S/C constraints. Task members also worked closely with the GOs during the observing shifts to use telescope time efficiently, thereby minimizing battery discharge.

Analysis performed by CSC personnel on Task 412 has determined that temperature and second order DN-corrected spectral reseau positions yield the best results for geometric corrections of an image (displacement from the found reseau positions is generally less than 0.5 pixel). Implementation of predicted reseau positions based on these results will represent the first major improvement in the geometrical compensation procedure since 1981.

Task 414 management, in coordination with TS&O task management, expanded the role of DASS task personnel in quality assurance of the annual and bimonthly IUE logs of observations. This change was a direct result of expertise demonstrated by task personnel over the last six months. This arrangement will speed up the production of the logs and will reduce the quality assurance burden on the Resident Astronomers.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

September 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 685  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for August 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211 CSC submitted to the POD four reports of system deficiencies. Two of the reports concern errors that occur when loading target information into the science header. One reported the potentially dangerous ability to uplink maneuvers calculated while in the maneuver planning mode. The last reported an error in the maneuver time line page (MANTMLNA) format.

On Task 212 the UIT operating program has been completed and is currently undergoing detailed checkout.

Task 214 personnel provided a rapid installation of the zodiacal history file and the software necessary to access it on the SACC IBM S/3081.

Through the use of division-wide CSC resources, Task 215 personnel have identified an efficient method for the definition of STARLAB requirements. This method will allow the generation of a document which is complete and yet easily referenced and updated.

Task 311 personnel, in coordination with the PI, planned and carried out a highly successful series of observations of the earth. Several months of careful planning were required for these observations, the first earth observations obtained with IUE at GSFC. The large apparent motion of the earth as viewed by the S/C creates additional constraints which make earth observations particularly difficult for IUE. Three complete sets of observations were made during the shift.

to D. West from P. Perry

date September 15, 1984

subject Progress Report

page 2

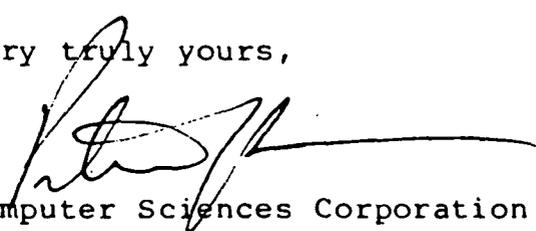
Also on Task 311, CSC made possible the continuous observation of a very short-period spectroscopic binary system for 16 hours simultaneously with the VOYAGER spacecraft and ground-based observations. The desired cycling time between observations was only 36 minutes. Task personnel, in coordination with the OCC and Greenbelt Tracking Station staffs, were able to arrange 10 IUE rangings that day so that the critical observing schedule was not interrupted.

Procedures developed by CSC personnel on Task 412 to correct the residual curvature distortion in IUE images were evaluated and proved to be remarkably successful in eliminating the effect of the distortion in the extracted spectrum.

Task 413 personnel organized and staffed special weekend processing shifts to reprocess numerous commissioning-period images which were originally processed during the 1983 period of computer disk hardware problems and to process the commissioning-period images which were not previously processed.

On Task 511, CSC assisted several users this month by developing new software routines and processing techniques. Most of these new routines will be of general interest and therefore will be made to conform to RDAF standards and added to the experimental library. This development work was done in spite of the large number of RDAF users this month (16) and the large number of specialized routines generated (13).

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

October 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for September 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 211 CSC, in coordination with VILSPA, performed the observations required to generate a new LWP ITF, as agreed upon by the Three Agencies. Meetings, planning documents, and discussions with VILSPA over the SCAMA lines were employed to plan and coordinate the overall effort. Observational procedures similar to the LWR ITF were followed to insure the highest quality for the final ITF. These included use of exposure meter images, null sensitivity tests, avoidance of radiation background contamination, and extensive record keeping. CSC established work-around procedures to minimize the impact of the long-wavelength ultraviolet flood lamp failures. On short notice, CSC rearranged several guest observer programs because a fifth day was needed for the ITF observations. Despite problems with lamp failures and high radiation, a full set of at least four good images per level was obtained for the ITF.

Task 212 personnel organized and participated in an ASTRO mission crew training session during which the various Mission and Payload Specialists became acquainted with the UIT system. The crew suggested several changes in the operation of the Dedicated Experiment Processor which have since been incorporated.

The successful agreement for large-scale access to the GSFC Code 630 facilities is the result of months of effort by Task 214 personnel and will greatly enhance IRAS data analysis capabilities and efficiency.

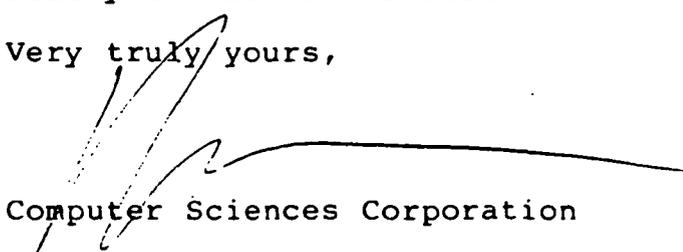
to D.K. West from P.M. Perry date 10/15/84  
subject Monthly Report page 2

Task 412 personnel discovered larger-than-expected differences between the reseau positions determined by the current geometrical compensation procedures and those determined by the new procedure currently being developed. Tests run on standard IUE images showed that some predicted reseau positions differed by almost 3 pixels in two of the five images tested. Assuming the new procedures are correct, these tests indicate that significant improvements can be made in both the photometric correction and the wavelength assignments of IUE spectral images.

Completion of the project of hand entering and proofreading over 33,500 sets of FES counts and mode from IUE GSFC observing scripts to a disk data set was accomplished by Task 414 personnel.

On Task 511, the RDAF staff have completed much of the work required to make remote data processing available to RDAF users. It is felt that the ability to analyze IUE data remotely will become an important RDAF capability in the near future.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

November 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-30

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for October 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 111, DMC personnel began organizing the proposals received for the eighth observing episode and updating the Proposer data base. In addition, task personnel began entering the eighth-episode GOTL on the SCF IBM S/3081.

Task 211 personnel analyzed the temporal behavior of the camera heater currents. The SWP heater current has risen in the last year, especially in August and September, but its value is still comparable with those of the other two cameras. The change in its behavior does not appear to be a simple aging effect.

On Task 212 iterations between the DEP control program, the IGSE command/display program, and the UIT flight hardware have progressed to the point where all the telemetry data and all but one of the serial commands have been verified.

Task 214 personnel examined in detail IRAS field 26 in the Milky Way in Cepheus, including analysis of the imaged data and integration with the cataloged data. The results were presented to the NASA Committee on Data Management and Computing and GSFC Code 600 management.

to D.K. West from P.M. Perry date 11/15/84  
subject Monthly Report page 2

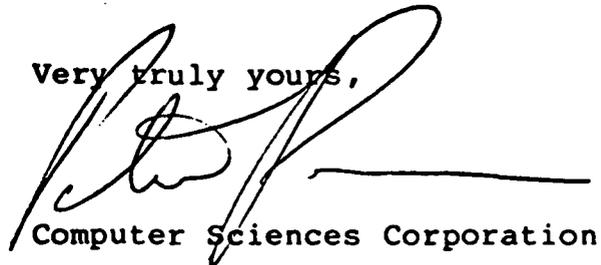
Task 311 members remain alert in anticipating problems with use of the IUE S-band antenna 4, which has experienced large power fluctuations for an hour or more after being turned on. Task members consulted with GOs to plan their observing shifts to avoid loss of spectrograph data due to the S-band antenna problem.

On Task 413, task personnel made special efforts to maintain a normal level of CalComp plot production during a period of unexpected personnel shortage. This made possible the timely shipping of output products of recently processed images to the principal investigators. In addition, task personnel conducted the training of the new CalComp operator.

At the request of the ATR, Task 414 personnel produced a prioritized list of classes of differences between the VILSPA and GSFC microfiche of the IUE Annual Merged Log of Observations. This work was done rapidly and resulted in a memo from the ATR to ESA personnel. These differences will be reported on by task personnel at the November IUE Three-Agency Coordination Meeting.

On Task 511, CSC provided assistance for a record number of users this month in spite of numerous hardware problems and severe disk space limitations.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mr  
Enclosure

C-2

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

December 15, 1984

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. J. Keith Kalinowski  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. Kalinowski:

Enclosed is the monthly Progress Report for November 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 221, a task member determined the LWP ripple correction parameters, which will be implemented in the IUESIPS production processing. Except for the lowest orders, the variation of the grating constant,  $K$ , with order number,  $m$ , can be adequately represented by a linear relation. The alpha parameter is the same as that for the LWR camera.

On Task 222 the DEP program was compiled into flight qualified PROMs and supported system checkout both before and after vibration testing. The DEP operated flawlessly.

On Task 224 the programs SELECT and COMPARE were interfaced and demonstrated to the ATR. The new AIPS configuration in GSFC Code 630 was completed, and further demonstrations were given to NASA administrators.

Task 227 personnel studied options and documented manpower estimates for various levels of image reprocessing to produce a "final form" of the IUE archive. These options were presented at the IUE Three-Agency Long-Range Planning Committee meeting held at GSFC on November 15, 1984.

to J.K. Kalinowski from P.M. Perry date 12/15/84  
subject Monthly Report page 2

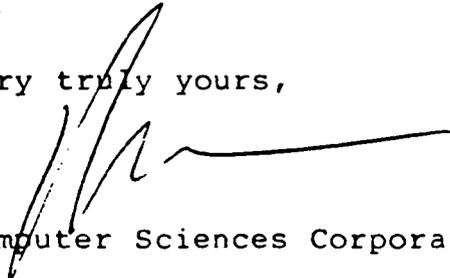
Task 321 personnel began processing eighth-episode proposals. Program ID codes and research categories were assigned to all 307 proposals. At the request of the Operations Scientist, task members provided a detailed subject-by-subject breakdown of proposals within each category and divided the larger categories into two sub-categories for Peer Review Panel assignment. Task members have begun reviewing proposals for technical feasibility. The collaborative proposals have been given first priority so that the results can be communicated to VILSPA for their proposal review.

On Task 422 it has been tentatively concluded that it is adequate to assume a Gaussian Point Spread Function (PSF) for the purposes of the high dispersion order overlap problem. Also, it has been tentatively concluded that the interorder background should not be smoothed in advance of the overlap correction. An algorithm based on a Gaussian PSF has been derived and will be tested on WAVECAL images.

Personnel on Task 423 worked extra shifts to fulfill a large archival image reprocessing request (over 70 images) in a timely fashion.

On Task 424 task personnel implemented several major changes to IUEAIMS which affect the addition of FES counts and mode to the data base and the project to generate photowrites of VILSPA raw images.

Very truly yours,



Computer Sciences Corporation  
Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

January 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. J. Keith Kalinowski  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. Kalinowski:

Enclosed is the monthly Progress Report for December 1984, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 221, task personnel prepared an observing plan for the absolute calibration of the IUE cameras. The desired number and type of standard star spectra are listed as well as the exposure times for the observations. This plan will help to ensure that the spectra acquired by GSFC and VILSPA personnel will be obtained in a uniform and optimum manner.

On Task 224 the arrival of the IRAS data base precipitated immediate scientific interest. The preparations of previous months allowed immediate access to the data with very successful initial results and the promise of many more.

On Task 226 the Payload Specialist attended a training session at MSFC on December 3-4, 1984. The purpose of this session was to become familiar with the design and operating procedures of the Astro Wide Field Camera and the Image Motion Compensation System.

Task 227 personnel reviewed the 1985-1990 S/C constraint predictions presented by OCC personnel at the IUE Three-Agency Coordination Meeting in November 1984. The principal constraints pertaining to science operations were identified. Task personnel began outlining the basic requirements for an integrated scheduling system for IUE. OCC analysts were asked to consider the possibility of additional S/C power reductions since this would directly affect S/C constraints.

to J.K. Kalinowski from P.M. Perry date 01/15/85  
subject Monthly Report page 2

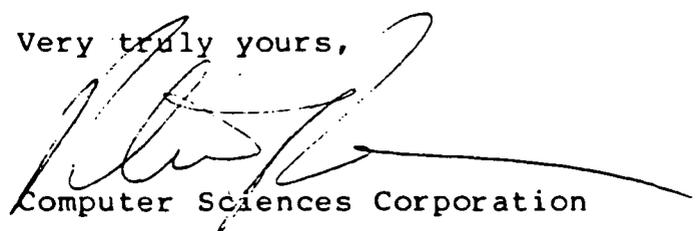
Personnel on Task 321 assisted a GO in obtaining observations of two stars in the galaxy M33. These are the most distant individual stars ever observed with IUE.

On Task 422 task members assisted IPS task personnel in applying temperature and DN corrections for the geometrical correction of null UVFLOOD images. A preliminary value for the width of the IUE Point Spread Function (PSF) was obtained by analysis of WAVECAL images and from images of the emission-line object, RR Tel. The FWHM of the PSF is about 3.5 pixels in the range 1200A-1250A.

Personnel on Task 423 supported special weekend shifts to complete the eighth-episode proposal cross-reference runs in a timely fashion.

In a continuing effort to provide for the needs of its users, the RDAF staff on Task 521 held their fifth RDAF Software Review Committee meeting on 14 December 1984. As a result of the meeting several experimental routines will be implemented in the standard RDAF libraries. In addition, at the request of the users, testing of the new version of IDL will be continued and the current version will not be changed until the final version allowing double precision is received and tested.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

CSC

E-41

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

February 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for January 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 123, CSC was able to provide timely and complete meeting support for the IUE Peer Review meeting held January 21-23, 1985 despite the off-site location of the first 2 days of the meeting. Task personnel successfully coordinated the acquisition, preparation, and distribution of meeting supplies, handouts, forms, and name tags.

On Task 124, CSC provided clerical support during the IUE Peer Review meeting by transcribing 307 proposal evaluation forms in a timely manner. Despite the off-site location for the first 2 days of the meeting, and despite the decision of many of the panel chairpersons not to release their handwritten notes for typing until the second day of the meeting, overtime hours enabled task personnel to complete a majority of the forms by the last day of the meeting.

Personnel on Task 222 participated in the successful completion of the UIT thermal-vacuum test. A number of corrections and refinements were made in both the software and the hardware systems as a result of the test.

Task 224 personnel demonstrated the versatility of the current AIPS system to Dr. Pellerin of NASA Headquarters to assist him and his staff in developing plans for future NASA support and development of astronomical image processing at GSFC and nationwide.

to D.K. West

from P.M. Perry

date 02/15/85

subject Monthly Report

page 2

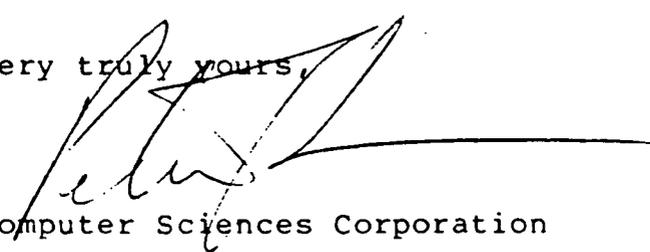
Personnel on Task 227 outlined, and discussed with the ATR, a plan for an Integrated Scheduling System (ISS). Major areas were identified which require GO and Project input in the pre-observation planning phase. As a result of the discussion, work was initiated on a more detailed version of the ISS plan for presentation to IUE Project personnel.

On Task 321, CSC personnel were available to the 11 IUE Peer Review panels to answer questions concerning the IUE scientific instruments, S/C capabilities, and the feasibility of individual proposals. A summary of CSC's feasibility comments for each proposal, organized by Peer Review panel assignment, and a memo detailing specific feasibility concerns were prepared for the Project Scientist for subsequent distribution to the panel members.

Personnel on Task 423 supported special weekend shifts to compensate for production processing time lost due to recurrent disk-drive errors. CSC also performed numerous tests to rule out corrupted software as a potential cause of those errors.

A large amount of software development work was completed this month by Task 521 personnel. Besides completing updated versions of the RDAF Tutorial and the RDAF HELP file, ten experimental routines were implemented in the standard RDAF libraries, one routine was added to the experimental library, and many procedures were tested to determine whether modifications would be required for implementing the new version of IDL.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

CSC

E-43

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

March 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for February 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 125, a new photowrite contact-printing procedure was devised, tested, and implemented by CSC to improve the final data product. By tailoring the exposure time for a print from an individual negative according to the peak photographic density on the negative, the Hardcopy Facility is now able to ensure that contact-print data products meet the desired density specifications more rigorously.

Task 221 and 321 personnel, in coordination with VILSPA, performed the observations required to generate a new SWP ITF, as agreed upon by the Three Agencies. Meetings, planning documents and discussions with VILSPA over the SCAMA lines were employed to plan and coordinate the overall effort. Observational procedures similar to those for the LWR and LWP ITFs were followed to ensure the highest quality for the final ITF.

The UIT Payload Specialist on Task 226 was invited to operate the Hopkins Ultraviolet Telescope (HUT) during a demonstration of its capabilities to a group of simulation engineers from MSFC who are charged with producing a crew training simulator of that instrument. This exercise provided the Payload Specialist with additional experience in operating HUT. It also provided a thorough checkout of the HUT draft crew procedures.

Task 228 personnel quickly organized task activities and met with the ATR and with other GSFC FUSE Project representatives to discuss the content and format of the FUSE Level I Science Operations Requirements document.

COPIES OF ORIGINAL FILES - THIS COPY - THE WORK

to D.K. West

from P.M. Perry

date 03/15/85

subject Monthly Report

page 2

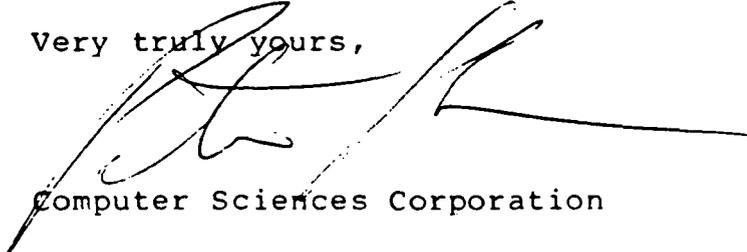
The efforts of task members on shift on Task 321 made possible the difficult observations of the nova RS Ophiuchi, a historically known nova which has not been in outburst in 25 years. The nova's location at a beta angle of  $131^\circ$  required careful planning to avoid excessive battery discharge. In spite of the power problems, two complete sets of observations were made.

Task 423 personnel provided extensive and timely support in the generation of the new SWP ITF.

Personnel on Task 521 played a significant role in the installation of the new 500-megabyte disk drive. The added disk space represents the most important hardware improvement since the facility was created.

Assistance was provided this month to a special RDAF visitor from the People's Republic of China. During the visitor's extended stay, CSC provided special assistance necessitated by the visitor's unfamiliarity with both IUE data and interactive computer systems.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

CSC

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

April 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for March 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 123, CSC contributed to the success of the IUE Users' Committee Meeting by collecting and distributing reports, recording meeting proceedings, and providing other forms of meeting support.

Personnel on Task 224 attended the IRAS Processing Development Workshop in Pasadena, California and demonstrated that GSFC has capabilities for working with the IRAS data that are comparable to the prime facilities of the three nations sponsoring the satellite (US, UK, Netherlands) and which were achieved at a fraction of the expense and manpower.

The UIT instrument has been shipped to KSC and is undergoing post-shipment activities in preparation for handover to KSC for integration. Under Task 226, the UIT payload specialist supported all activities involved in this process and participated in crew training activities on the Hopkins Ultraviolet Telescope (HUT) and the Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE).

On Task 227 CSC has prepared a draft of a report estimating the scientific gains to be obtained from reprocessing various subsets of the IUE archives. The report identifies several areas where data quality can be greatly improved by reprocessing and estimates the number of images involved.

to D.K. West

from P.M. Perry

date 04/15/85

subject Monthly Report

page 2

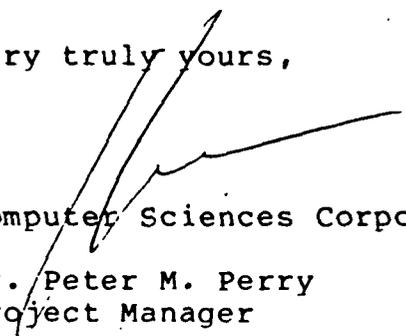
On Task 228 the preliminary draft of the FUSE Level I Science Operations Requirements document was completed on schedule and delivered to the ATR.

CSC personnel on Task 321 made possible a series of observations of the emission spectrum of the earth's upper atmosphere. The GO and task personnel planned and performed these observations where the S/C tracked the earth at a rate of 24 degrees per hour. This was the first time that IUE observations of this nature had been attempted. Task members created a detailed plan, including emergency procedures, which ensured S/C safety during the observations.

Personnel on Task 423 responded promptly to a large archival reprocessing request (70 images) for the eighth IUE episode. As a result of their timely efforts, the requested reprocessing will be completed very early in the eighth episode, which begins on April 1.

Task 521 members tested the newly installed call-back authenticator. It represents a significant step in developing the remote usage capability by reducing the financial burden on the remote user while improving the security of access to the RDAF.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

May 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for April 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 121, a statistical report which lists the episode in which a proposer first used the IUE facility was expanded. The report now determines whether a principal investigator in the upcoming episode was funded in the current episode. This will help determine the priority of funding for NASA headquarters.

A task member on Task 221 analyzed the changes of the LWR high dispersion sensitivity along order 82. This order contains the wavelength region between 2790 and 2802 Angstroms and is of particular interest because it contains the Mg II resonance doublet. Preliminary results indicate that the order displays an average sensitivity decline of  $-2.08 \pm 0.53$  percent a year. This value is similar to the low dispersion results, but additional images are needed to reduce the uncertainties in the rate of sensitivity decline.

On Task 222 all functions of the DEP flight program were verified during the UIT pre-delivery checkout, after the incorporation of a number of minor modifications to accommodate external software and hardware changes.

On Task 228 the preliminary draft of the FUSE Level I Science Operations Requirements document was completed on schedule and delivered to the ATR.

to D.K. West

from P.M. Perry

date 05/15/85

subject Monthly Report

page 2

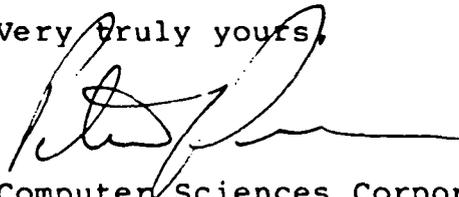
A task member's proposal on Task 321 for relaxing the OBC temperature-constrained observing regions was approved at the Three-agency Coordination Meeting. The new rules will provide greater scheduling and real-time observing flexibility.

With only several seconds' warning of an impending ground system crash, an alert task member stopped a camera read as it was about to begin. This quick action prevented the loss of a 123-minute time-critical exposure of a binary star system which could not have been repeated for several years.

CSC personnel on Task 423 arranged and staffed a number of overtime shifts to provide rapid turnaround for several archival reprocessing requests.

Task 521 members, during extensive testing of XIDL and the procedures modified to run under XIDL, uncovered several deficiencies not only in XIDL but also in the IDL documentation and the CU RDAF procedures. In addition, work was initiated this month on testing DIDL and developing a computerized cross-reference system for publications pertaining to the analysis of IUE data.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

June 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for May 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 125, task management, working with the GSFC Health and Safety Unit, has obtained several safety related items for use by the Hardcopy Facility personnel.

On Task 221 CSC tested the changes and enhancements to the OPSPRC42 file. No problems were found. However, with the impending reconfiguration of the LWR camera to the 4.5 kv UVC setting, it will be necessary to have the capability of converting to the 5.0 kv configuration. Therefore, a new procedure has been written to allow this reconfiguration. This procedure and several other enhancements to the procedure file have been communicated to the POD.

Task 222 personnel have made considerable progress on developing and testing a real-time data capture subsystem for the POCC ground terminal. The subsystem serves to decode the Spacelab High Rate Multiplexer (HRM) data stream during flight and to transfer captured data to a logging computer.

A task member on Task 227 completed a report estimating the benefits and disadvantages of replacing the Sigma-9 computer currently used for all image processing and reprocessing. Task members and Project personnel met with representatives of the Telefile Corporation, manufacturers of the most attractive replacement for the Sigma-9, to discuss details of the Telefile-Sigma-9 compatibility.

to D.K. West

from P.M. Perry

date 06/15/85

subject Monthly Report

page 2

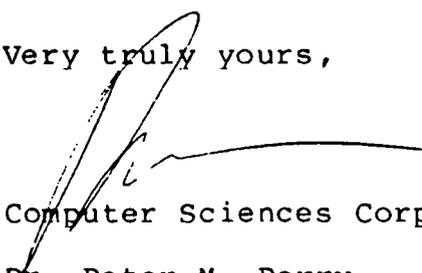
Task 321 personnel mailed a letter to GOs detailing the recent relaxing of beta-angle constraints. This will allow greater flexibility in real-time observing by expanding the area of the sky available for observations at a given time of year.

At the request of the ATR, Task 424 members rapidly designed and coded a program to generate statistics for IUE "science efficiency" expressed in terms of camera exposure time as a function of spacecraft time in orbit.

Task 521 staff members continued testing of DIDL. Several important errors previously undetected by CU RDAF users were discovered using structured testing procedures. CU has provided an improved version of DIDL. The testing has also uncovered deficiencies in the documentation which are currently being corrected.

Also under Task 521, work with LASP personnel, in conjunction with new RDAF software and documentation, has extended the RDAF remote usage capability by implementation of a second phone line with modem and call-back authenticator and special remote-user-oriented software.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

July 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for June 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 221, task members have analyzed FES data from 935 standard stars obtained during the 8 years of IUE science operations. Utilizing these data, CSC has derived the time-dependent terms for the FES sensitivity decline. The FES brightness as a function of time since 1978 is given by  $F(T)/F(O) = 0.98568 + 0.00791T - 0.00396T^2$ . The FES has declined in sensitivity by about 15 percent since the launch of IUE.

Task 227 personnel met with representatives of the National Archives to provide them with information on the quantity, format and long-term usefulness of the IUE Science Operations' records and documentation. The discussions centered on subjects falling under CSC IUE task responsibility, including telescope operations, SI calibration, image processing, and the IUE data base.

On Task 229, CSC personnel analyzed a listing of sources from the Catalog of Infrared Observations which were not previously identified with IRAS Point Source Catalog (PSC) sources and showed that 436 unique PSC sources can be assigned new cross-identifications.

D.K. West

P.M. Perry

06/15/85

Monthly Report

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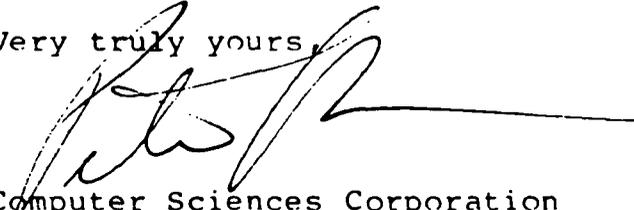
On Task 321 the successful first GO exposure of a faint target at the reduced LWR camera UVC setting uncontaminated by the LWR flare was made possible by CSC advance planning. CSC developed a manual method to safely reconfigure the LWR camera to the lower voltage for the duration of the observations.

Task 321 members also performed a successful series of fast trail slews and obtained the first ever optimally exposed trailed spectrum of Eta Uma, the most fundamental of the IUE calibration stars. On fast trails the star will often only graze or completely miss the aperture due to inaccuracies in the slew. CSC is currently testing a possible workaround of this problem in order to obtain good trailed spectra from slew rates as high as 120 arcseconds per second.

Personnel on Task 423 worked extra shifts to perform work required for calibration improvement projects directed by the C&SA task and to maintain rapid turnaround for recently acquired data.

CSC personnel on Task 424 developed a new procedure for generating the preface to the Annual Merged Log of Observations. This was necessary due to the inability of the MARK IV reporting system to handle the large number of proposal titles now in the data base.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

August 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for July 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. On Task 121, DMC personnel have created an on-line list of individuals to whom the SERC IUE Low Dispersion Microfiche Atlas has been sent.

Task 125 personnel rectified several technical problems with the Photowrite Systems hardware thereby alleviating downtime and the need for several costly service calls.

On Task 226 the UIT payload specialist participated in the level IV functional testing of each of the Astro-1 instruments. This provided rare and valuable experience in the operation of the flight hardware which is not often possible during crew training activities.

For Task 227, CSC prepared a report for the Project Scientist on the sources of lost observing time during the last 3 years. The report identified a significant trend in increasing observing time losses due to ground computer downtime.

On July 18, 1985, a routine correction to the IUE orbit was aborted when Worker 19, the OBC software which maintains S/C pointing during the main burn, temporarily failed. After the OCC staff brought the S/C under control, CSC personnel on Task 321

D.K. West

P.M. Perry

08/15/85

Monthly Report

2

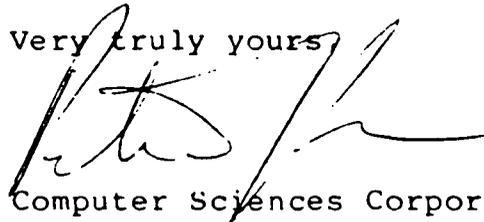
re-established the S/C attitude by performing a beta-zero attitude recovery. Careful management of the S/C power requirements extended the time available at the anti-sun position for the attitude recovery. Due to the difficulty of identifying the star field at the beta-zero region and the paucity of catalog stars there, the recovery took 5 hours to perform.

On Task 422 analysis of the results of applying the 2x2 spatially-smoothed LWR ITF to three data images shows poorer S/N than for the normal ITF, as had also been the case for the 3x3 spatially-smoothed ITF. Thus the current image registration method appears to be very good, and spatial smoothing does not improve photometric accuracy.

Task 424 personnel coordinated the installation of SCF IBM S/3081 disk data sets with RDAF personnel so that the installation occurred during a planned down-time of the RDAF computer thus minimizing the impact on RDAF users.

Despite extensive downtime this month, personnel on Task 521 were able to support a record number of users. In addition, special assistance was provided to three astronomers from Japan, Germany, and Italy using the RDAF on extended visits.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

September 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for August 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. Particularly significant this month are those relating to the quick and expert response CSC was able to provide following the failure of IUE Gyro 3 on August 17, 1985. The coordinated dedicated efforts of the CSC observatory staff, the OCC staff, and IUE Project personnel made possible IUE's rapid return to health and scientific productivity under the two-gyro plus FSS control mode. Highlights pertaining to these and other contract activities are described below.

As a result of the gyro failure on August 17, 1985, the two-gyro plus FSS procedure file (OPS2PR02) was released by the POD for routine S/C operations. Personnel on Task 221 quickly reviewed the two-gyro procedure file to identify any procedures which might have to be modified to ensure S/C safety. Prior to the gyro failure a number of changes had been made to the three-gyro procedure files but had not yet been incorporated into OPS2PR02. During S/C testing of the two-gyro plus FSS procedure file it was discovered that there is no method of changing to raw gyro control for the pitch and yaw axes without executing a procedure which would also do some other unwanted function. The procedure FESTRK has therefore been modified to allow the option of switching to raw gyro control. The above modifications and enhancements to OPS2PR02 have been communicated to the POD.

TO: D.K. West

FROM: P.M. Perry

DATE: 09/15/85

SUBJECT: Monthly Report

PAGE: 2

On Task 224 the reformatting and further analysis of the ZOHF will allow a more precise understanding of instrumental calibration effects and thus a more realistic model of the zodiacal emission.

On Task 226, the Astro-1 Level IV Mission Sequence Test (MST) was performed on August 22-23, 1985. This represented a major milestone in the integration of the Astro-1 payload and was the first opportunity for the crew to actually exercise a segment of the mission timeline. The test went extremely well and was touted by KSC as the smoothest Level IV MST to date.

Years of IUE operations experience and the extensive two-gyro/FSS control system ground simulations conducted by Task 321 personnel made possible the smooth transition from an S/C emergency to in-flight verification of a new three-axis attitude control system. This followed the August 17, 1985 failure of IUE Gyro 3. During flight testing task members discovered some problems which were soon fixed by OBC software programmers. CSC's rapid progress in these critical early phases indicated that IUE would meet its 60-hour commitment for UV spectroscopy and visual imagery of comet Giacobini-Zinner during the International Cometary Explorer fly-by on September 9-11, 1985.

Personnel on Task 423 scheduled the image processing activities to best accommodate the current image processing work load, priority processing request, and C&SA projects within the reduced time available on the Sigma-9 computer. Access to the computer has been significantly curtailed due to spacecraft operations requirements since the failure of Gyro 3.

On Task 424 task management, DMC management, and IUE project management coordinated efforts to expedite the production of the IUE Annual Merged Log microfiche after problems were encountered with the GSFC Building 18 microfiche facility.

GSFC IUE Project personnel enthusiastically approved CSC's recommendation under Task 424 that the SCF IBM S/3081 computer be used in producing the cross-reference lists of IUE proposed targets. CSC had initiated a reconsideration of the matter due to improvements in the IBM facility, degradation of the Sigma-5 and Sigma-9 computers, and the increasing number of targets to be compared.

TO: D.K. West

FROM: P.M. Perry

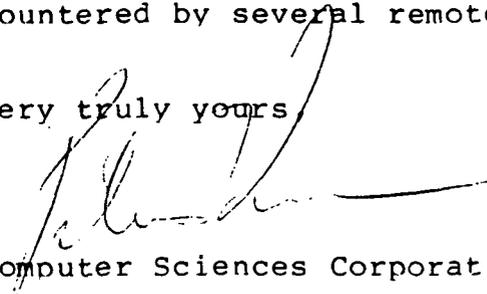
DATE: 09/15/85

SUBJECT: Monthly Report

PAGE: 3

Staff members on Task 521 provided special assistance to several users this month who were unable to complete their intended analysis. Staff members were able to provide the special assistance and normal operations support despite numerous hardware problems. These included the loss of all disk files in areas DR2 and DR3, continuing tape drive problems, 11 days of computer downtime, trouble accessing data in the IUE archives, and transmission noise problems encountered by several remote users from the west coast.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

October 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for September 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. CSC personnel on Task 123 contributed to the success of the IUE Users' Committee Meeting by collecting and distributing reports, recording meeting proceedings, and providing other forms of meeting support.

Task 221 personnel submitted two new procedures for the OPS2PRO2 procedure file to the POD. In the current two-gyro/FSS system it is possible to uplink a roll slew when the S/C is not properly configured for the maneuver. To prevent this dangerous situation from happening, a new procedure, ROLLMAN, was written for roll slews; the capability to uplink a roll slew through the procedure UPLINK was removed. A new procedure, PYSLEW, will be used to perform blind offset acquisitions with the two-gyro/FSS system.

Task 222 personnel and the CSC payload specialist traveled to KSC and assisted UIT engineers in the resolution of two long-standing hardware problems.

On Task 224 final analysis of the ZOHF adjunct files has increased our understanding of the IRAS mission and will allow a clean, flexible, versatile version of the ZOHF to be created.

On Task 229 the Atlas of Infrared Source Cross-Identifications was restructured to provide a clearer and more concise catalog.

On Task 321 CSC planned and performed the flight verification of all OBC and S/C functions needed for the resumption of normal science operations under the two-gyro/FSS control system. Task members supported critical science programs, designated new S/C tests, diagnosed problems with flight and ground software, requested software modifications, and developed new operational procedures to improve science operational efficiency. Task personnel were on duty 24 hours per day to monitor the SI and perform S/C tests and science operations and to prepare for and recover attitude after the daily earth shadows.

Also on Task 321 CSC expertise made possible the 24-hour-per-day IUE observations of Comet Giacobini-Zinner during the International Cometary Explorer (ICE) flyby. IUE provided the only earth-orbiting spectral and imaging data of the comet as ICE passed through its tail. Task members also developed and tested a new blind offset observing technique which made it possible for IUE to obtain the first spaceborne images and ultraviolet spectra of Comet Halley.

CSC provided frequent assistance on Task 423 in the form of technical discussions and magnetic tape versions of various IUESIPS software and calibration data to subcontractor personnel working under another IUE task to produce a DEC VAX compatible version of IUESIPS applications programs under another IUE task.

On Task 521 staff members loaded a record number of 1206 files for RDAF visitors and remote users this month. This exceeds the previous record of 1160 files for the month of July. By comparison, the average number of files loaded for the past two and a half years has been about 540 per month. Staff members also assisted a record number of remote users. Thirteen remote users were scheduled in September, exceeding the previous record of eight set in August. In addition to the above accomplishments, the RDAF staff provided special assistance to several users and made substantial progress on the creation and testing of the DIDL test-bed software.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrđ  
Enclosure

# COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION

(301) 589-1545

8728 COLESVILLE ROAD · SILVER SPRING, MARYLAND 20910

November 15, 1985

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Attention: Dr. Donald K. West  
Code 684.1  
Building 21, Room G-61C

Subject: Contract NAS5-27295

Dear Dr. West:

Enclosed is the monthly Progress Report for October 1985, as required by the terms of the subject contract. Please note that a glossary of acronyms is included for your convenience.

I would like to bring several task highlights to your attention. CSC personnel on Task 125 rectified several technical problems with the Hardcopy Facility hardware thereby alleviating downtime and the need for additional service calls.

Task 221 personnel conducted several tests of the fast trail technique using the two-gyro system. A trail with a rate of 120 arcseconds/second was successfully performed by backing the star up by 90 arcminutes before starting the slew across the aperture. The ability to do fast trails with the two-gyro system appears to be about the same as with the three-gyro system. Accurate fast trails are essential for obtaining spectra of Eta UMa, the fundamental absolute calibration standard.

Task 222 personnel are undertaking a study of implementing a CCD detector system for an informal proposal on upgrading the UIT telescope for possible future missions.

On Task 224 the successful implementation of AIPS routines to deconvolve IRAS maps has significantly increased the group's abilities to do good science. It also holds great promise for dealing with other kinds of images, such as those to be generated during the International Halley Watch.

TO: D.K. West

FROM: P.M. Perry

DATE: 11/15/85

SUBJECT: Monthly Report

PAGE: 2

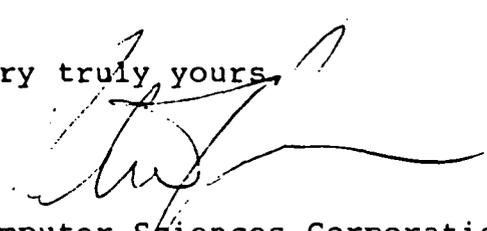
At the request of the ATR, CSC personnel on Task 227 have begun a new study of hardware and software requirements and options for the reprocessing of the IUE archives. Areas of study, including hardware requirements, image processing software compatibility and conversion effort, and future calibration enhancements, were defined and assigned priorities.

Since Task 229 was initiated in February 1985, CSC has made significant progress by adding 20,000 new data entries from about 350 journal articles to the IR data base. It is interesting to note that these entries, acquired from the 1983-84 literature, total approximately 25 percent more than those which had previously been acquired from the 1965-82 literature.

On Task 321 CSC obtained the first optimally exposed IUE low dispersion exposure of the fundamental calibration star Vega. The exposure has an effective exposure time of 0.045 seconds, the shortest IUE exposure to date and the first successful IUE trailed exposure made at the maximum trail rate of 120 arcseconds per seconds. The minimum commandable exposure time is 0.4096 seconds. The exposure was made using techniques originally developed by task personnel for the three-gyro system and suitably modified for the two-gyro/FSS control system.

Staff members on Task 521 participated in several important meetings this month which dealt with all phases of the RDAF task. Valuable input was provided by staff members in discussions with IUE project personnel, LASP personnel, and CU RDAF staff members.

Very truly yours,



Computer Sciences Corporation

Dr. Peter M. Perry  
Project Manager

PMP:mrd  
Enclosure

ORIGINAL PAGE IS  
OF POOR QUALITY

APPENDIX F - COMMENDATION LETTERS

APPENDIX F - COMMENDATION LETTERS

Reproduced herein are letters and memoranda of commendation received by CSC IUE Observatory staff members during the contract period, in chronological order.

Note that in addition to the written commendations collected here, the entire CSC IUE Observatory staff received the NASA Group Achievement Award from GSFC on December 13, 1982, and two individual CSC IUE Observatory staff members received the GSFC Outstanding Service Award on the same date.

October 13, 1982

Dr. Al Holm  
IUE Observatory  
Code 685.9  
Goddard Space Flight Center  
Greenbelt, MD 20771

Dear Dr. Holm,

I have just concluded my two observing runs at IUE for this season, and am sending this letter to express my appreciation for the excellent support I was given by all the RA's and TO's I worked with. This is particularly true for those people I worked with most, Sid Broude among the TO's and Cathy Imhoff and George Sonneborn among the RA's. Cathy Imhoff was also a great help in getting my time scheduled so I could catch my variable stars at maximum light. The other TO's I worked with (for one shift only) were Stephen Walter and Richard Wasatonic, both of whom were quite helpful.

In general I was impressed with the performance of everybody I met at IUE, and I thought I would let you know.

Sincerely,



Scott R. Baird

cc: Dr. Yoji Kondo

SRB/paw



Bowling Green State University

Physics and Astronomy  
Bowling Green, Ohio 43403  
(419) 372-2421

January 4, 1983

Dr. Albert Holm, Code 685  
IUE Program  
NASA Goddard Space Flight Center  
Greenbelt, Maryland 20771

Dear Dr. Holm,

This short note is a probably inadequate message of thanks and commendation to the IUE staff for making my recent observing visit a success. I would not have been surprised to find a reduced state of morale and performance for those who drew Christmas-season shifts, but, happily, the three operators (Steve Walter, Bill O'Donnell and Sid Broude) and the three resident Astronomers (George Sonneborn, Nancy Oliverson and Tom Ake) assigned to my shifts were uniformly pleasant, hospitable, helpful, alert and efficient.

While all six did great jobs, I want to particularly commend Nancy Oliverson, Tom Ake and Sid Broude for excellent advice on anticipated radiation levels that allowed me to obtain a successful four-hour SWP exposure of Markarian 79 during the second shift on December 27-28. Without their accurate predictions and other assistance, I would not have attempted such a difficult exposure in second shift.

I am also grateful to the staff of the data reduction group and of RDAF (particularly Keith, Ruth and Bob Panek) for seeing to it that my images were reduced and available for analysis during my short stay at Goddard.

Please pass my sincere thanks and a Happy New Year greeting along to all of the above.

Sincerely,  
  
Ronald Stoner  
Professor of Physics & Astronomy

RS/dt

xc: Dr. Yoji Kondo

April 15, 1983

To: 685.9/CSC/A. Holm  
From: 685.3/IUE Operations Scientist  
Subject: RA Staffing of VILSPA IUE Shift, 0200-1000Z, April 12, 1983

In this memorandum I wish to express my thanks to Drs. Nancy Oliverson and Tom Ake for their unscheduled, stand-in support of the IUE operation made necessary by VILSPA's inability to accept handover of the spacecraft on April 12. The Project recognizes that contributions like this are a matter of personal sacrifice and professional dedication. That such contributions have been a rule rather than an exception during CSC's years of IUE mission support was definitely a factor in your collective receipt of a GSFC Group Achievement Award this past December.

IUE science time is a valuable resource and all minimization of lost time is an important Project objective. However, I personally consider it to be especially significant that maximum unscheduled VILSPA shift support be provided in circumstances involving NASA/ESA/SERC collaborative science programs. I trust we will see future examples of the top-flight spontaneous support which has been characteristic of CSC's contributions to the IUE mission.



J. Keith Kalinowski  
IUE Operations Scientist

# ASTRONOMY PROGRAM

University of Maryland, College Park, Md. 20742

tel: 301-454-3001

TWX: 710-826-0352

13 May 1983

Dr. Edward J. Weiler  
Astronomy/Relativity Branch  
NASA - HQ  
Code SC-7  
Washington, DC 20546

Dear Dr. Weiler,

Enclosed is a brief summary of the work Paul Feldman and I carried out on the recent Comet 1983d with the IUE satellite. A somewhat less technical version has been prepared in collaboration with Yoji Kondo and will appear in various NASA in-house publications as well as in the popular press.

At this time we would like to particularly thank the staff of the IUE facility for the tremendous job they did in preparing on very short notice for these unique observations which were very difficult operationally as well as scientifically exciting. This relatively low budget satellite continues to perform exciting science long beyond its designed lifetime.

Sincerely,



Michael F. A'Hearn  
Professor

MFA:msb

Enclosures

cc: J. Brandt  
P. Feldman  
N. Hinners  
Y. Kondo

THE JOHNS HOPKINS UNIVERSITY

DEPARTMENT OF PHYSICS  
HOMewood CAMPUS  
BALTIMORE, MARYLAND 21218

May 17, 1983

Dr. Noel Hinners  
Code 100  
Goddard Space Flight Center  
Greenbelt, MD 20771

Dear Noel:

It was a pleasure to have been able to share with you the excitement of discovery during our IUE observations of comet IRAS-Araki-Alcock last week. Both Mike A'Hearn and I feel strongly indebted to the Goddard IUE management and the Computer Sciences Corporation staff members who made our success possible. Particularly deserving of our appreciation are the Resident Astronomers, who over the years have unselfishly provided excellent and innovative support for our solar system programs.

Sincerely,



Paul D. Feldman  
Professor of Physics

lb-w

XC: ✓ Dr. Yoji Kondo, Code 685  
Dr. John Brandt, Code 680  
Dr. Edward J. Weiler, Code EZ-7, NASA Hq.  
Dr. M. F. A'Hearn, Univ. of Md.

UNITED STATES GOVERNMENT

# Memorandum

TO : Dr. Y. Kondo

DATE: May 17, 1983

FROM : W. A. Feibelman

SUBJECT: IUE Data Reduction

I would like to take this opportunity to point out a remarkable feat in IUE data acquisition and processing, and to thank the entire IUE team for their expertise and efficiency. On May 5, 1983, I had a 16-hour observing session and left the observing room at about 8:30 p. m. When I returned on May 6, at about 10 a. m., the G. O. tapes were ready to be picked up and to be processed by me. at the mini-computer. The photowrites and Calcomp plots were ready soon thereafter. This truly approximates "real-time" observing. Keep up the good work!



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UNITED STATES GOVERNMENT

# Memorandum

TO : Dr. Y. Kondo

DATE: July 11, 1984

FROM : W. A. Feibelman

SUBJECT: Re-processing of IUE images

I would like to take this opportunity to comment on and thank the IUE staff for the very speedy response to our request of July 6 for re-processing four low dispersion spectra. Two stellar images were inadvertently processed as extended sources, and two nebular ones as point sources (our fault). In order to keep the entire set of 32 objects homogeneous, we felt it was important to re-process the stellar images, for a major survey paper which is now in its final typing stage.

Sometimes, when a project is in its 7th year of operation, enthusiasm, competence and morale tend to diminish. I see no evidence of this for IUE and its entire staff. The RA's, TO's, support team and RDAF are as helpful and courteous as ever.

*Walter A. Feibelman*

c. c. J. Mead



5010-110

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July 17, 1984

TO: 684.9/CSC/Barry E. Turnrose

FROM: 684/IUE Operations Scientist

SUBJECT: IUE 8th-Episode Proposal Opportunity Announcements

This memo is written to commend the exceptional assistance provided to the IUE Project by DMC personnel Corrie Etchinson, Karen Frum, Ash Ramamurty and Ming Wang (and by Dot Appleman, who coordinated the effort) in preparing the subject announcements for distribution to members of the American Astronomical Society during the week of July 2nd. This work involved preparing letters and envelopes for nearly 4000 AAS members. It was accomplished in a timely and thorough manner and resulted in dated material being mailed with a minimum of delay. The IUE Project appreciates this contribution from these members of the Science Operations Center staff.



J. Keith Kalinowski



# TUFTS UNIVERSITY

Department of Physics

October 2, 1984

Dr. J. Keith Kalinowski  
IUE Operations Scientist  
Code 684.9  
Goddard Space Flight Center  
Greenbelt, MD 20771

Dear Dr. Kalinowski,

You will be pleased to know that our simultaneous observations of YZ CMI with the IUE and the VLA were completed without problems Sunday morning, September 30. Although the VLA had to be rescheduled due to a rare IUE calibration procedure, it will not be necessary to write a letter of explanation to the VLA scheduling committee. Because we have a very good working relation with them, it is probably best to keep things at a low key and not dramatize the problem. In any event, thank you for offering to write a letter of explanation.

The IUE resident astronomer Ron Pitt was very helpful in preparing our program during U.S. Shift 1. I doubt that things would have gone so smoothly without his help - particularly in the tiring hours of the subsequent Shift 2. It was rather surprizing to find line detectability virtually disappear during the short exposures required to avoid saturation during the period of peak particle background. This limited useful data to several hours at the beginning of the run and to a few hours at the end. During the peak background radiation time we had a probability of roughly 1 in 3 of catching a flare.

Now that I have had some experience observing, let me return the attached form about remote observing and offer some comments. The opportunity to direct observations in real time is absolutely crucial. The presence of the guest observer is also very important, particularly if the person is unexperienced as I am. The educational experience and the opportunity to learn about data limitations while participating in observations is scientifically fruitful and protects the guest observer from misinterpreting data. The optional service observing mode might very well be useful after we have gained considerable experience, but the remote observing mode is not an economically feasible one for our small group.

As a final point, it would be useful to obtain updated archival information on two of our targets - YZ CMI and AD LEO. At the time that our proposal was accepted, Yoji Kondo sent the attached list of archival data for these objects. He subsequently telephoned me to ask if another

observer could observe YZ CMI, but after trying to contact him for several days I just assumed he would take my approval for granted. It would nevertheless be useful to obtain a record of observations of both YZ CMI and AD LEO during 1984. Could someone be kind enough to supply us with this information?

We will look forward to observing once again during the U.S. Shift 2 on November 7 to 10, inclusive. At that time both the Very Large Array and the Arecibo Telescope will also be observing AD LEO.

Sincerely yours,



Kenneth R. Lang  
Associate Professor of Astronomy  
Tufts University  
Department of Physics  
Robinson Hall  
Medford, MA 02155

October 4, 1984

TO: 684.9/CSC/Dawn Stone

FROM: 684/IUE Operations Scientist/Keith Kalinowski *KK*

SUBJECT: Recognition of Special Effort

We received an exemplary and commendable effort from Corinne Etchison the last two days. She assumed sole responsibility for collating the 6-year Cumulative Merged Log microfiche and inserting them into Newsletter No. 25. She worked steadily and accomplished a big job in a time that was brief relative to the size of the task, all the while evidencing a spirit not readily derived from a rote assignment. Ms. Etchison consistently demonstrates that she is a valuable and effective part of CSC's staff in the IUE Data Management Center. Her efforts are appreciated.

cc: 684.9/C. Etchison .

National Aeronautics and  
Space Administration



Goddard Space Flight Center  
Greenbelt, Maryland  
20771

1985 March 4

Reply to Attn of:

Dr. Peter Perry, Manager  
Astronomy Operations  
Computer Sciences Corporation  
8728 Colesville Road  
Silver Spring, MD 20910

Dear Dr. Perry:

The performance of the IUE observatory personnel employed by Computer Sciences Corporation has been excellent over the past seven years. However, it is perhaps appropriate to acknowledge truly outstanding performance from time to time.

The support of the IUE 8th year peer-review activities provided by the CSC staff has been superb. The credit goes to all the CSC personnel involved but the leadership, efficiency and dedication exhibited by Dr. Cathy Imhoff has been particularly noteworthy.

I would like to take this opportunity to thank you for providing the enlightened management that has enabled your staff to support so effectively the immensely successful operation of the IUE since its launch in January 1978.

Sincerely,

  
Yoji Kondo  
IUE Project Scientist

UNITED STATES GOVERNMENT

# Memorandum

TO : B. Turnrose

DATE: August 19, 1985

FROM : W.A. Feibelman

SUBJECT: IUE NEWSLETTER

I want to commend Mona Brexler for her invaluable help in putting IUE NEWSLETTER #26 and 27 (and, hopefully, many more) together. It has been a real pleasure to work with a competent, efficient, and cheerful person to get these tasks done.

*Walter A. Feibelman*  
Editor

c. c. Mona Brexler



5010-110

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National Aeronautics and  
Space Administration



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

1985 October 1

Reply to Attn of:

Dr. Peter M. Perry, Manager  
Astronomy Operations  
Computer Sciences Corporation  
8728 Colesville Road  
Silver Spring, MD 20910

Dear Peter:

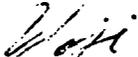
I am writing this letter to commend the outstanding performance of the IUE observatory staff, employed by Computer Sciences Corporation, at the time of the crisis caused by the failure of one of the three remaining gyros. This magnificent feat was accomplished by the CSC team led by the Resident Astronomers George Sonneborn and Cathy Imhoff and also including Ron Pitts, Nancy Evans, Nancy Oliverson and the Telescope Operators.

A minimum of three gyros are normally needed for the pointing of the telescope in three dimensional space. In fact, the X-ray satellite Einstein failed when its gyros stopped although two of them were eventually brought back to life. So, when the third gyro failure occurred three years ago leaving only three operational gyros, we immediately embarked upon an effort to develop a two-gyro pointing system, which employed the fine solar sensor (FSS) as the third frame of reference for the telescope. The task was not an easy one; however, with the participation of CSC's Al Holm, Tom Ake, Cathy Imhoff and George Sonneborn, the engineering staff of the GSFC Guidance and Control Branch and the Bendix engineers succeeded in developing the 2-gyro system.

When the fourth gyro failed on August 17, the difficult task of implementing the two-gyro system was carried out. George Sonneborn and Cathy Imhoff performed that job superbly well with the help of other competent CSC IUE observatory staff, working with the technical staff of the Control Center. Both George and Cathy exhibited exemplary professionalism and dedication. Thanks to their fine work, the IUE observatory was able to obtain, within two weeks of the gyro failure, some time-critical observations, such as the observations of Comet Giacobini-Zinner in conjunction with the ICE encounter with the comet. As of September 30, the recommissioning of the IUE has been completed and the observatory has resumed normal operations.

I would like to congratulate you on their accomplishment and thank you for providing the enlightened management that enabled the CSC personnell to work so effectively.

Very cordially,

  
Yoji Kondo  
IUE Project Scientist

cc: C. Frum  
B. Turnrose

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

Reply to Attn of: 697.

November 4, 1985

Dr. Peter M. Perry  
Project Manager  
Computer Sciences Corporation  
System Sciences Division  
8728 Colesville Road  
Silver Spring, MD 20910

Dear Dr. Perry:

I am writing to express my great appreciation for the outstanding contributions made to our IRAS research program by Dr. Richard White. Richard's expertise with image processing using the AIPS system and generally energetic efforts on behalf of our task over the past several years have made it possible for us to establish the most powerful facility in the country, and possibly in the world currently, for science analysis using IRAS image data products. This capability also made it possible for us to produce some very beautiful and interesting scientific results using the IRAS data during the first few months after they became publicly available.

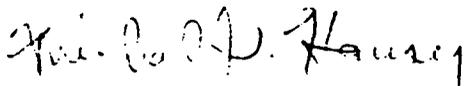
Richard began this endeavor prior to public release of the IRAS data, at which time he identified our software needs for accessing and using the IRAS products generally. He recognized the great potential of the computing resources in Division 630, and, in spite of a moderately disorganized environment for users in those facilities, quickly brought on-line the very powerful AIPS system. He also instigated the software development needed in the IBM 3081 environment for working with the low-resolution image products and various discrete source catalogs (the latter ably implemented by Marion Schmitz). The result of this aggressive development effort was that by Nov. 1984, when the IRAS products were first publicly released, all science users at Goddard had access to a very complete set of user-friendly tools and local expert guidance to support their exploration of this vast new astronomical dataset.

Richard's contributions actually extend well beyond the local environment. Because of his expertise, we have been able to take pre-release versions of most of the IRAS data products and test them for usability, accuracy, and conformity to advertised formats. Since numerous anomalies were in fact found this way, his work has been of

direct benefit both to the IRAS project, the NSSDC, and science users around the world. He has also aided the NSSDC staff directly by serving as a local expert on these products as they wrestled with the job of preparing them for wide public dissemination. He attended the first international data processing conference held by the IRAS project following public release of the data products, and helped to guide other processing centers in their efforts to establish image processing systems. He has also looked for ways in which the AIPS software system itself could be improved for users of IRAS data, and has helped to guide and encourage NRAO personnel in the development of such upgrades.

With the departure of Richard White from our program, we lose a major contributor and valued colleague. Though he has trained other colleagues to reach some degree of proficiency with these techniques and left us with voluminous documented files, we shall surely miss his thorough expertise and ability to anticipate and solve expeditiously the many challenging problems which continue to arise in our work. We hope that he finds his future endeavors as challenging, successful, and rewarding.

Sincerely,



Michael G. Hauser  
Head, Infrared Astrophysics Branch

cc: R. White

