

# An IUE RDAF Software Package for UNIX Workstations

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## 1. Introduction

A software package for the analysis of observations made by the IUE satellite is now available for UNIX (Sun OS and DEC Ultrix) workstations from the Regional Data Analysis Facilities (RDAFs) at NASA/GSFC and the University of Colorado. This package is based on the existing IUE RDAF VAX/VMS software written in the Interactive Data Language (IDL) and currently consists of approximately 155 IDL procedures and related databases.

The bulk of this software is made up of the IDL procedures most commonly used at the GSFC and CU RDAFs. Approximately half of these routines are applicable to both IUE and general astronomical data reduction. Many of these procedures present the user with an interactive, menu driven interface, and can be run from workstation monitors using SunView or DECwindows as well as from Tektronix compatible graphics terminals. Also included are procedures which facilitate tape handling, data file transfer, and the display and manipulation of IUE image files.

The following sections give a brief overview of the software package, discuss the available documentation, and describe the format for the software distribution.

## 2. Overview

This software package is based on the existing VAX/VMS RDAF software currently available at the IUE RDAFs and retains many of the most commonly used RDAF routines. It includes procedures which allow spectral extraction and the basic reduction and measurement of IUE data. Another important class of procedures which are available in UNIX RDAF software are those which assess IUE data quality. Figure 1 is a sample plot made by the UNIX software package which should look familiar to experienced users of the VMS RDAF software. Along with a plot of an extracted low dispersion spectrum, it contains a summary of the information in the IUE label and marks points of questionable data quality (in this case, *reseau*) with "X's".

The UNIX RDAF software package also includes procedures which provide a number of additional capabilities important in a windowing workstation environment. Several of these new procedures, briefly outlined below, are based on software contributed by George Sonneborn, John Clarke, and members of the RDAF staff. Further documentation is provided in the prologs for the individual procedures and in the supplemental documentation described in the following section.

### 2.1. Data File Transfer

IUE label and data (.lab and .dat) files can be transferred over the network from a VAX to a Sun or DEC workstation using, for example, ftp in binary mode, or other transfer programs which handle binary files. Once on a workstation, these files must be converted to the proper internal data type representations before they can be subjected to any further processing. This conversion can be accomplished using the new RDAF routine "con\_go". Other conversions of binary files of specific data types can be performed using the new procedure "dtrans".

Alternatively, IUE GO format tapes can be copied directly to disk using a new version of the RDAF routine "iuecopy" designed for UNIX workstations. Disk files created with "iuecopy" do not require the data type conversion described above.

## 2.2. Image Display

The "rdz", and "lblfix" image display routines are also included in the UNIX RDAF software package and must be run from the workstation monitor using SunView or DECwindows.

The procedure "rdz.pro" allows an interactive examination of IUE image files (e.g. raw, pi and lbl files) and is extremely useful for assessing IUE data quality. It is intended in part, as an alternative to a simple visual inspection of an IUE image photowrite. This procedure displays the image in the graphics window with the graphics cursor activated. The pixel coordinates and values under the cursor are displayed and continuously updated in the text window. For IUE line-by-line files, wavelength and order number can be optionally shown instead of x and y pixel coordinates. Portions of the image can then be selected interactively and enlarged by an adjustable factor.

The procedure lblfix.pro allows the user to interactively replace bright spots or cosmic ray hits in an IUE line-by-line file. The routine is menu driven and makes extensive use of the IDL function "wmenu". The output file has the same format as the input file but contains the changes to the flux and epsilon data arrays made by the user during the execution of the procedure. This file can then be used with other RDAF routines to produce an extracted spectrum file.

## 2.3. Reference Data

The UNIX RDAF software is distributed with three databases, the IUE standard star catalog, the IUE UV flux catalog, and a UV atomic line list. Kurucz model atmosphere fluxes are also included in the distribution. This data can be accessed as described in the VMS user's tutorial. The IUE merged log, however, is not included with the software package. Currently, a special guest account on the IUE VAX can be used remotely via Internet, SPAN, or dial-up modems for merged log searches. The NASA Astrophysics Directory Service will also provide this service for remote users and is scheduled to become operational in late 1990.

## 3. Documentation

Extensive documentation for this software package exists in the form of prologs for the individual IDL procedures. These are available for on-line access through the IDL routine "doc\_library" and include summaries of the procedure's function and design, detailed descriptions of the calling parameters, and examples of usage. Further documentation for the UNIX RDAF routines can also be found in the manuals directory included with the distribution files. This directory contains text files with general introductory documentation, supplemental discussions of some of the more complex RDAF procedures, and information specific to the topics of file conversion and tape handling under the UNIX operating system.

No user's tutorial for this UNIX IDL software package is presently available. However, the procedures that are described in the tutorial for the VAX/VMS software, the "IUE RDAF User's Tutorial Manual" (RDAF Staff, June 1989), are available, for the most part, in the UNIX software package. The differences between the UNIX and VMS RDAF software are largely those dictated by the differences in the operating systems' handling of file names and I/O. Also, the UNIX RDAF software is built on "C-based" IDL which uses key words and system variables which usually differ from those used in the VMS RDAF software built on "FORTRAN-based" IDL. In general, these differences are fairly straight forward and the UNIX RDAF package was designed to be used in as similar a manner as possible to the

existing VMS RDAF software. It should therefore function in a familiar way for experienced RDAF users and the existing VMS tutorial should also serve as a reasonably effective guide to the UNIX RDAF package for new users. The files needed to create a LaTeX version of the VMS RDAF tutorial are located manuals directory. Copies of the tutorial are also available through the IUE RDAF.

#### 4. Distribution

The IUE RDAF UNIX software package is presently available on magnetic tape as two files intended to be read with the UNIX "tar" command. The first file contains the IUE RDAF distribution of IDL data analysis procedures, data files, and documentation for SUN or DEC workstations. The second file contains, the IUE standard star, UV flux catalog, and UV atomic line databases. The disk space requirements for these files are approximately 5 and 25 megabytes respectively.

This software is distributed free, courtesy of the IUE Regional Data Analysis Facility. Requests for this software package should be directed to one of the following individuals.

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