EUV IMAGING SPECTROMETER
Hinode

EIS SOFTWARE NOTE No. 25

Version 1.0 31 July 2020

How to search for and download EIS files from IDL

Peter Young
NASA Goddard Space Flight Center
Greenbelt, MD 20771
U.S.A.

1 Overview

This document describes how to search the EIS archives for specific types of data and then download the files to your machine, all by using IDL commands.

2 Before you start

The software makes use of the routine `eis_ingest` to automatically put the downloaded EIS files into an organized directory tree. Please check out Sect. 4 of EIS Software Note No. 18 for how to set IDL environment variables so that the ingestion process works correctly.

3 Searching for EIS data

The key IDL routine to use is `eis_obs_structure`, which was briefly described in EIS Software Note No. 19. It returns an IDL structure containing metadata about the EIS files that match the query parameters.

There are two basic ways of using the routine: (1) by time, and (2) by raster acronym. The first is:

```
IDL> s=eis_obs_structure(t0,t1)
```

where t0 and t1 are times given in any standard Solarsoft format. The structure will contain information about all EIS data-sets obtained between the two times.

The second call is:

```
IDL> s=eis_obs_structure(rast_acr=rast_acr)
```

where `rast_acr` is the raster acronym. *Be aware that the raster acronym is not the study acronym!* A study consists of one or more rasters, although mostly it will be a single raster. If you know the study acronym, then do:

```
IDL> eis_xstudy
```

which will bring up a GUI listing all of the EIS studies. If you select a study, then the window at the bottom of the GUI will now show the rasters for that study. The window will display the raster acronym. It is this acronym which needs to be input to `eis_obs_structure`.

(`eis_obs_structure` also has the optional input `study_acr=` for inputting the study acronym but this is much, much slower due to how the EIS databases are structured.)

Try setting `rast_acr=atlas_60`, which searches for one of the EIS spectral atlas studies that is run regularly. Despite searching the entire EIS database, you will notice that the call is very fast.

The structure output by `eis_obs_structure` is an array, with one entry for each raster. For example, the EIS planner may have scheduled a study (consisting of a single raster) to run at 10:00 UT, and specified that the study is repeated 20 times. This results in 20 rasters. The output from `eis_obs_structure` for this observation will be a structure array of 20 elements.

4 Additional search filtering

Once the observation structure has been created by `eis_obs_structure`, you can perform additional filtering with the routine `eis_filter_obs_struc`. Some examples are:

```
IDL> s2=eis_filter_obs_struc(s,/narrow)
IDL> s2=eis_filter_obs_struc(s,slit_index=1)
IDL> s2=eis_filter_obs_struc(s,xcen=[-200,200])
IDL> s2=eis_filter_obs_struc(s,ycen=[800,1100])
```

The first keeps only narrow slit data (i.e., the 1" and 2" slits); the second keeps the 266" slot data[1]; the third keeps only rasters with xcen values between -200 and 200; and the fourth keeps only rasters with ycen values between 800 and 1100.

Perhaps the most powerful filter is for wavelength. For example:

```
IDL> s2=eis_filter_obs_struc(s,wvl=[184.54,275.36])
```

will return only those rasters that contain both the Fe X λ184.54 and Si VII λ275.36 emission lines. Note that this checks if any of the wavelength windows contain these lines. For example, if a window extends from 184.50 to 186.50 Å then it will be flagged even though the λ184.54 line is right at the edge of the window.

5 Download the files

Once you have filtered the observation structure, you can then download the files from the VSO by doing:

```
IDL> eis_vso_download_files,s
```

This routine calls `eis_ingest` to correctly place the files in your EIS data directory tree.

[1]The EIS slits have indices 0,1,2,3 corresponding to the 1",266",2" and 40" slits.

A Document modification history

Version 1.0, 31-Jul-2010: First version.