Extending the Virtual Solar Observatory (VSO) to Incorporate Data Analysis Capabilities (III)

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The VSO organizes access to integrated data resources. But many data sets require pre-processing capabilities before they can be used. And once everything is downloaded, display tools are required to support integrated analysis. Our IDL/SolarSoft tools do precisely this. Here is how.

SEARCH VSO

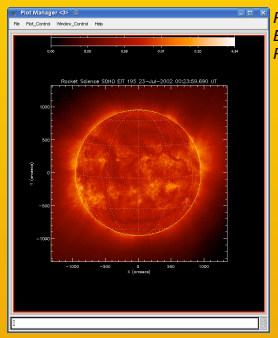
```
IDL>time='23-Jul-2002 ' + ['00','02']
IDL>files=vso_search2(time[0], time[1],inst='EIT')
```

vso_search2 connects to the VSO to search for solar data. In this specific case, EIT images in the given time interval are searched and the URLs of the images are returned.

PREPROCESS DATA FOUND ON VSO

```
IDL>psb = obj_new("idlprepserverbridge")
IDL>eit_image = psb->getPrepEIT(files[3].url)
IDL>psb->writeDataToFile, eit_image, 'eit_image.fits'
```

An EIT image is chosen from the list of URLs and sent to the preprocessing server. The processed image is returned back. The utility PLOTMAN is used to display it.

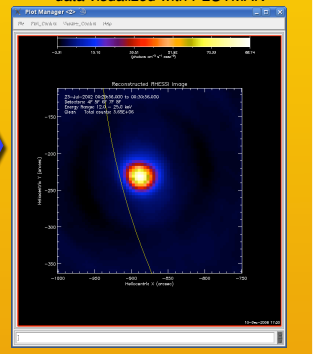


Remotely preprocessed EIT data visualized with PLOTMAN

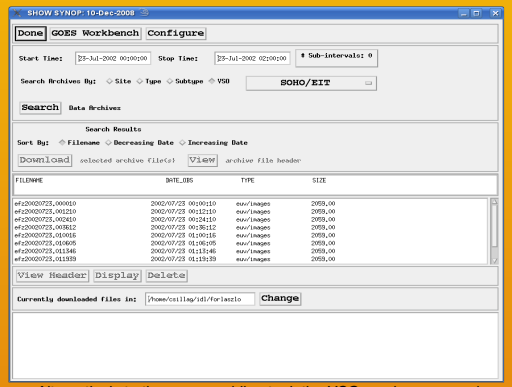
ACCESS THE PREPROCESSING SERVER DIRECTLY

```
IDL>img = psb->createRHESSIImage(time[0],
                                 time[1])
IDL>rfile = 'hsi_image.fits'
IDL>psb->writeDataToFile, img, rfile
```

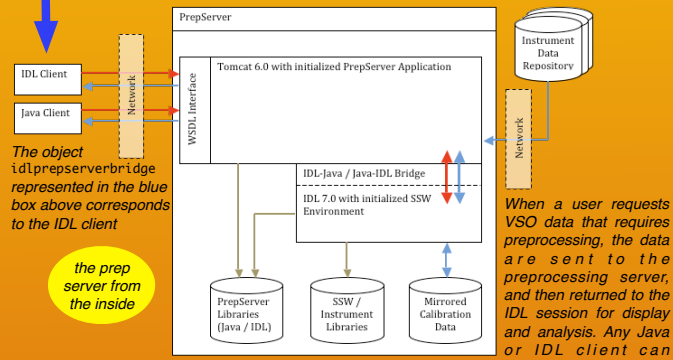
A RHESSI image is created according to the parameters passed to the server, and stored in a local file.



Remotely preprocessed RHESSI data visualized with PLOTMAN



Alternatively to the command-line tool, the VSO can be accessed from IDL with the SHOW_SYNOP Graphical User Interface



The object idlprepserverbridge represented in the blue box above corresponds to the IDL client

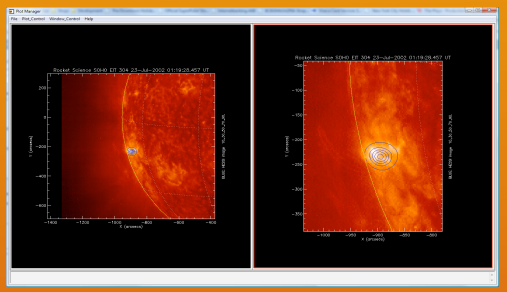
the prep server from the inside

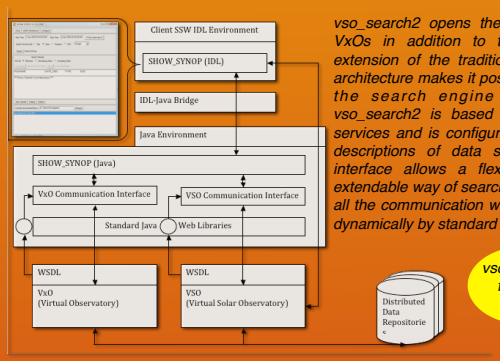
When a user requests VSO data that requires preprocessing, the data are sent to the preprocessing server, and then returned to the IDL session for display and analysis. Any Java or IDL client can connect to the server.

OVERLAY THE DATA WITH PLOTMAN

```
IDL>rhessi = obj_new('rhessi')
IDL>rhessi->read, rfile
IDL>eit = obj_new("eit")
IDL>eit->read,
'20020329122405_eit_image.fits, eit
IDL>p = plotman(input=rhessi, plot_type='image',
                desc='HESSI image')
IDL>p->new_panel, input=eit, plot_type='image',
                desc='EIT image'
```

RHESSI (countours) and EIT overlays

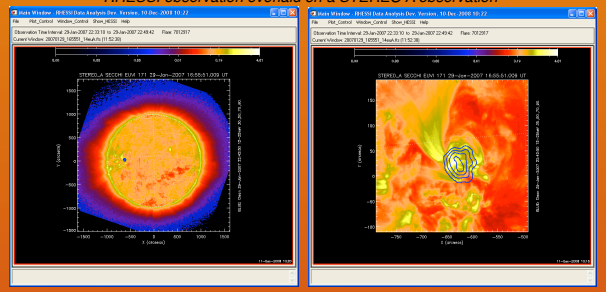




vso_search2 opens the door to accessing VxOs in addition to the VSO. It is an extension of the traditional vso_search. Its architecture makes it possible to easily adapt the search engine to other VXOs. vso_search2 is based on Java and Web services and is configured based on WSDL descriptions of data sites. The Java-IDL interface allows a flexible, dynamic, and extendable way of searching the VSO, where all the communication with VSO is managed dynamically by standard Java tools.

vso_search2 from the inside

RHESSI observation overlaid on a STEREO A observation



OVERLAY WITH PLOTMAN ADVANCED IMAGE CAPABILITIES

PLOTMAN support co-registration of solar disk observations from different orbital view angles, position angles, and distances — such as from the twin STEREO spacecraft.

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