

The AVO Prototype

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Abstract. The Astrophysical Virtual Observatory (AVO) prototype is a suite of tools that serves as a testbed for scientific and technical use cases. For instance, it supports the Simple Image Access (SIA) protocol, hierarchical browsing based on the IDHA data model and fully exploits the potential of Unified Content Descriptors (UCD).

Each of the software components of the AVO prototype is developed and maintained by a different team in a different country. All modules work stand-alone, but can be integrated. The AVO prototype consists of a browser backed by image and catalogue servers, a web service for the identification of sources in FITS images and a utility for analyzing the spectral energy distribution.

1. Introduction

The AVO¹ is a research and demonstration programme jointly funded by the European Commission and six European organizations. The partner organizations are the European Southern Observatory (ESO), the European Space Agency (ESA), AstroGrid (funded by PPARC as part of the UK's E-Science programme), the CNRS-supported Centre de Données Astronomiques de Strasbourg (CDS), the University Louis Pasteur, the CNRS-supported TERAPIX astronomical data centre and the Jodrell Bank Observatory. The AVO project is working in conjunction with other international VO efforts as part of the International Virtual Observatory Alliance² (IVOA).

2. Overview

The AVO prototype is a set of tools that initially consisted of three components (fig. 1, fig. 2):

- The Aladin type of interface for metadata discovery and visualization
- The Astronomy Catalogue Extractor (ACE)
- The Spectral Energy Distribution (SED) utility

¹<http://www.euro-vo.org/>

²<http://www.ivoa.net/>

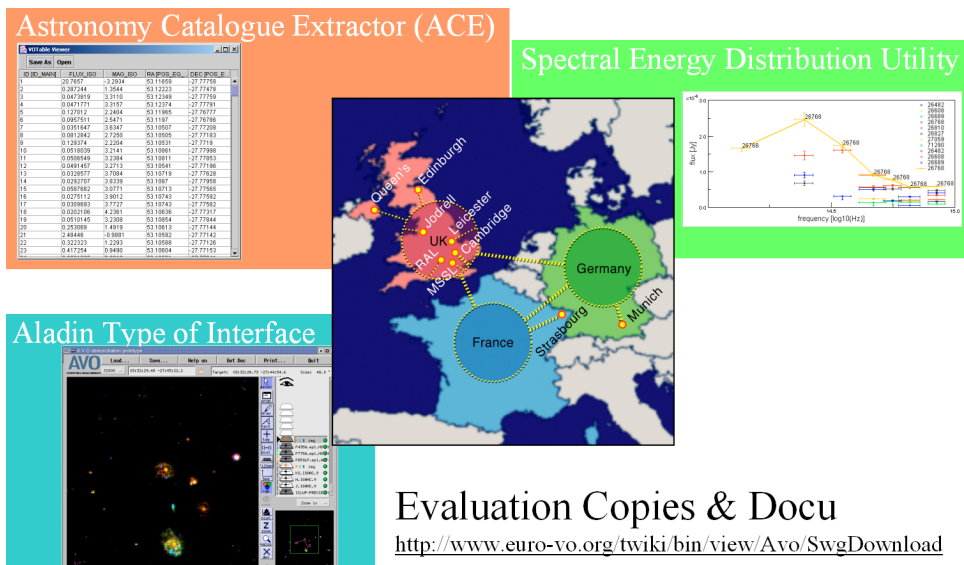


Figure 1. AVO software components.

Recently VO-India contributed the VOTable plotter VOPlot and further work continues, for instance, into a cross matching facility.

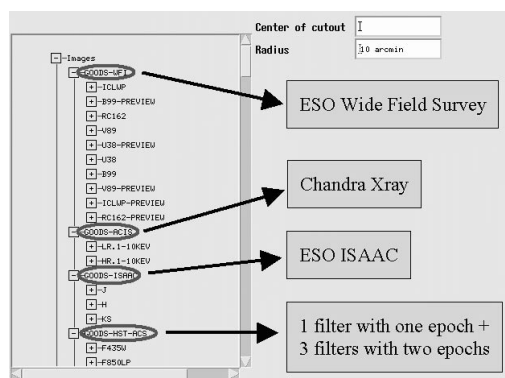


Figure 2. Hierarchical tree of available data for given patch of sky.

3. VOTable & UCD

The various modules exchange information in UCD tagged VOTable format (fig. 3). Although often compared to the FITS format its scope is much wider and the format far more versatile. Uniform Content Descriptors (UCDs) are meta data to describe astronomical parameters. UCDs are arranged in a hierarchical tree. UCDs and extensions thereof will soon form the basis of a meta data standard for expressing meaning in astronomical terms in a system independent way.

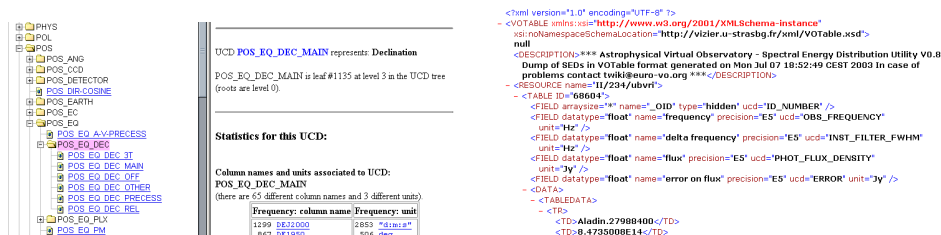


Figure 3. Part of UCD tree(left) and VOTable snippet describing SEDs (right).

4. Scientific Scenarios

At various occasions scientists demonstrated the unique capabilities of the toolset using a number of scientific scenarios such as the identification of super nova candidates, the investigation of the high redshift environment in the GOODS fields and the multi-waveband analysis of radio observations in the HDF-N and HFF.

Several colour catalogues provided by the ESO Imaging Survey (EIS), source catalogues from Chandra, ISO, VLA etc. in conjunction with images listed in tab. 1 helped in detecting peculiar objects.

Table 1. Spectral coverage of investigated region.

Organization	Observ./Instr.	Bands
MPG/ESO	2.2m/WFI	U,B,V,R,I
ESO	VLT/ISAAC	J,H,K
NASA/ESA	HST/ACS	B,V,i,z
NASA	Chandra/ACIS	0.1 - 10 KeV
NRAO	VLA	1.4 & 8.5 GHz
UMAN/JBO	MERLIN	1.4 GHz

5. Future

The next round of demos will focus on adding support for spectroscopic data and opening the system to arbitrary data providers. This entails the specification and adaptation of the simple spectrum access (SSA) protocol. A geometric cross matching capability will be added. Various new scientific scenarios are driving the current development which will result in a new release in January 2004.

Acknowledgments. The Astrophysical Virtual Observatory was selected for funding by the 5th Framework Programme of the European Community for research, technological development and demonstration activities, contract HPRI-CT-2001-50030.