WA2, Interoperability

SWG meeting

Garching, January 28th, 2004

Second year overview (1)

- Work program for second year:
  - Running of tests and evaluation of results
  - Implementation of new functionalities

    (information discovery tool - metadata, cross-identification functions)

Second year overview (2)

- Prototype development for science demos
  - July 2003 (IAU GA)
  - On-going: January 2004
- Implementation of new functionalities in the services
- Visit of scientists for science tests

Second year overview (3)

- Interoperability standards
  - Fifth interoperability meeting in Strasbourg (120 participants)
  - Active participation to the development of standards, in particular UCD, VOTable, DAL, Data Model, Web Services

Second year overview (4)

- International aspects
  - Collaboration with VO-India on VOPlot development
  - Implementation of links to international archives in VizieR/Aladin

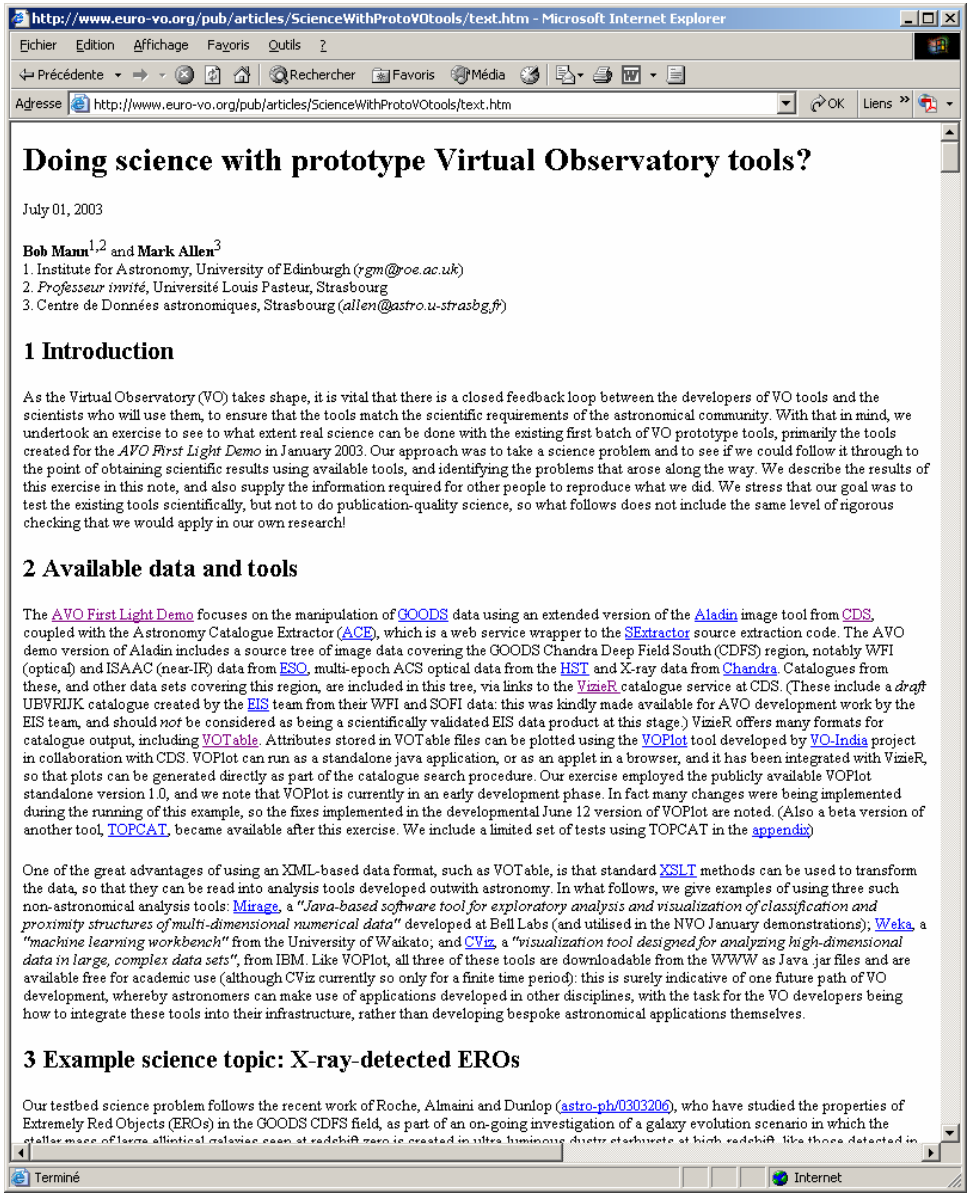
WP2.1 Inclusion of archives in the interoperability system

In collaboration with the data centres

- Active links to ISO, ISO
- SIAP compatibility
- International archives: MACHO in VizieR, CGPS in Aladin

WP2.2 Running of tests and evaluation of results

- Demos
- Visits to CDS on Associate Professor positions: R.G. Mann (Edinburgh), M. Kontiza and E. Kontizas (Athens) – science use cases
- E.g. tests of VOPlot beta version, input on ergonomics and functionnalities



http://www.euro-vo.org/pub/articles/ScienceWithProtoVOtools/text.htm - Microsoft Internet Explorer

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Doing science with prototype Virtual Observatory tools?

July 01, 2003

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1 Introduction

As the Virtual Observatory (VO) takes shape, it is vital that there is a closed feedback loop between the developers of VO tools and the scientists who will use them, to ensure that the tools match the scientific requirements of the astronomical community. With that in mind, we undertook an exercise to see to what extent real science can be done with the existing first batch of VO prototype tools, primarily the tools created for the *AVO First Light Demo* in January 2003. Our approach was to take a science problem and to see if we could follow it through to the point of obtaining scientific results using available tools, and identifying the problems that arose along the way. We describe the results of this exercise in this note, and also supply the information required for other people to reproduce what we did. We stress that our goal was to test the existing tools scientifically, but not to do publication-quality science, so what follows does not include the same level of rigorous checking that we would apply in our own research!

2 Available data and tools

The AVO First Light Demo focuses on the manipulation of GOODS data using an extended version of the Aladin image tool from CDS, coupled with the Astronomy Catalogue Extractor (ACE), which is a web service wrapper to the SExtractor source extraction code. The AVO demo version of Aladin includes a source tree of image data covering the GOODS Chandra Deep Field South (CDFS) region, notably WFI (optical) and ISAAC (near-IR) data from ESO, multi-epoch ACS optical data from the HST and X-ray data from Chandra. Catalogues from these, and other data sets covering this region, are included in this tree, via links to the VizieR catalogue service at CDS. (These include a *draft* UBVRIJK catalogue created by the EIS team from their WFI and SOFI data: this was kindly made available for AVO development work by the EIS team, and should *not* be considered as being a scientifically validated EIS data product at this stage.) VizieR offers many formats for catalogue output, including VOTable. Attributes stored in VOTable files can be plotted using the VOPlot tool developed by VO-India project in collaboration with CDS. VOPlot can run as a standalone java application, or as an applet in a browser, and it has been integrated with VizieR, so that plots can be generated directly as part of the catalogue search procedure. Our exercise employed the publicly available VOPlot standalone version 1.0, and we note that VOPlot is currently in an early development phase. In fact many changes were being implemented during the running of this example, so the fixes implemented in the developmental June 12 version of VOPlot are noted. (Also a beta version of another tool, TOPCAT, became available after this exercise. We include a limited set of tests using TOPCAT in the appendix)

One of the great advantages of using an XML-based data format, such as VOTable, is that standard XSLT methods can be used to transform the data, so that they can be read into analysis tools developed outwith astronomy. In what follows, we give examples of using three such non-astronomical analysis tools: Mirage, a *"Java-based software tool for exploratory analysis and visualization of classification and proximity structures of multi-dimensional numerical data"* developed at Bell Labs (and utilised in the NVO January demonstrations); Weka, a *"machine learning workbench"* from the University of Waikato; and CViz, a *"visualization tool designed for analyzing high-dimensional data in large, complex data sets"*, from IBM. Like VOPlot, all three of these tools are downloadable from the WWW as Java .jar files and are available free for academic use (although CViz currently so only for a finite time period): this is surely indicative of one future path of VO development, whereby astronomers can make use of applications developed in other disciplines, with the task for the VO developers being how to integrate these tools into their infrastructure, rather than developing bespoke astronomical applications themselves.

3 Example science topic: X-ray-detected EROs

Our testbed science problem follows the recent work of Roche, Almaini and Dunlop (astro-ph/0303206), who have studied the properties of Extremely Red Objects (EROs) in the GOODS CDFS field, as part of an on-going investigation of a galaxy evolution scenario in which the stellar mass of large elliptical galaxies seen at redshift zero is created in ultra-luminous dusty starbursts at high redshift, like those detected in

Terminé Internet

ASTROPHYSICAL VIRTUAL OBSERVATORY

WP2.3 Implementation of new functionalities and standards (1)

New functionalities

- Implementation of several functions developed for the AVO demo in Aladin public s/w
  - hierarchical data tree
  - Filters (using in particular UCD)
  - More flexible plane stack
  - VOPlot plug-in
- As expected in WA2 program, prototype cross-id tool
- Example of feedback: image registration in Aladin (P. Leahy at Jan. 2003 demo)

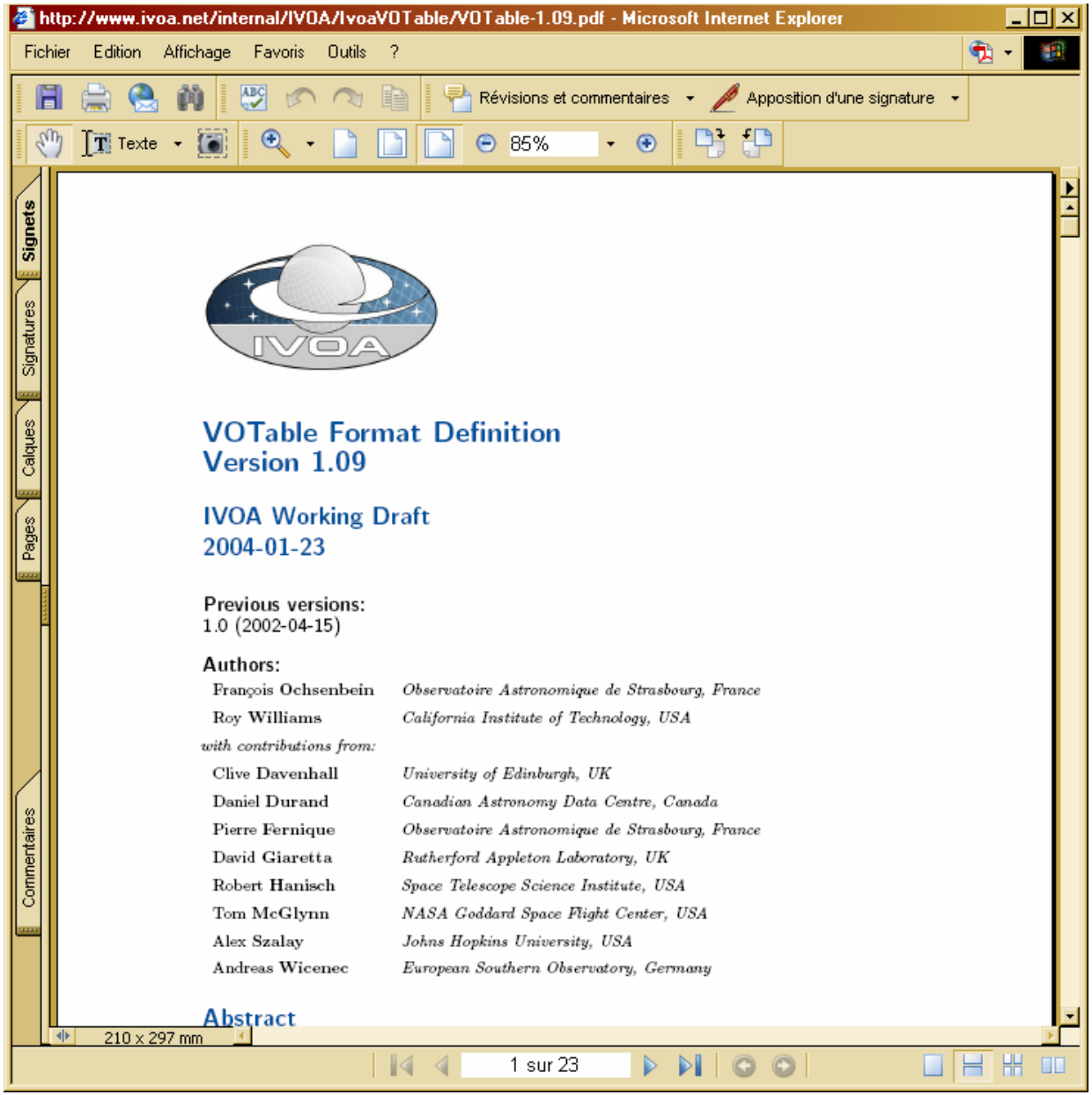
WP2.3 Implementation of new functionalities and standards (2)

Interoperability standards

- UCD
  - Now under responsibility of an international Steering Committee chaired by R. Williams
  - A huge work to check and prune the UCD tree (S. Derriere, A. Preite Martinez, F. Ochsenbein)
  - UCD2: too far from data managers needs, UCD1+ being discussed
  - Development of assignment tool
  - Implementation in VizieR and Aladin (filters)

WP2.3 Implementation of new functionalities and standards (3)

- VOTable
  - An essential element of the international VO demos
  - F. Ochsenbein is now in charge of the VOTable IVOA WG. New version in discussion
  - VOTable 'lite' parser SAVOT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VOTable Format Definition
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1.0 (2002-04-15)
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Abstract
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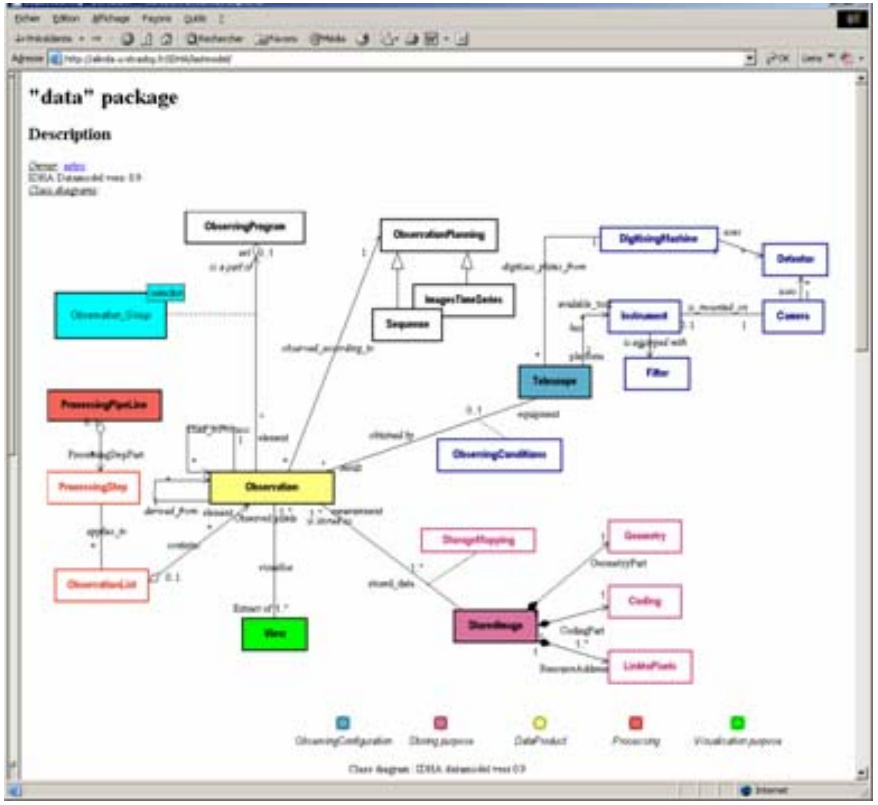
WP2.3 Implementation of new functionalities and standards (4)

- Data Access layer

  Hierarchical data tree used in AVO demos (and now in Aladin) from the IDHA data model

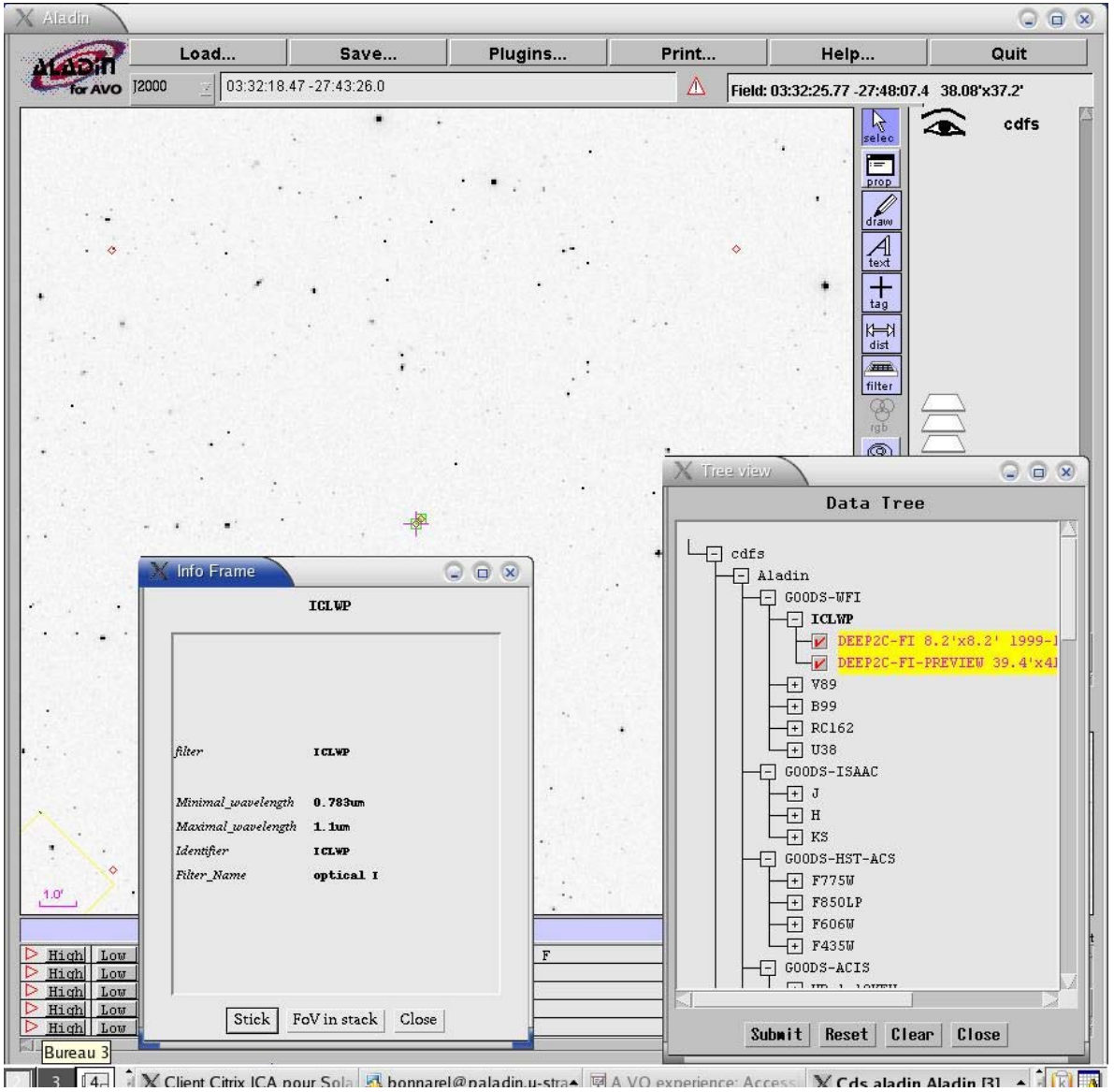
The IDHA data model

http://alinda.u-strasbg.fr/IDHA/lastmodel/



Data structuration
and metadata

A view of IDHA
data model
in the AVO demo



WP2.3 Implementation of new functionalities and standards (5)

- Web Services
- Also: a SOAP 'lite' library

ASTROPHYSICAL VIRTUAL OBSERVATORY

WP2.4 Evaluation of interoperability tools

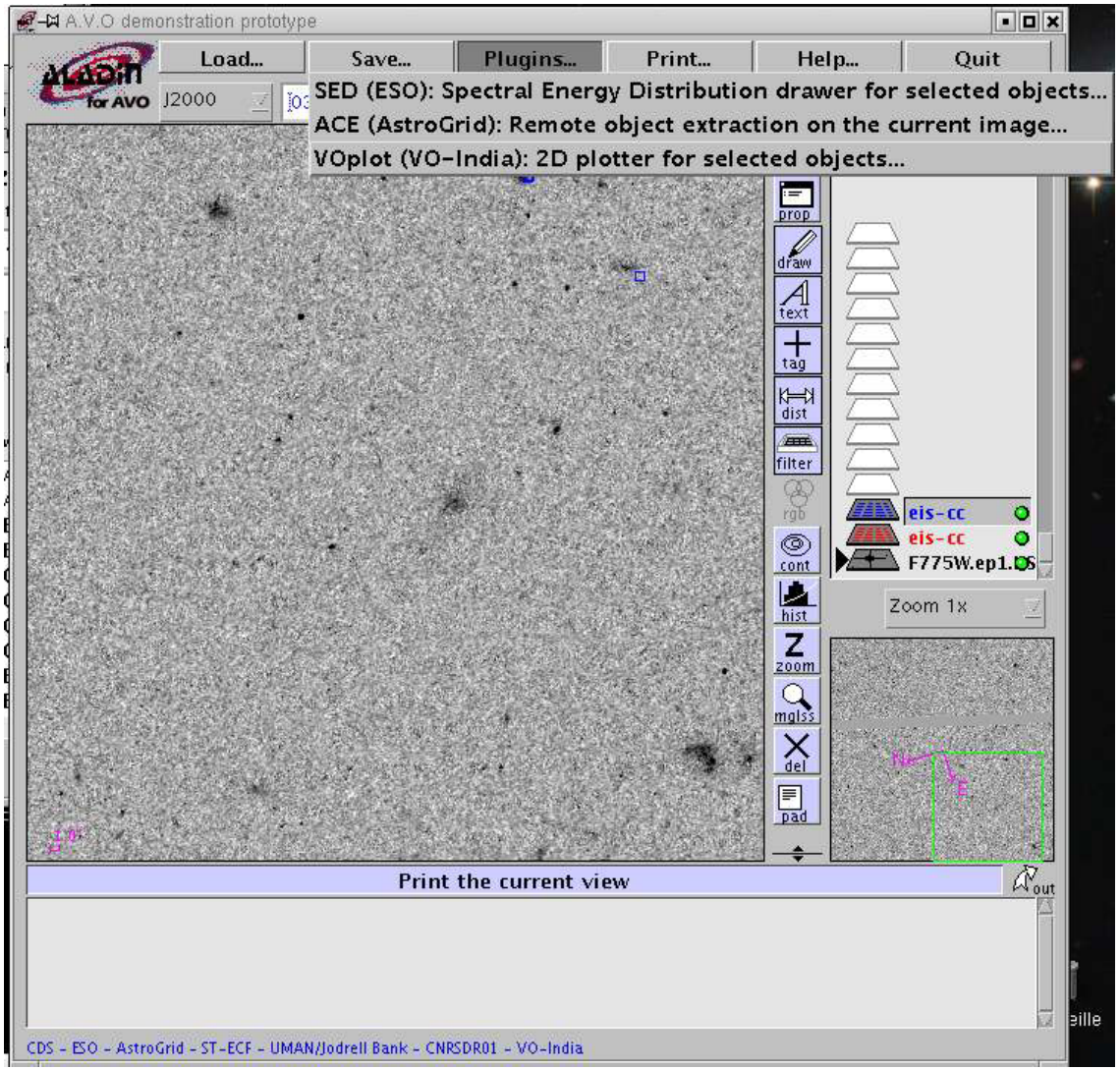
- Cf Mann/Allen's report

July 2003 IAU demo

- International aspects
  - Connection with VOPlot (ExtApp interface)
  - Compatibility with SIAP (client/server)
  - Inclusion of MACHO in VizieR
- Also
  - ‘Clean’ plug-in: SED integration with ExtApp
  - Support JVM 1.4 to integrate ACE
  - Metadata tree fully integrated in forms
  - Improvement of filter interface

SIA interface

Plug-in


A.V.O demonstration prototype
Load...
Save...
Plugins...
Print...
Help...
Quit
for AVO
J2000
SED (ESO): Spectral Energy Distribution drawer for selected objects...
ACE (AstroGrid): Remote object extraction on the current image...
VOplot (VO-India): 2D plotter for selected objects...
prop
draw
text
tag
dist
filter
rgb
cont
hist
zoom
mglss
del
pad
eis-cc
eis-cc
F775W.ep1.05
Zoom 1x
Print the current view
out
CDS - ESO - AstroGrid - ST-ECF - UMAN/Jodrell Bank - CNRSDR01 - VO-India

January 2004 demo (1)

M. Allen, T. Boch, F. Bonnarel, L. Cambrésy, S. Derriere, P. Fernique, F. Genova, A. Schaaff, F. Ochsenbein

- Active participation to the demo science definition – extragalactic and galactic case
- Data inclusion
  - Catalogues in VizieR
  - ACS, CGPS in Aladin
  - Links to the proper ISO, XMM data

January 2004 demo (2)

- Many technical developments
  - Spectral data
    - metadata for spectra and data cube in the metadata tree
    - Specview integration with Aladin and VOPlot
  - « Add a column » function
  - Prototype cross-match tool, and its integration with Aladin as plug-in
  - Management of CGPS data in Aladin (data cube)
  - Also: VizieR OAI repository for the registry international demo (operational)
  - Also: image decompression on a PC cluster