Late Submitted Posters

P.161 New features of the Spectrum Services for the Virtual Observatory

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Abstract. We present the new version of Spectrum Services for the Virtual Observatory. The two year long development period led to a reconsidered user interface, more available datasets, and several scientific functions. Currently available datasets include observed spectrum catalogs (SDSS DR1-DR4, 2dF), as well as simulated or theoretical catalogs (such as Charlot 100k spectrum library, BaSeL stellar library).

Spectrum Services are redesigned to allow seamless integration of different remote data archives via web services, allowing researchers to query the large spectrum databases parallel. The new user interface allows easy sorting of search results and retrieval of the required data in several data formats. We also made a preview implementation of the preliminary IVOA standard of the Simple Spectrum Access protocol.

Newly available scientific functions include generation of composite spectra, dereddening and calculation of synthetic magnitudes convolving with band pass curves of optical instrument filters to generate simulated photometric catalogs on-the-fly. The most important services are the continuum and spectral line fitting functions which are available for the researchers through the web user interface and through the SOAP web services programmatically. When fitting continuum, different template sets can be chosen including Bruzual-Charlot 03 templates and the SDSS 450k eigenspectra).

MySpectrum is a cross-platform version of the spectrum web service to set up your own spectrum repository. It integrates into the main service allowing easy access for the VO community to your data.

P.162 From Telescopes to Users: Optimized Dataflows for New Science Opportunities

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CADC

Abstract. Dramatically shrinking the time between data acquisition at the telescope and its availability to users is key in enabling new science opportunities that seek to explore real-time properties of astrophysical phenomena such as moving objects, supernovae and gamma-ray bursts. Despite great geographical distances which may separate telescopes, data centers and user communities, data can now flow from telescope to its end-user community within a few hours (instead of a few weeks) from acquisition. Using the CFHT Legacy Survey as an example, we show how improvements to every component of the integrated science dataflow can achieve the necessary time savings . Network data transfers and vastly expanded storage capacities allow data centers to automatically distribute data to users through "push/pull" mechanisms. Rather than selecting and requesting data through web forms, users can now implement agents that monitor new data arrivals of interest. Direct programmatic access to storage systems through commonly-used protocols means that users are no longer required to store data locally for their analyses. Image cutout services also allow users to retrieve subsets of pixel data tailored to their goals. This optimized dataflow infrastructure has been used to support new VO-centric exploration systems based on space, time and wavelength.

P.163 APECS - The Atacama Pathfinder Experiment Control System

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Abstract. APECS is the distributed control system of the new Atacama Pathfinder EXperiment (APEX) Telescope, located at the Llano de Chajnantor at 5100m in the Atacama desert in northern Chile. APECS is based on the ALMA Common Software (ACS) and the Test Interferometer Control Software (TICS). ACS provides the CORBA-based middleware communication layer to interface the hardware components to APECS. TICS provides the basic CORBA objects for antenna control, coordinate systems and patterns.

We have added a layer on top of ACS and TICS to provide a UDP socket based communication protocol between the embedded instrument control systems and CORBA. The interfaces for common instruments such as frontends and backends are kept generic so that new devices can be easily added. The CORBA side of the interfaces is automatically generated from the (IDL) interface files. We have developed generic Python simulators to be able to run APECS for tests and developments without the need for real hardware.

The observer level of APECS provides a Python-based scripting language for observing, the central Observing Engine to coordinate all devices and processes, the online MBFITS raw data writer and the online data calibrator to automatically perform the atmospheric corrections and provide CLASS (Gildas software) data with a T_A^* temperature scale. In addition to that, there are a number of monitoring tools to see the antenna positions, scan status, the Sun avoidance zone and the values and possible alarm states of all available monitor points. An automatic observing logging tool and an observer control GUI are under development.

Overall, APECS now provides a fully featured single-dish telescope observing system that supports the standard observing modes like calibration, pointing, focussing, on-offs, pointed rasters and on-the-fly mapping. Special modes for bolometers and heterodyne array receivers will be added when those instruments are delivered to APEX.

P.164 AstroGrid Virtual Observatory System Demonstration

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Abstract. AstroGrid, currently creating the UK's Virtual Observatory (VO), will demonstrate its current release v1.1 operational system
(see http://www.astrogrid.org/release). The demo will illustrate the key capabilities available to the end user scientists through the AstroGrid v1.1 system release. This will include discussion of applications and data, how to access them, and how to develop both simple and powerful systems to both discover and manipulate data with the applications in the VO.

Additionally, information will be available on the demo stand about the AstroGrid v1.1 software release (see http://software.astrogrid.org) which will be of relevance to resource providers. This will cover how a provider is able to obtain, install and locally configure the AstroGrid system (all or elements of) to make their data and applications available to the wider VO.

Finally, AstroGrid will be demonstrating the use of a number of new technical solutions allowing authorised access to resources, including an interoperability demonstration between NVO and AstroGrid VOspace datastores, data and applications.

P.165 The MUSE Data Reduction Pipeline

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Abstract. MUSE will be one of the 2nd generation instruments for the ESO VLT, and will be a large, adaptive optics supported, integral field spectrograph. In this poster, we will present the current status and the timeline for development of the data reduction software for this project.

P.166 EFIGI: Automatic classification of galaxies

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Abstract. We propose an automatic morphological classification of galaxies. Our system was conceived to handle images with various resolution, an usual problem while observing from Earth. Classifying galaxies according to their aspect is a hard task, based on subtil criterias. This is particularly true for far galaxies which suffer from "blur" due to the point-spread function and a poor signal-to-noise ratio.

We discuss constraints linked to this kind of classification and present in details the three steps of our software : pretreatment, dimensionality reduction and supervised learning.

We present preliminary results obtained from a subset of 774 galaxies from the Principal Galaxies Catalog PGC. Images were produced by the Sloan Digital Sky Survey (SDSS) in the visible spectrum.

Results of our automatic classifier are compared to human classifications made by astronomers.

Finally, we discuss future improvments before releasing our tool to the community, especially as services.

P.167 Enhancing supernova remnant searches using image-matching techniques

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Abstract. We describe an image-processing technique through which we improve the chances of identifying image features representative of supernova remnants, the last stage of the life cycle of a high-mass star. Supernova remnants have a unique imaging signature, an enhanced H
alpha to [SII] flux intensity ratio, the detection of which requires accurate continuum-subtraction of the narrow-band images. Since the success of this approach is highly dependent on the images having similar point-spread functions, the effectiveness of this procedure is greatly improved by matching the respective image point-spread functions before subtraction. We apply this technique to archival survey data of a Local Group Galaxy and discuss some issues regarding its most effective use. We present some initial results of our image processing procedures, and discuss some future applications.

P.168 The UK Swift Science Data Centre

Laurence Tyler[1], Kim Page[1], Mike Goad[1], and Julian Osborne[1]

University of Leicester

Abstract. We present an overview of the organisation, data flows and public facilities of the UK Swift Science Data Centre.

Swift is a joint US/UK/Italian mission to study gamma-ray bursts (GRBs). Swift is unique in being able to perform multi-wavelength observations of new bursts completely autonomously within minutes of detection. Burst alert data is distributed within seconds via the GRB Co-ordinates Network, and initial observation data.

P.169 A Framework for Binding: The CASA Abstract Tasking Environment

David DeBonis, Darrell Schiebel, Wes Young inst, and Joe McMullin

Abstract. Past efforts for the implementation of a tasking environment have ended in functional limitations and technology lock-in. Given modern tasking environments and future environments, boundary classes need to be complete implementations of functionality without any direct coupling to a tasking environment. With an interface description and support information contained in an unbound representation, binding to a multitude of environments are generated through simple translators.

A tasking abstraction layer within the CASA package allows for a complete general representation of boundary classes. In order to represent a boundary class without binding it to a tasking environment, XML is employed to describe the classes interface complete with signature, default values, constraints on interface parameters, and help information for each of the classes exposed services.

Boundary classes are contained within a CASA library that offers a service or facility. Boundary classes are a self contained, complete representation of some functionality that is being exposed to an external client. In general, this class is a facade pattern composed of many CASA library classes hidden from the client. In the case of a task, the internal classes are other boundary classes (tools) utilized to perform some complex script-like operation, exposing the task as the actual boundary class.

P.170 The FUSE database in the virtual observatory

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Institut d'Astrophysique de Paris (IAP)

Abstract. We have developped a database containing more than three thousands FUSE public observations at IAP, Paris (http://fuse.iap.fr).

FUSE (Far-Ultraviolet Spectroscopic Explorer) is a NASA/CNES-supported astronomy mission that was launched on June 24, 1999, to explore the Universe using the technique of high-resolution spectroscopy in the far-ultraviolet spectral region see http://fuse.pha.jhu.edu/

Up to now, more than three thousands FUSE public observations are available and the telescope is still observing (until 2008).

This database is a user friendly and interactive tool to sort out the data using various criteria, to cross correlate or apply real time calculations on the spectrum, in order to visualize and to retrieve datasets. To improve its capabilities, this database is linked to the MAST and the CDS and appear in the Vizier tool.

We have developed an SSAP (simple spectrale access protocol) for this database in collaborations with others spectrale databases in the fields of stars and galaxies. Now that we have registered this database in the NVO registry, the spectrum are accessible by everyone using any VO-compalient tools without knowing the database or the FUSE programme itself.

Our team have developed a profile fitting software,called "Owens", to extract information from any spectra (column densities, temperature, etc...) in a semi-automated way.This very powerfull tools allow the whole community to solve problems and to get publication.

We are now trying to develop a webservice with this tool. The general idea is for example for one user to get a STIS spectrum from the MAST archive and a VLT spectrum of the same object from ESO database, to obtain the atomic and molecular line from another service and finally to use our webservice to obtain a profile fitting of the lines and extract the physical parameters required.

I would like to present, in a poster, how we have been able to simply convert our already existing UV spectral database into a VO object. I will first quickly present the mission and the scientific interest of those spectrum, then I will show how we connected this database within the VO, then i will present the set of tools we have developed and which are accessible for the community to convert the FUSE fits data in VOTable format online or offline. finally I would like to develop and talk more in front of this poster about the webservices that we are working on currently.

P.171 Position Refinement of Spitzer-Space-Telescope Images

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Abstract. Position refinement methods have been developed and are currently used in operations at the Spitzer Science Center to optimally register infrared astronomical images taken by the Infrared Array Camera (IRAC), one of the three science instruments onboard the Spitzer Space Telescope. The methods routinely involve frame-to-frame optimal matching of point sources in overlapping images and point-source matching to absolute-astrometric 2MASS-catalog sources. A recently-studied case consists of Spitzer observation campaign IRAC006800, in which 44,173 raw images were acquired in all four IRAC channels (corresponding to infrared spectral bands centered at 3.6, 4.5, 5.8, and 8.0 microns). Over 90% of the images in the campaign have exposure times ranging from 1 second to 100 seconds, with the remainder under 1 second. An analysis demonstrated that, for images in the two shortest wavelength bands, the average radial separations between image sources and their matched absolute counterparts are reduced from $\sim$ 0.34 arcseconds to $\sim$ 0.17 arcseconds as a result of position-refinement processing. There are also improvements for images in the two longer wavelength bands, although not by as much (only a factor of 1.2 reduction was achieved) because the matched stars are fainter at longer wavelengths and the image data in the 5.8-micron band are noisier than in the 8.0-micron band. An additional capability that will soon go online, called the super-boresight pipeline, is the simultaneous refinement of IRAC images from all four of its wavelength-band channels. This allows the pointing information gained from the shorter wavelength channels to benefit those at longer wavelengths.

P.172 OSIRIS Mask Designer for Multi-Object Spectroscopy

E.D. de Miguel, J.I. GonzálezSerrano, and M. SánchezPortal et al.

Abstract. The design of slitmasks for multi-object spectroscopy with OSIRIS at the GTC telescope is now possible with the OSIRIS Mask Designer tool, a Java plug-in to the well-known JSky application. Observers can use external reduced images to design new MOS masks for future observations with OSIRIS and, once the instrument is up running, will be able to use OSIRIS raw images to plan and design future observing campaigns.

P.173 Implementing Arbitrary Measurement Equations With the MeqTree Module

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ASTRON

Abstract. A Measurement Equation is a mathematical model of an instrument (e.g. a radio telescope) and the observed object(s). It can be used to predict the data measured with the instrument. In general, calibration of an observation (e.g. selfcal in radio astronomy) involves solving for parameters of an ME in some shape or form. Most calibration packages implicitly or explicitly implement some specific form of the ME. By sheer necessity, this involves making some simplifying assumptions about the instrument and the observation. As new instruments come on-line (WSRT LFFEs, LOFAR, etc.) we find ourselves pushing the limits of these assumptions.

The MeqTree module provides a flexible system to implement Measurement Equations of arbitrary structure and complexity, and to solve for arbitrary subsets of their parameters. The presentation will demonstrate how the use of a more complex ME gives better results than using the ones that are implicit in existing radio astronomy reduction packages.

P.174 Astrogrid Science

Jonathan Tedds[1], Duncan Law-Green[1], Tony Linde[1], Keith Noddle[1], Nicholas Walton[2], Silvia Dalla[3], Eduardo Gonzalez-Solares[2], and Anita Richards[3]

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Abstract. Astrogrid is an £8M UK e-Science project to deliver the *infrastructure* and leading edge *tools* to engage with the global *Virtual Observatory* (VO). The University of Leicester plays a leading role in the project and technical management and hosts a core development team pioneering e.g. the science *workflow* tool and access via LEDAS to key *high energy datasets* like 1XMM, Chandra and Swift. A new *AstroScope* tool will provide front end access to any VO compliant dataset including new mission pipelines such as UKIDSS/WFCAM and VISTA.

P.175 User Interface for the ESO Advanced Data Products Image Reduction Pipeline

Charles Rite, Nausicaa Delmotte, Joerg Retzlaff, Piero Rosati, Remco Slijkhuis, and Benoit Vandame

Abstract. This poster presents a friendly user interface for image reduction, totally written in Python and developed by the Advanced Data Products (ADP) group.

The interface is a front-end to the ESO/MVM image reduction package, used currently to reduce imaging data from several instruments such as WFI, ISAAC, SOFI and FORS1. As part of its scope,

it produces high-level, VO-compliant, science images from raw data providing the astronomer with a complete monitoring system during the reduction, computing also image properties which act as a guide for the quality of the reduced data and further stacking.The interface is meant to be used for VO services and it is free but unmaintained software and the intention of the authors is to share code and experience. The poster will describe the interface architecture and current capabilities and give a description of the ESO/MVM engine for image reduction.

P.176 Implementing a VOStore Interface for NGAS

Paul Harrison, Jens Knudstrup, Andreas Wicenec, and Markus Dolensky

European Southern Observatory

Abstract. The ESO Next Generation Archive Service (NGAS) is a combined hardware and software solution to the problem of archiving the large amounts of data produced by modern instruments. Whilst NGAS (http://www.eso.org/projects/dfs/dfs-shared/web/ngas/ngas-general.html) is proprietary to ESO, it would be of benefit to the Virtual Observatory to provide a standard interface to access the contents of NGAS. The proposed VOStore (http://www.ivoa.net/internal/IVOA/IvoaGridAndWebServices/vostore-0.18.pdf) interface most closely matches the facilities provided by NGAS, and this poster presents the lessons learned in creating this interface. In particular, the architectural design and implementation constraints are discussed, and some suggestions for clarification of the VOStore standard are made.

P.177 Monitoring and remote control of scientific instrumentation through the Grid

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Abstract. Grid infrastructures currently in use for production purposes are strongly computing-oriented, suitable for scientific communities whose applications require intensive computation on a relatively small amount of data. Middleware implementations underlying such infrastructures well support the sharing and distribution of Grid-embedded computational resources but problems arise when trying to use such Grids to satisfy the sharing of data-oriented and services-oriented resources. The Grid middleware model does not allow the embedding of a meta-computing machine.
Some scientific communities are strongly limited in using such Grid infrastructures for their applications; they have a wider perception of the Grid and their applications require not only traditional computation but also access to complex data repositories and services as well as mixed distributed computations. The astrophysical community certainly has this perception of the Grid.
This work concentrates on the interoperability aspects between the Grid and the scientific instrumentation. The new IE (Instrument Element) Grid Element has been designed, built and tested for this purpose.
The IE makes possible to monitor and remotely control any scientific instrumentation. The first implementation of the IE is focused on the monitoring aspects; astronomers having access to a Grid infrastructure through a Grid-UI can interface the observing facility where his/her observing runs are in progress and check the telemetric data as well as scientific data during their acquisition. Future releases of the IE will be extended to the remote control so that remote working sessions using remote astronomical instrumentation shall also be possible.
This work is part of the wider project (including the Query Element) whose goal is to exploit the Grid technology to build a homogeneous astronomical working environment where scientific data are acquired, checked, compared with data coming from other databases, processed and stored.

P.178 Development of the control system for the 40m radiotelescope of the OAN using the Alma Common Software (ACS)

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Observatorio Astronómico Nacional

Abstract. The Observatorio Astronómico Nacional (OAN) is building a 40m radiotelescope in its facilities in Yebes (Spain) which will be delivered by Spring 2006. The radiotelescope is an instrument composed of antenna, receivers, backends, and auxiliary equipment connected through a Gigaethernet LAN. The control system therefore has to deal with a distributed environment which needs to be remotely controlled and monitored from external heterogenous users (astronomers and engineers). Curently we are developing the remote control of the radiotelescope under Linux.

We have chosen the Alma Common Software (ACS) framework because it fulfills the requirements of the control system for the 40m radiotelescope. We present an overview of the software architecture of the radiotelescope and the current status of the development of the components. We have grouped individual instruments with a common relationship in packages. Each instrument is controlled by an ACS component and the whole package is managed by one container. Each container tipically runs on a Linux computer. We have developed components which use in home developed libraries for using GPIB, serial, and ethernet ports which allow us to manage instruments via different hardware interfaces. We have also developed components to compute astronomical ephemeris.

P.179 The Nançay Radio Telescope Archive

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Abstract. The Nançay radio telescope (NRT) is a national instrument, the fourth single-dish instrument in the world for its collecting area. It provides spectral and/or continuum data in the frequency range 1.06 to 3.5 GHz, and covers various fields from cometary studies, evolved stars's envelopes, pulsar timing, HI in galaxies and quasars/microquasars variability. Two on-line databases are available at http://klun.obs-nancay.fr and a general archive is being designed to fullfill the VO standards: - HIG (HI profiles of Galaxies) contains reduced 1-D 21-cm spectra for $\approx$ 4500 galaxies; - NAP (Nançay Archive of Pulsars) provides a few thousands pulse profiles from regular timing observations of $\approx$ 40 pulsars - NRTA (Nançay Radio Telescope Archive) will host all NRT raw data from various backends (autocorrelator, numerical spectrometer, and pulsar dedispersors) ; most of the data consist of time-frequency The package which is used for the database management and pipeline is the Pleinpot software developed for the hyperleda database (http://leda.univ-lyon1.fr/install/mirror.html).

P.180 A Catalog/Collection Model for the Virtual Observatory

Brian Thomas, Edward Shaya, and Zenping Huang

UMD

Abstract. We present a quantity-based catalog/collection data model that can support VO-wide science catalog and registry searches and transport. This catalog model is serialized in XML and is designed to support sophisticated queries through its ability to be queried via an extended form of XQuery. This query-based catalog can support easy manipulation of its contents to form new catalogs.

In our poster we show model diagrams, applicable use-cases and the software which supports this model.

P.181 A New Interactive User Interface for Spacecraft Data Processing

Craig Anderson, Doug Morgan, Peter Mendygral, and Joy Nichols

SAO

Abstract. We have developed a GUI-based user interface for Chandra data processing automation, data quality evaluation, and control of the system. This system, known as The Telemetry Tracker 9000 (TT9), allows dynamic interaction and monitoring of all operational tasks, including automated data quality evalutation, quicklook generation, submission to archival processing, realtime data flow, and reporting metrics in a single multi-tab GUI. A MySQL database serves as a backend for this system enabling identification of anomalies, unusual acquisition situations, as well as tracking statistics. Automated threshold checking of incoming data quality and error detection with pager notification are features of TT9, which has greatly reduced staffing requirements and minimized operator error. TT9 is a flexible interface around the archival data processing system that can be modified easily to accommodate changes in the operational constraints of the instruments, spacecraft, and ground system. The modular design allows new data processing tasks to be automated and interfaced with additional GUI Tabs. The system is adaptable to other missions.