

AGENDA

1. Institutional Status and Work Plan for Year 1
2. Discussion of Vacant Jobs, Job Descriptions and Strategies for Recruitment
3. Project Logistics and Finances for Year 1
- LUNCH
4. AVO Roadmap and NVO coordination
5. June 2002 Meeting
6. PR and the AVO Web Site
7. AOB

ATTENDANCE

S. Ansari (ESA), P. Benvenuti (ESA), P. Diamond (JBO), F. Genova (CDS), K. Gorski (ESO), A. Lawrence (ASTROGRID), T. Linde (ASTROGRID), A. Micol (ESA), C. Page (ASTROGRID), B. Pirenne (ESO), P. Quinn (ESO, Chair), G. Rixon (ASTROGRID), N. Walton (ASTROGRID), A. Wicenec (ESO)

AGENDA ITEMS

Item 1.1 Opening Remarks

- PQ stressed the importance of the kick off meeting as the initiation of the AVO project and the creation of a project team. All partners now have to work as an integrated project team towards common goals. This means coordination, communication and decision making at all levels of the project towards the best interests of the common project
- The attendance at this meeting represents the AVO Executive Committee and key individuals from each Work Area (work package managers, project scientists etc.). Meetings at this level should take place quarterly

Item 1.2 Work Area 0 (Program Management) Report

- The contract was formally signed by the Commission on 1 November 2001. The official start date of the project will be set to 15 November
- Benoît Pirenne (ESO/DMD Head of Operations Technical Support Group) will act as Deputy Program Manager to PQ
- AVO was approached by Dr Mark I Parsons, Commercial Manager, EPCC to join the GRIDSTART EC Accompanying Measure proposal to facilitate communication and coordination among EC funded GRID programs. AVO accepted and formally joined the proposal with 9 other projects. Some additional manpower (~ 9 man months) and travel money will be associated with the successful proposal. GRIDSTART documentation will be put on the AVO web site. **(ACTION 01-15/11/01)**
- U. Cambridge as a member of ASTROGRID has asked to be included on the AVO contract so as to employ staff with AVO funds. This was not positively received by the AVO Exec. PQ to explore EC options and report to AL **(ACTION 02-15/11/01)**

Item 1.3 Work Area 1 (Science) Report

- Letter of appointment for the AVO Science Working Group - December 01
- Draft and advertise Science Area position - December 01

- Draft charter of the AVO SWG. Circulate among partners and collect feedback. Prepare final version. - January 02
- Internal discussion of possible science test cases - interaction with partners. - January 02.
- Draft work statements and schedule for the Science Area
- 1st Meeting of the AVO SWG. - early February 02. Draft Agenda:
 - Introduction and definition of scope.
 - Discussion on possible Science test cases
 - Discussion on quality criteria and parameters
 - Tracing the "scientific" decisions: raw and original data vs processed data.
- Critical analysis of 1-2 test cases. Draft initial set of requirements for Interoperability and GRID - Feb - March 02
- Assessment of quality (as defined by the SWG) of a first set of archives - Feb - May 02
- Revision of AV Call for Proposals - April 02
- Prepare reports about 7 and 8 for the AVO Conference.
- 2nd Meeting of AVO SWG - June 02
- Submit extension of AV to EC - (TBD, as for EC schedule)
- WA1 staff contributions are needed by PB (**ACTION 03-15/11/01**)
- An important strategic push of the science case is to highlight the multi-wavelength capabilities of AVO in comparison to the more limited approach of NVO

Item 1.4 Work Area 2 (Interoperability) Report

- FG presented WA2 status (APPENDIX 1) highlighting CDS membership of WA1 and WA3 as well as WA2 workpackages
- WA2 staff contributions are need by FG (**ACTION 04-15/11/01**)

Item 1.5 Work Area 3 (Technology) Report

- AL presented an overview of the ASTROGRID project and its contributions to WA3 (APPENDIX 2)
- WA3 staff contributions are need by AL (**ACTION 05-15/11/01**)

Item 1.6 Work Program Effort Matrix

- The following table shows the work effort matrix for each WA in year 1 as FTEs. A detailed partition of the FTEs to work packages will be completed by the WA managers in January (**ACTION 06-15/11/01**)

Person	WA 0	WA 1	WA 2	WA 3
ESO				
Quinn		0.1		
Pirenne		0.1		
Wicenec				0.1
Gorski			0.2	
Knudstrup				0.2
Devillard				0.1
Suchar				0.1
AVO 1		1.0		
AVO 2				0.5
				0.5
ESA				
Benvenuti			0.1	
Micol				0.1
Dolensky				0.2
Pierfederici			0.1	0.2
ECF NN				0.3
ECF Student			0.5	
AVO 3			1.0	
ASTROGRID				
Walton			0.3	
Lawrence			0.2	
McMahon			0.2	
Watson			0.2	
Allan			0.2	
Mann				0.25
Rixon				0.25
AVO 4				1.0
Page				0.25
Davenhall				0.25
AVO 5				1.0
CDS				
Fernique				0.1
Bonnarel				0.1
Wenger				0.1
Egret			0.1	
Genova				0.2
Allen (AVO 6)			0.1	0.5
AVO 7				1.0
Derriere				0.3
Ochsenbein				0.2
Schaaff				0.2
TERAPIX				
Mellier			XX	
Didelon				XX
AVO 8				XX
				XX
JBO				
Diamond			0.1	
Leahy			0.1	
Garrington				0.1
Holloway				0.1
Noble				0.1
Muxlow			0.1	
Kramer			0.1	
O'Brien			0.1	

Person	WA 0	WA 1	WA 2	WA 3
Jackson			0.1	
AVO 9				0.25
TOTALS				

Item 2.1 WA0,1,2,3 Job Descriptions

- The status of AVO positions 1-9 was discussed. Job descriptions for AVO-1, 2, 3, 4,5 and 7 were presented (see APPENDIX 3)
- Remaining job descriptions to PQ by end of December (**ACTION 07-15/11/01**)

Item 2.2 Recruitment Strategy

- Each member organization will pursue recruitment via their normal channels
- All AVO funded job ad should contain the AVO logo and state they are funded by the AVO Project using similar text as AVO-1 (WA0) to introduce the project
- All positions will also be posted on the AVO web site
- PQ will assess and organize a joint job add to appear in the print media (**ACTION 08-15/11/01**)

Item 3.1 Logistics and Finances for Year 1

- The official signature date of the EC contract will be set to 15 November 2001
- EC expects to distribute advanced funds to ESO in January 2002
- All claims on AVO funds needs to be approved by WA managers and WP managers at the responsible institutions

Item 4.1 AVO Roadmap

- PQ emphasized the need for a coherent, public roadmap for the international VO effort that should be discussed next June in Munich
- NVO, AVO and ASTROGRID PIs agree with this approach
- The roadmap should focus on core issues that will prevent the VO from being truly international and will work towards global "buy-in" by the astronomical community
- The roadmap is not intended to globally constrain the science or the success of the global VO. Each VO community must be allowed to succeed on its own terms with respect to both science and technology.
- Some key roadmap topics are :
 - Interoperability standards
 - Data Quality standards (this has more to do with describing the data rather than describing the science it is capable of)
 - Early delivery of tools - a demonstration of new science capabilities
- PQ to discuss roadmap strategy with AL and AS before end December (**ACTION 09-15/11/01**)
- Roadmap comments and suggestions to PQ by beginning December (**ACTION 10-15/11/01**)

Item 5.1 June 2002 Meeting

- Considerable progress has been made on setting up the meeting for June 2002 in Munich
- Kris Gorski is Programme Committee Chair - all input and comments to Kris
- See details on the website : <http://www.eso.org/gen-fac/meetings/vo2002/>

Item 6.1 Public Relations, Press Releases and Web Sites

- A press release is planned for early December released jointly by the member organizations, PQ to coordinate (**ACTION 11-15/11/01**)
- An AVO video has been prepared by the ESA PR team in the STECF. This will play a major role in future PR and education

- A reworking of the AVO web site will take place in January/February with help from ESA PR - possibly moving to a new site at euro-vo.org (**ACTION 12-15/11/01**)

Item 7.1 Next Meeting

- AVO project team meetings should occur quarterly
- Next meeting in March 2002, possibly in Paris

ACTION SUMMARY

ACTION number	Description	Owner	Due by
01-15/11/01	GRIDSTART docs on AVO web	PQ	Jan 02
02-15/11/01	U.Cambridge issues with EC	PQ/AL	Dec 01
03-15/11/01	WA1 FTE contacts to PB	ALL	Jan 02
04-15/11/01	WA2 FTE contacts to FG	ALL	Jan 02
05-15/11/01	WA3 FTE contacts to AL	ALL	Jan 02
06-15/11/01	Work effort matrix input to PQ	PB, FG, AL, PD, YM	Jan 02
07-15/11/01	Job Descriptions to PQ	FG, AL, PD, YM	Dec 01
08-15/11/01	Joint job add	PQ	Jan 02
09-15/11/01	Meeting with AL and AS on roadmap	PQ	Dec 01
10-15/11/01	Roadmap points/comments	ALL	Dec 01
11-15/11/01	AVO PR	PQ	Dec 01
12-15/11/01	AVO Web update	PQ	Feb 02

APPENDIX 1 - Work Area 2 Report**CDS Statement of Work
Draft, V0.2, November 21st, 2001, F. Genova****Work Area 1: Science (managed by ECF)**

CDS key person: D. Egret

CDS participants: M. Allen, F. Genova

Work Area 2: Interoperability (managed by CDS)

Manager: F. Genova

WA 2 aims at deployment and demonstration of an interoperability prototype, including a set of representative, ground and space European archives from all the AVO project partners. The tools will be the CDS interoperability services, VizieR for data federation and Aladin for data integration.

The objectives of Work Area 2 are:

- to realize a prototype of an interoperable system; this prototype will be open for community usage;
- to evaluate it by running a few science cases in a controlled way (ergonomics, new functionalities);
- to improve the federation and integration tools;
- to assess critical technical points;
- to establish common (internationally agreed) data exchange standards for interoperability;
- to evaluate the available interoperability tools, in particular those that might be developed in the frame of other VO initiatives.

WA 2 consists of several Work Packages:

WP 2.1	Inclusion of archives in the interoperability system
WP 2.2	Running of tests and evaluation of results
WP 2.3	Implementation of new functionalities and standards
WP 2.4	Evaluation of interoperability tools

WP 2.1. Inclusion of archives in the interoperability system

Key person: F. Ochsenbein

CDS participants: M. Allen (from December 2001), P. Fernique, F. Genova, X (AVO engineer, position open)

A set of European archives, representative of a variety of techniques (space/ground based, images/spectra, wavelengths from X-rays to radio), will be federated in the VizieR system. The list of observations in the archive will be included in VizieR, with a standardized description, links to individual records in the archive will be implemented when possible, and an update mechanism will be built for "living"

catalogues. Management of duplicate archives (e.g. for different versions of the HST observation list) will be implemented in VizieR.

Target archives and surveys are the following: VLT, NTT, EIS (ESO); HST/ECF, ISO, XMM (ESA); Wide Field UK archives; Jodrell Bank; Terapix reduced pixels.

All catalogue data will be accessible in Aladin through VizieR. Suitable image data (i.e. with proper FITS astrometry description) will also be made accessible through Aladin.

Deliverables

- Working interoperability prototype, open for community usage, including archives from all the partners
- Set of procedures and guidelines for archive managers

Milestone (year 1)

- October 2002: Working prototype

Activities, year 1

- The objective is to have a working prototype by the end of the first year of the AVO project. This will thus be an intensive activity, which will require active participation of all partners.

The following activities are foreseen:

- *2.1.1. Finalization of the list of target archives; identification of the contact persons for each of them*
Action: all partners, ASAP
- *2.1.2. Documentation on procedures and guidelines*
Action: CDS
 - A web site supporting basic documentation will be implemented in November 2001
 - The documentation will be updated regularly, taking into account the discussions with the archives

The final product will be a set of guidelines and procedures for data managers. The procedures and guidelines will be publicized towards and discussed with projects preparing archives (e.g. Integral Science Data Centre).

- *2.1.3. Implementation of the links*
Action: CDS and each partner
 - Preliminary discussion between the CDS and the partner (schedule, work to be done, interfaces, update mechanism,...)
 - Each partner will furnish a log of its archive and a preliminary description of its contents;
 - CDS will check the contents, discuss it with the partner and implement this log in VizieR;
 - Relevant links (data, proposals, ...) will be identified and implemented;
 - Update procedures will be implemented;
 - If FITS WCS images are available from the archives, access to them will be implemented through Aladin.

WP2.2. Running of tests and evaluation of results

Participants: M. Allen, S. Derriere, other CDS scientists

Science cases to test the prototype interoperability system will be proposed by the project teams or through the AVO or AstroVirtel proposals. A limited number will be run through the system, with some support from the CDS team. The results will be evaluated, with help of the proposer.

In parallel, the interoperability system will be open for community usage, with the possibility for users to send feedback to the development team.

This activity is expected to begin very soon after the kick-off meeting: an AstroVirtel case has been identified from the 2001 AO, and a few representative test cases have already been proposed.

Deliverables:

- brief summary report for each scientific test case;
- the tests will produce scientific results;
- evaluation of the interoperability system;
- identification of new desirable functionalities.

Links with other WAs:

- with WA1: participation to the definition and selection of the AVO proposal; communication with AstroVirtel.
- with WA3: if some science cases are suited for test of interoperability and GRID.

WP2.3. Implementation of new functionalities and standards

CDS participants:

X, S. Derriere, F. Ochsenbein, F. Bonnarel, P. Fernique, M. Wenger

The following improvements will be studied:

- development of an information discovery tool. This will require the definition of metadata describing the dataset contents, in collaboration with the archive providers.
- implementation of cross-identification functions (first studied in the frame of the ESO/CDS data mining project).

In addition, the science cases and tests will also lead to identify, study and implement new functionalities.

The definition of common or compatible exchange standards is the key for the implementation of a truly global Virtual Observatory. Contact has already been taken with one key member of the NVO project (R. Williams, system architect).

Deliverables:

- Improvements to the federation and integration tools;
- Development of an information discovery tool;
- Implementation of cross-identification functions;
- Standards: specification; definition; discussion; implementation.

- Assessment of difficulties encountered, evaluation of methods, ...

New proposed standards will be discussed widely through the OPTICON interoperability Working Group. This group is open to European data managers (proposed by the OPTICON partners), and the membership goes beyond EC with key participants from the US NVO project, from Canada and from Australia.

Milestone (year 1):

- Standards: The aim is to propose a common roadmap with NVO at the time of the Garching meeting (May 2002).

WP2.4. Evaluation of interoperability tools

VizieR/Aladin versus other tools available or developed in the frame of other VO

Working Group-type activity.

WG chair: F. Genova

WA3 Technology (managed by AstroGRID)

CDS participants

GRID technology	P. Fernique
Storage/computation techniques	F. Bonnarel
Database technology	M. Wenger

APPENDIX 2 - Work Area 3 Report**ASTROGRID Overview and Status**
Andy Lawrence 15/11/2001

AstroGrid web page : <http://www.astrogrid.ac.uk>

Consortium Institutions : Belfast, Cambridge, Edinburgh, Jodrell, Leicester, MSSL, RAL.

Areas covered : Optical, Infra-red, X-ray, Radio, Solar, Space Plasma

The project :

- PPARC funded project
- part of UK e-Science programme
- Phase A study Sept 2001 - August 2002
- funding 0.7Mpounds
- full programme 2001 - 2004
- funding £2M confirmed £5M expected
- intersects with AVO, EGSO and VISTA programmes
- Grid technology development programme
- Stepping stone to Virtual Observatory

Why AstroGRID ?

- focus on technology problems
- embedded in UK cross-disciplinary programme
- using standard "Grid toolkit" - Globus, SRB, Condor
- work with new National e-Science Centre
- interaction with GridPP e.g. network monitoring
- GRID concept useful
- Web = distributed docs; Grid = distributed CPU
- datagrid = distributed archives and services

Goals

- assessments of key technologies
- Globus vs Jini vs .NET etc
- DBMS choices
- XML derivatives, UDDI etc
- uniform AstroGrid interface
- data-mining machines connected in grid
- tools for :
 - browsing, visualisation
 - database queries, mixture fitting
 - statistical manipulations, model fitting
 - system for uploading code

Recent developments

- Funded staff = 18, FTEs=12.8
- (including 3 UK-AVO positions)
- official project start Sept 1st
- new Project Scientist Nov 1st
- Nic Walton (Cambridge)
- new Project Manager Nov 1st
- Tony Linde (Leicester)
- Five further recruitments imminent
- two PPARC funded positions
- three AVO funded positions

Lead Investigators

- Lawrence (Edinburgh - Project Leader)
- McMahon (Cambridge)
- Allan (RAL)
- Watson (Leicester)
- Murtagh (Belfast)
- Harra (MSSL)
- Garrington (Jodrell)

Funded Personnel (18 bodies, 12.8 FTE)FGn

- Walton (PS) 1.0 reqs Nov 01 cam
- Linde (PM) 1.0 manage Nov 01 leic
- Page 1.0 DB Sep 01 leic
- Rixon 1.0 Grid Sep 01 cam
- Bentley 1.0 Grid Sep 01 mssl
- Mann 0.5 Fedns Sep 01 edi
- Davenhall 0.5 DB Sep 01 edi/ral
- Pike 0.5 solar reqs Sep 01 ral
- Perry 0.5 STP reqs Sep 01 ral
- Richards 0.3 radio Fedn Sep 01 jod
- Sherman 0.2 hardware Sep 01 ral
- Giaretta 0.2 Grid Sep 01 ral
- Allan 0.1 manage Sep 01 ral
- PDRA-1 1.0 DB/Grid Jan 02 edi
- PDRA-2 1.0 DB/hardware Jan 02 leic
- EU-1 1.0 Grid Jan 02 cam
- EU-2 1.0 DB Jan 02 edi
- EU-3 1.0 Radio Fedn Jan 02 jod

AVO contributions

- WA1 (Science)
 - 0.3 Walton
 - 0.2 Lawrence,McMahon, Watson, Allan
 - WA2 (Interoperability)
 - 0.25 Mann
 - 0.25 Rixon
 - WA3.1 Grid Tech
 - 0.25 Rixon (WP manager)
 - 1.0 EU-1 (Cambridge)
 - WA3.2 Storage/Compute
 - 0.25 Page
 - WA3.3 Database technology
 - 0.25 Page (WP manager)
 - 0.25 Davenhall
 - 1.0 EU-2 (Edinburgh)
- Total : 2.0 FTE contributed, 2.0 funded

Workplan

WPN	Name	Leader	Other workers
WP0	Project Infrastructure	Linde	(PM)Walton (PS)
WP1	Science Requirements	Walton	(PS) everybody
WP2	Data Grid Technology	Rixon	EU1, Bentley, Giaretta, PP1
WP3	Storage/Compute Technology	Sherman	Page,PP2, Rixon
WP4	DataBase Technology	Page	Davenhall, EU2, PP2
WP5	Pilot Programme	Mann	Bentley, Page, EU3, Perry,Pike
WP6	WFCAM/VISTA	McMahon	TBD
WP7	Liaison	Murtagh	everybody
WP8	Phase B	Lawrence	(PL) everybody

Requirements approach : concrete use-cases

Example Use case: log on locally, operate remotely

- Story
 - User wishes to operate on a number of data sets and facilities around Astrogrid, all of which are password-protected. Instead of having to log in separately to each grid site, which would be unspeakably tedious, User logs in "to the grid" on his/her local computer. The Astrogrid sites recognize this authentication and allow access without prompting for passwords.
- Alternative story
 - As above, User needs to access a number of grid sites. However, user intends to use a software agent to do the searching, and the agent must run unattended. User logs in to the grid on the agent-programme's behalf, starts the agent, then goes away. Each time the agent reaches a new site, the authentication information is passed and the agent is granted access.
- Discussion
 - This feature is central to grid computing. It is the key thing that distinguishes grid access from web access: one can't implement this easily and securely on the WWW because HTTP doesn't pass enough information to relay the authentication from site to site.

Clearly, once an entity gets into the grid, there is open access. Hence, each part of the grid has to be super-secure.

Recent work

- installed and tested Globus
- weakness : flat file transfer only
- weakness : user authentication but no data authentication
- SX/Objectivity on Beowulf
- putting MPI in SX
- testing speed-up versus topology
- HTTP based Grid portal experiment
- aimed at fleshing out requirements
- and testing ergonomics
- talk by Guy Rixon

key issues

- machine readable semantics
- standards standards standards
- data mining facility
- hardware
- algorithms
- remote operation
- resource allocation (data, cpu cycles, bandwidth)
- meta-computing
- intersection with AVO

APPENDIX 3 - Job Descriptions**AVO-1**

Astrophysical Virtual Observatory Senior Systems Engineer.

Introduction:

The Astrophysical Virtual Observatory (AVO <http://www.eso.org/avo/>) Project is a Phase-A, three year study for the design and implementation of a virtual observatory for European astronomy. A virtual observatory (VO) is a collection of interoperating data archives and software tools which utilize the internet to form a scientific research environment in which astronomical research programs can be conducted. In much the same way as a real observatory consists of telescopes, each with a collection of unique astronomical instruments, the VO consists of a collection of data centres each with unique collections of astronomical data, software systems and processing capabilities.

AVO is a joint project emanating from 6 different organizations based in three major European countries: the European Southern Observatory (lead) and the Space Telescope -- European Coordinating Facility in Munich, Germany; the Centre de Données Stellaires of Strasbourg, France; the Terapix consortium, Paris; the Jodrell Bank Observatory, UK and the AstroGRID consortium, representing many UK Institutions.

Assignment:

A working framework in which all the partners will contribute their data and expertise but also benefit from the outcome of the project has been put in place. It calls for new personnel to be hired and located at the various partner sites. For the project headquarters, near Munich, Germany, we need the assistance of a "Senior Systems Engineer" who will help define the necessary concepts, tools and infrastructure based on scientific requirements provided by the Science Work Area of AVO. The Senior Systems Engineer is expected to coordinate the design process of the AVO by providing an overall systems design and interface to the component projects/systems. S/he will also in charge of the preparation of the Phase B of the project.

The Senior Systems Engineer will report directly to the AVO program lead or his deputy.

Qualification:

The selected candidate will have a degree in computer science or related discipline and a proven record of successful large project design, with particular emphasis on interactions with multi-national, geographically dispersed groups. Previous exposure to problems related to scientific data manipulation and processing would be considered an important advantage. An outstanding command of the English language, both spoken and written is required, together with excellent interpersonal skills.

Duty station: Garching near Munich, Germany

Starting date: asap

Contract: The contract is for a period of 3 years.

AVO-2

WA2 and WA3 Engineer

- GRID S/W evaluation and installation
- Technical communication/collaboration with ASTROGRID
- Collaboration with other AVO groups
- Definition of requirements for the Science Archive Facility and NGAS
- Implementation of interface between AVO/GRID world and the ESO Science Archive Facility

Skills :

- Programming in C/C++, Java, Python
- SW engineering (design and development)
- Team work
- Willing to learn and use new technologies

Advantageous :

- OO analysis and design (UML)
- System analysis and design
- Knowledge of XML
- Scientific background

AVO-3

Astrophysical Virtual Observatory Scientist

[common introduction]

Assignment:

The Project activities have been divided into three Work Areas: Science, Interoperability, Technology. For the first Work Area (Science), the Project requires the assistance of an AVO Scientist who will contribute to the definition of the AVO scientific requirements and to the scientific testing of the AVO pilot implementation. In particular the AVO Scientist will define, with the contribution of the AVO Science Working Group, the AVO Science Reference Mission, the data types to be included in the AVO, the data quality criteria to be applied and their description and the requirements for AVO specific algorithms and procedures. Finally the AVO Scientist will be responsible for carrying out specific science test cases during the different stages of implementation of the AVO.

Qualifications

The selected candidate will have a degree in Astronomy or Physical Sciences and a proven record of research activity mainly based on the analysis of large quantities of data, preferably obtained from multiwavelength archives or large surveys. Experience with astronomical data analysis packages (IRAF, MIDAS, IDL, etc.) and the development of data analysis procedures is required. Experience with the scientific calibration and data quality assessment of astronomical instrumentation is required. Basic knowledge of an archive functional structure is desirable.

Good command of the English language, both spoken and written, is required. Ability to work in a team and to collaborate/communicate with a geographically distributed group is required.

Duty Station: Garching

Starting date: asap

Contract: 3-year contract

Salary: Commensurate to the experience/seniority,

AVO-4

Database Technology Software Developer for combined AVO/AstroGrid Projects

JOB DESCRIPTION

1. The AVO and AstroGrid projects

AVO and AstroGrid are projects working towards an international vision of the Virtual Observatory. The AVO ("Astrophysical Virtual Observatory") project is an EU-funded project involving six organisations in Germany, UK, and France. AstroGrid is a UK project involving a consortium of seven Universities and labs, and is funded by the Particle Physics and Astronomy Research Council (PPARC). The AstroGrid consortium is one of the partners in the AVO project, and the work programmes of the two projects have a considerable overlap - several existing staff are working on the joint programme, and we are recruiting new staff funded by the EU contract to work on the joint AVO/AstroGrid programme. The position described here is a software developer post to be located in Edinburgh and working in Database Technology.

In much the same way as a real observatory consists of telescopes, each with a collection of unique astronomical instruments, the **Virtual Observatory** consists of a collection of data centres each with unique collections of astronomical data, software systems, and processing capabilities. Co-operating data centres aim to provide services in a transparent way to astronomical users, including distributed computing (the "grid" concept). This involves significant technical challenges, some of which are specifically astronomical, but many of which are common to other areas, and are summed up in the ideas of the Grid and the Semantic Web. The aim of the AVO programme is a three-year Phase A study of such problems, including testbed systems, leading towards a larger Phase B proposal intended as the European part of a global Virtual Observatory. The AstroGrid project focuses on relevant technology development and applications, as well as an early pilot system, and has strong links to a UK cross-disciplinary "e-science" programme, especially in Particle Physics, Bio-Informatics, and the development of "Grid" middleware, seen as the next logical step in the evolution of the Internet.

Further information and some formal documentation about the two projects can be found at <http://www.eso.org/projects/avo> and <http://www.astrogrid.ac.uk>

The AVO partners are the European Southern Observatory (ESO); the Space Telescope European Co-ordinating Facility (ST-ECF); the TeraPix data centre in Paris; the Centres de Données Astronomique de Strasbourg (CDS); the Astrogrid consortium; and the Jodrell Bank Observatory (JBO). Within Astrogrid, the consortium institutions are the universities of Cambridge, Edinburgh, Leicester, and Manchester (Jodrell Bank), the Rutherford Appleton Laboratory in Oxfordshire, Queen's University Belfast and the Mullard Space Science Laboratory of University College London, in Surrey.

2. Responsibilities of post

The successful candidate will work on the evaluation of database management systems, and the assessment and development of technologies to facilitate the federation of distributed astronomical databases into a global "Virtual Observatory". Central to this enterprise is the provision of systems scalable to Petabyte-scale databases, and employing metadata of sufficient richness to enable the interoperability of heterogenous datasets, making possible the sophisticated data mining of astronomical archives. This work will necessitate the development of a detailed understanding of the database requirements of the astronomical community and an ability to engage actively with the rapidly developing field of Grid computing. This position constitutes a significant role within a leading e-science project, and we seek a candidate with the expertise and personal skills capable of capitalising on this opportunity to develop cutting-edge technology and support world-class science.

Experience in the design and deployment of database management systems is essential, as is an understanding of the advantages and disadvantages of relational, object-relational, or object-oriented approaches, and a knowledge of their existing (commercial and freeware) implementations. The position will involve the design and execution of benchmark tests simulating the operation of astronomical databases, their evaluation against agreed criteria and the presentation of results, in oral and written reports, to an audience with limited technical knowledge of database systems.

The AVO project will eventually comprise a multi-disciplinary team of astronomers, computer scientists and software engineers distributed across Europe, and will interact with similar initiatives internationally, notably in North America. The successful candidate must thrive in such an interdisciplinary environment, while self-motivation and the ability to work independently according to agreed plans are key skills, as communication with colleagues will be primarily via the Internet.

Applicants should have strong programming abilities, ideally in both procedural and object-oriented languages, while expertise in web technologies based on CGI and languages such as Java, Perl, PHP, or Python, would be advantageous, as would experience in the use of XML for metadata expression. Familiarity with Linux or another Unix-like operating system is required, while experience in using parallel architectures, such as Beowulf clusters of PCs, would be beneficial.

Candidates should be familiar with the basic techniques of software engineering, notably coding modules to fit into large-scale frameworks, object-oriented design methods, version control and software testing.

Knowledge of astronomy is not necessary, although it would obviously be useful. The working language of the AVO project (and international astronomy generally) is

English. The appointment will involve travel for meetings at the other AstroGrid and AVO sites. Occasional visits to AVO/AstroGrid partners in the USA may also be required.

3. Terms of Appointment

The formal recruitment procedure will be through the University of Edinburgh, who will provide the actual terms and conditions. Potential applicants should look out for the advert requesting applications which may appear in a variety of places, but certainly including the University of Edinburgh Personnel Department web-page, the website jobs.ac.uk, and the AstroGrid web page. This document is for guidance only, representing the intentions of the AstroGrid consortium.

The post will be located at the Institute for Astronomy, University of Edinburgh, which is co-located with the UK Astronomy Technology Centre (ATC) at the Royal Observatory Edinburgh. Line management will however be through the Database Work Package manager in Leicester, Clive Page. The post will be available for up to three years, and is to start as soon as possible in 2002. Salary will be appropriate to experience and demonstrated aptitude for the job, but is expected to be approximately in the range 20,000 to 35,000 UK pounds per annum.

4. Contacts for informal enquiries

Clive Page (cgp@star.le.ac.uk) Physics & Astronomy Dept, Leicester
Database Technology Work Package Leader for both AVO and AstroGrid.

Andy Lawrence (al@roe.ac.uk) Institute for Astronomy, University of Edinburgh
AstroGrid Project Leader and Manager of AVO Technology Work Area

Tony Linde (tol@star.le.ac.uk) Physics & Astronomy Department, University of
Leicester AstroGrid Project Manager

5. Person Specification

<i>Essential</i>	<i>Desirable</i>
<i>Degree in a relevant subject</i>	<i>PhD in related subject</i>
<i>Familiarity with basic software-engineering techniques</i>	<i>Experience in distributed computing</i>
<i>Ability to work in a distributed team</i>	<i>Experience in web development</i>
<i>Ability to work in Unix environment</i>	<i>Experience in database development</i>
<i>Willingness to travel</i>	<i>Working knowledge of C, Perl, Java</i>
<i>Familiarity with design and deployment of database management systems</i>	<i>Competence in technical writing</i>
	<i>Experience with large scientific databases</i>
	<i>Working knowledge of C, Perl, Java, XML</i>

AVO-5**GRID Technology Software Developer for combined AVO/AstroGrid Projects****1. The AVO and AstroGrid projects**

AVO and AstroGrid are projects working towards an international vision of the Virtual Observatory. The AVO ("Astrophysical Virtual Observatory") project is an EU-funded project involving six organisations in Germany, UK, and France. AstroGrid is a UK project involving a consortium of seven Universities and labs, and is funded by the Particle Physics and Astronomy Research Council (PPARC). The AstroGrid consortium is one of the partners in the AVO project, and the work programmes of the two projects have a considerable overlap - several existing staff are working on the joint programme, and we are recruiting new staff funded by the EU contract to work on the joint AVO/AstroGrid programme. The position described here is a software developer post to be located in Cambridge and working in Grid Technology.

In much the same way as a real observatory consists of telescopes, each with a collection of unique astronomical instruments, the **Virtual Observatory** consists of a collection of data centres each with unique collections of astronomical data, software systems, and processing capabilities. Co-operating data centres aim to provide services in a transparent way to astronomical users, including distributed computing (the "grid" concept). This involves significant technical challenges, some of which are specifically astronomical, but many of which are common to other areas, and are summed up in the ideas of the Grid and the Semantic Web. The aim of the AVO programme is a three-year Phase A study of such problems, including testbed systems, leading towards a larger Phase B proposal intended as the European part of a global Virtual Observatory. The AstroGrid project focuses on relevant technology development and applications, as well as an early pilot system, and has strong links to a UK cross-disciplinary "e-science" programme, especially in Particle Physics, Bio-Informatics, and the development of "Grid" middleware, seen as the next logical step in the evolution of the Internet.

Further information and some formal documentation about the two projects can be found at <http://www.eso.org/projects/avo> and <http://www.astrogrid.ac.uk>

The AVO partners are the European Southern Observatory (ESO); the Space Telescope European Co-ordinating Facility (ST-ECF); the TeraPix data centre in Paris; the Centres de Donnees Astronomique de Strasbourg (CDS); the AstroGrid consortium; and the Jodrell Bank Observatory (JBO). Within AstroGrid, the consortium institutions are the universities of Cambridge, Edinburgh, Leicester, and Manchester (Jodrell Bank), the Rutherford Appleton Laboratory in Oxfordshire, Queen's University Belfast and the Mullard Space Science Laboratory of University College London, in Surrey.

2. Responsibilities of post

This post is to carry out both assessment and development work in the area of DataGrid technology, under the supervision of Dr Rixon at the Institute of Astronomy in Cambridge, who leads both the AstroGrid and AVO workpackages in this area.

The successful candidate will work initially on the evaluation of existing technology such as Globus, SRB, HTTP/CGI/XML/SOAP and Java based technologies, for building Data-Grids, and later on the production of the specific systems needed to bring AstroGrid and AVO testbeds into operation. The work includes both rapid prototyping of software and development of high-quality systems for end-users. The developer will be required to document the work and will have the chance to contribute to academic published papers describing the project.

All AstroGrid/AVO developers can expect to be involved in all phases of the software lifecycle from capture of requirements through to support of the first users of the system. The development team, which is distributed across the UK for AstroGrid, and across Europe for AVO, will be small initially but will expand in the second and third years of the project. We seek a software developer who can work cooperatively in a loosely-linked team that communicates mainly via the Internet. Self-motivation and independence are valuable, but the developer must be committed to building software according to an agreed architecture and plan.

Candidates must be familiar with the basic techniques of software engineering, notably coding modules to fit into large-scale frameworks, object-oriented design methods, version control and software testing. Higher-level methods in software engineering (e.g I-CASE, programme proof, language design) are less advantageous. Candidates should know (or be prepared to learn quickly) C, Perl and Java, and must be able to work in a Unix environment.

Experience in distributed computing will be advantageous; experience with Globus and related technology is particularly valuable but not essential. Experience of development for the WWW would also be an advantage, particularly experience with XML and database related technology.

Knowledge of astronomy is not necessary, although it would obviously be useful. The working language of the AVO project (and international astronomy generally) is English. The appointment will involve travel for meetings at the other AstroGrid and AVO sites. Occasional visits to AVO/AstroGrid partners in the USA may also be required.

3. Terms of Appointment

The formal recruitment procedure will be through the University of Edinburgh, who will provide the actual terms and conditions. Potential applicants should look out for the advert requesting applications which may appear in a variety of places, but certainly including the University of Edinburgh Personnel Department web-page, the website jobs.ac.uk, and the AstroGrid web page. This document is for guidance only, representing the intentions of the AstroGrid consortium.

The post will be located at the Institute of Astronomy, University of Cambridge. (For administrative reasons however, the post-holder will be employed through the University of Edinburgh). The post will be available for up to three years, and is to start as soon as possible in 2002. Salary will be appropriate to experience and demonstrated aptitude for the job, but is expected to be approximately in the range 20,000 to 35,000 UK pounds per annum.

4. Contacts for informal enquiries

Guy Rixon (gtr@ast.cam.ac.uk) Institute of Astronomy, University of Cambridge
Grid Technology Work Package Leader for AVO and AstroGrid.

Richard McMahon (rgm@ast.cam.ac.uk) Institute of Astronomy, University of Cambridge
AstroGrid Lead Investigator

Tony Linde (tol@star.le.ac.uk) Physics & Astronomy Department, University of Leicester
AstroGrid Project Manager

Andy Lawrence (al@roe.ac.uk) Institute for Astronomy, University of Edinburgh
AstroGrid Project Leader and Manager of AVO Technology Work Area

5. Person Specification

<i>Essential</i>	<i>Desirable</i>
<i>Degree in a relevant subject</i>	<i>PhD in related subject</i>
<i>Familiarity with basic software-engineering techniques</i>	<i>Experience in distributed computing</i>
<i>Ability to work in a distributed team</i>	<i>Experience in web development</i>
<i>Ability to work in Unix environment</i>	<i>Experience in database development</i>
<i>Willingness to travel</i>	<i>Working knowledge of C, Perl, Java</i>
	<i>Competence in technical writing</i>

AVO-6

Ingénieur Astrophysical Virtual Observatory

JEUNE INGENIEUR INFORMATICIEN

Lieu de travail: Centre de Données astronomiques de Strasbourg ([CDS](#))

L'ingénieur sera chargé du développement de services de recherche d'information dans des ressources en ligne hétérogènes distribuées. L'objectif de ce travail, dans le cadre du projet européen [Astrophysical Virtual Observatory](#), est de permettre des accès conjoints aux archives des grands observatoires sol et spatiaux européens partenaires du projet (Observatoire Européen Austral - ESO, Agence Spatiale Européenne - ESA, archives britanniques, ...), en particulier à l'aide d'outils d'interopérabilité développés au CDS.

Débutant ou quelques années d'expérience, contrat à durée déterminée, 1 an renouvelable

Compétences:

- Pratique des langages C, C++ et Java.
- Connaissance de la mise en oeuvre des outils du Web.
- Connaissance d'XML et des outils associés.
- Environnement stations de travail Unix.
- Goût du travail en équipe.
- Anglais lu, écrit, parlé indispensable.

Si vous êtes intéressé(e) par le poste, contactez M. Hameury, Observatoire astronomique, 11 rue de l'Université, 67000 Strasbourg, ou hameury@astro.u-strasbg.fr^[1]^[2]^[3]

AVO-7

**Ingénieur Astrophysical Virtual Observatory
JEUNE INGENIEUR INFORMATICIEN**

Lieu de travail: Centre de Données astronomiques de Strasbourg (CDS)

L'ingénieur sera chargé du développement de services de recherche d'information dans des ressources en ligne hétérogènes distribuées. L'objectif de ce travail, dans le cadre du projet européen AstrophysicalVirtual Observatory, est de permettre des accès conjoints aux archives des grands observatoires sol et spatiaux européens partenaires du projet (Observatoire Européen Austral - ESO, Agence Spatiale Européenne - ESA, archives britanniques, ...), en particulier à l'aide d'outils d'interopérabilité développés au CDS.

Débutant ou quelques années d'expérience, contrat à durée déterminée, 1 an renouvelable

Compétences:

- Pratique des langages C, C++ et Java.

- Connaissance de la mise en oeuvre des outils du Web.
- Connaissance d'XML et des outils associés.
- Environnement stations de travail Unix.
- Goût du travail en équipe.
- Anglais lu, écrit, parlé indispensable.

Si vous êtes intéressé(e) par le poste, contactez M. Hameury, Observatoire astronomique, 11 rue de l'Université, 67000 Strasbourg, ou hameury@astro.u-strasbg.fr

AVO-8

The European Community has recently funded a three-years Astronomical Virtual Observatory project (AVO ;see www.eso.org/projects/avo/index.html). The goal is to design and implement the first virtual observatory for European astronomy. It involves the European Southern Observatory (ESO), the European Space Agency (ESA/ST-ECF), the Centre de données Astronomiques de Strasbourg-CDS, the National UK ASTROGRID consortium, the Jodrell-Bank Observatory in UK and the Terapix data center in Paris).

The Terapix data center offers a new position, which will be focused on AVO:

Qualification: Software Engineer

- **Duty station:** Institut d'Astrophysique de Paris, Terapix image processing center
- **Starting dates:** as soon as possible
- **Contract:** this is a fixed-term contract of two years with the possibility of one year extension. Contract funded by AVO.
- **Education:** Diploma in Computer Science or data processing
- **Knowledge and Experience:** Database management, pipeline, data processing, handling high data volume. Knowledge of C/C++ is necessary as well as knowledge and experience with relational and object-oriented databases. Knowledge of XML is recommended. Knowledge in object conception and modeling is an advantage. An excellent knowledge of the UNIX/LINUX operating systems as well as standard scripting languages are required. A good knowledge and practice of the English language and a strong sense of team spirit are essential.

Applications/CV should be sent to Yannick Mellier: mellier@iap.fr or Emmanuel Bertin: bertin@iap.fr

AVO-9

The University of Manchester

Department of Physics and Astronomy

**Astrophysical Virtual Observatory Astronomer for Jodrell Bank Observatory
(Ref.no. 1059/01)**

Jodrell Bank Observatory (JBO) requires a person to work within the EU-funded Astrophysical Virtual Observatory (AVO) project. The AVO is a consortium of 6 European astronomy organizations. The aim of the first phase of the AVO project is to prototype the scientific requirements, methodologies and technologies necessary to establish and operate a virtual observatory for European astronomy. The specific role played by JBO within the AVO consortium will be to ensure that radio astronomical data is fully integrated into the AVO by designing and developing the appropriate software tools and investigating the technologies required.

The post is available for two years, in the first instance, from an early date to be agreed. Applicants should have a good degree in a mathematical or physical science (or equivalent qualification). Experience of scientific software development and astronomical data processing is essential. Experience of software development for parallel architectures is desirable. Starting salary in the range £17,451 - £22,299 p.a.

Informal enquiries to Dr. Philip Diamond at Jodrell Bank Observatory tel: +44 (0)1477 572625, email: pdiamond@jb.man.ac.uk

Application forms and further particulars are available at <http://www.man.ac.uk/news/vacancies> or from the Office of the Director of Personnel, The University of Manchester, Oxford Road, Manchester M13 9PL tel: ++44 (0)161 275 2028; fax: ++44 (0)161 275 2471; Minicom (for the hearing impaired): ++44 (0)161 275 7889; e-mail: personnel@man.ac.uk. Please quote ref: 1059/01. Closing date for applications: 25 January 2002

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