

Background Information:

The Astrophysical Virtual Observatory - an introduction

The breathtaking capabilities and ultrahigh efficiency of new ground and space observatories have led to a 'data explosion' calling for innovative ways to process, explore, and exploit these data.

Researchers must now turn to the GRID paradigm of distributed computing and resources to solve complex, front-line research problems. To implement this new IT paradigm, you have to join existing astronomical data centres and archives into an interoperating and single unit. This new astronomical data resource will form a Virtual Observatory (VO) so that astronomers can explore the digital Universe in the new archives across the entire spectrum. Similarly to how 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.

The Astrophysical Virtual Observatory Project (AVO) will conduct a research and demonstration programme on the scientific requirements and technologies necessary to build a VO for European astronomy. The AVO has been jointly funded by the European Commission (under FP5 - Fifth Framework Programme) with six European organisations participating in a three year Phase-A work programme, valued at 5 million Euro. The partner organisations are the European Southern Observatory (ESO) in Munich, Germany, 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 in Strasbourg, France, the CNRS-supported TERAPIX astronomical data centre at the Institut d'Astrophysique in Paris, France, and the Jodrell Bank Observatory of the Victoria University of Manchester, United Kingdom.

The Phase A program will focus its effort in the following areas:

- A detailed description of the science requirements for the AVO will be constructed, following the experience gained in a smaller-scale science demonstration program called ASTROVIRTEL (Accessing Astronomical Archives as Virtual Telescopes).
- The difficult issue of data and archive interoperability will be addressed by new standards definitions for astronomical data and trial programmes of "joins" between specific target archives within the project team.
- The necessary GRID and database technologies will be assessed and tested for use within a full AVO implementation.

The AVO project is currently working in conjunction with other international VO efforts in the United States and Asia-Pacific region. This is part of an International Virtual Observatory Alliance to define essential new data standards so that the VO concept can have a global dimension. The AVO partners will join with all astronomical data centres in Europe to put forward an FP6 IST (Sixth Framework Programme - Information Society Technologies Programme) Integrated Project proposal to make a European VO fully operational by the end of 2007.