

D-Lib Magazine ‘in Brief’ column contribution.

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The Astrophysical Virtual Observatory

Astronomy, like many other physical sciences, has reached a crisis point for the execution of large national and international research programs. In the last decade of the 20th century, an array of new ground and space observatories were inaugurated which now collect data across large sections of the electromagnetic spectrum. The data explosion from these new observatories can no longer be readily processed, explored and exploited on the desktops of individual astronomers. Researchers must now turn to the GRID paradigm of distributed computing and resources to conduct new and innovative programs. A necessary step to utilize this new IT paradigm is to join the existing astronomical data centres and archives into an interoperating and federated unit. This new astronomical data resource will effectively form a Virtual Observatory (VO) in which the digital Universe resident in the new archives can be seamlessly explored across the entire spectrum. 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.

The Astrophysical Virtual Observatory Project (AVO : <http://www.eso.org/projects/avo/>) will conduct a research and demonstration program on the scientific requirements and technologies necessary to build a VO for European astronomy. The AVO has been jointly funded by the European Commission and six European organizations for a three year Phase-A work program valued at 5 million Euro. The six partner organisations are lead by the European Southern Observatory (ESO) in Garching near Munich. The other partners are the Space Telescope European Coordinating Facility (ST-ECF), the ASTROGRID (UK) consortium, the Centre de Données Astronomiques de Strasbourg (CDS) at the University Louis Pasteur in Strasbourg, the TERAPIX astronomical data centre at the Institut d'Astrophysique in Paris and the Jodrell Bank Observatory. The Phase A program will focus its work in three areas. Firstly, 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. <http://www.stecf.org/astrovirtel/>). Secondly, the difficult issue of data and archive interoperability will be addressed by new standards definitions for astronomical data and trial programs of “joins” between specific target archives within the project team. Finally, the necessarily GRID and database technologies will be assessed and trailed for use within a full AVO implementation.

The need for VOs has also been recognized by the international astronomical communities. The American National Academy of Science Decadal Survey of Astronomy recommended the funding of a National Virtual Observatory in the US which has now been funded by the NSF. The AVO project team has formed a close alliance with the NVO effort and both groups are working towards a joint international meeting to be held in Munich in June 2002 (<http://www.eso.org/gen-fac/meetings/vo2002/>) . It is clear to the NVO and AVO communities that there are no intrinsic boundaries to the VO concept and that all astronomers should be working towards a truly global virtual observatory that will enable new science to be done on the wealth of astronomical data held in the growing number of first class international astronomical archives.