

CHINESE VIRTUAL OBSERVATORY



The Chinese Virtual Observatory (China-VO) project was initiated by the National Astronomical Observatories of China (NAOC) and the Large Sky Area Multi-Object Fiber Spectroscopic Telescope project (LAMOST). The China-VO became a member of the International Virtual Observatory Alliance (IVOA) in October 2002.

The Research and Development (R&D) program of the China-VO brings many new opportunities and challenges to the Chinese astronomical community. Acting as a bridge between the International Virtual Observatory Alliance (IVOA) and the Chinese astronomical community, the China-VO will enable domestic astronomers to enjoy the latest advances and discoveries from the international astronomical community, and to share Chinese astronomical resources with colleagues worldwide.

The China-VO will cooperate closely with the LAMOST project, which is currently the only major astronomical project in China. The LAMOST telescope is a meridian reflecting Schmidt telescope (Fig. 1). It is a unique instrument, combining a large aperture (4 m) with a wide field of view (5 degrees). The telescope is linked to 4000 fibers on its large focal plane and will be able to acquire tens of thousands of spectra per night when it becomes operational in 2006. It will usher in a new era of Chinese astronomy, taking a leading role in wide field spectroscopy and in the fields of large scale and large sample astrophysics.

The China-VO mainly addresses the following tasks:

- **Astronomical data interoperation:** The China-VO will collaborate with IVOA partners to solve the common challenges of a VO to make the IVO a real data-intensive online astronomical research platform.
- **Spectral data auto-processing:** The China-VO will collaborate with the LAMOST project closely. Lamost is a powerful spectroscopic sky survey telescope requiring a toolkit to process automatically the huge volume of spectral data produced. The China-VO will take a key role in developing this toolkit and integrating it into the IVO.
- **VO-enabled LAMOST:** Automatic processing and analysis of spectral sky survey data are an important feature of the China-VO. The VO-enabled LAMOST is a major goal of the China-

Fig. 1: LAMOST Telescope (art)



VO, which includes integrating the sky survey data and the telescope into the IVO. Furthermore, the LAMOST sky survey needs an excellent predefined catalog of observation targets that can be collected from the abundant astronomical resources integrated through the IVO.

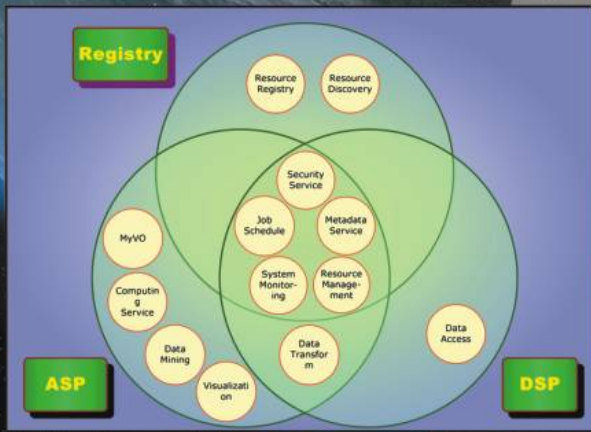


Fig. 2 Service-oriented China-VO Architecture

The system architecture of the China-VO is based on Grid technologies, notably the Open Grid Service Architecture (OGSA) developed by the Global Grid Forum. Service-oriented procedures will be implemented in the R&D phase of the China-VO. Server-side components of the system will have three roles: data service provider (DSP), application service provider (ASP) and VO Registry (Fig. 2). System functions will be implemented by different VO services, forming a kind of Grid service. The Chinese National Grid (CNGrid) will act as a test-bed for the China-VO to provide a high performance Grid computing service. Recently a ConeSearch service based on the Globus Toolkit 3 Beta (Fig. 3) has been developed to access some popular catalogs, including GSC-II, 2MASS, USNO-A 2.0, NVSS, Tycho-2, etc.

Main access to the China-VO services is via a portal and the China-VO will adopt a standard modular developing mode so that services from different providers can be integrated into the portal easily, and users can customise their "MyVO" as a personalized VO accessing environment. Internationalization and localization are both necessary for the China-VO to provide a user-friendly interface for national users and to share the valuable Chinese historical observational data with international users. The China-VO will follow international standards and adopt compatible tools in its R&D program.

At present, China-VO partners include:

- Department of Astronomy, Peking University
- Astrophysics Center, Tsinghua University
- Center for Astrophysics, University of Science and Technology of China
- Yunnan Astronomical Observatory, NAOC, Chinese Academy of Sciences
- Computer Network Information Center, Chinese Academy of Sciences
- Institute of High Energy Physics, Chinese Academy of Sciences

Please send suggestions and comments to: Chenzhou CUI (ccz@bao.ac.cn) or Yongheng ZHAO (yzhao@lamost.org).

<http://www.china-vo.org>

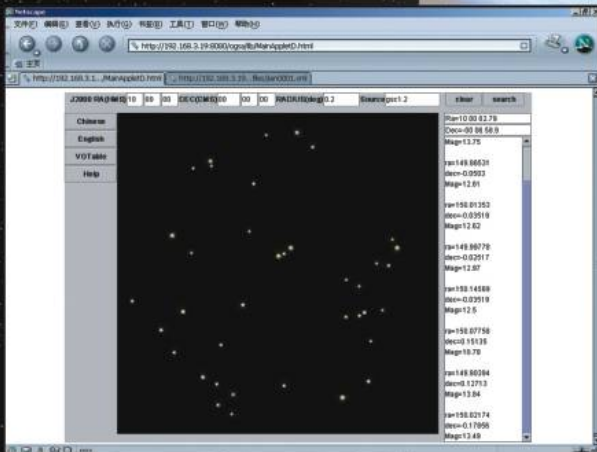


Fig. 3a China-VO ConeSearch Service

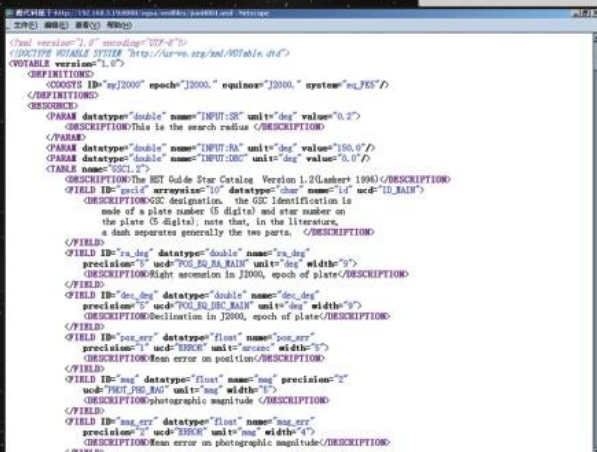


Fig. 3b China-VO ConeSearch Service