

# IVOA Status Report 2005

IVOA Executive  
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The International Virtual Observatory Alliance (IVOA) was formed in June 2002 with a mission *to facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and interoperating virtual observatory*. By January 2005, the IVOA has grown to include 15 funded VO projects from Australia, Canada, China, Europe, France, Germany, Hungary, India, Italy, Japan, Korea, Russia, Spain, the United Kingdom, and the United States. This membership is now being expanded to include representation from projects constructing and planning new observatories and astronomical facilities, as well as emerging astronomical communities that seek to benefit from the global availability of VO facilities and technologies.

In January 2003, the IVOA Executive adopted several strategic approaches to achieving the IVOA mission. Firstly, the work of producing standards was to be modelled on the W3C process involving a cycle of Working Drafts, Proposed Recommendations, and finally Recommendations to the international community as represented by the International Astronomical Union (IAU). Secondly, Working Groups were created with cross-project membership in those areas where key interoperability standards and technologies had to be defined and agreed upon. The Working Groups represent a significant commitment from each of the projects to build new standards on a time scale consistent with the original IVOA Roadmap (2002-2005). Finally, the IVOA Executive emphasised the importance of annual demonstrations for the astronomical community of new and emerging VO capabilities. Demonstrations provide a forum to engage the scientific community, they provide a major, regular, and predictable milestone for development projects to meet deadlines, and they allow the IVOA Executive to assess progress on standards development in order to set priorities for standards roll-out in a coordinated way.

Currently the IVOA coordinates eight Working Groups as well as four Interest Groups in areas such as Applications and Theory. The efforts of the Working Groups have been coordinated and focused through five international Interoperability Workshops held in the US, the UK, France, and India between October 2002 and October 2004. To date, the Working Groups have produced Working Drafts, Technical Notes and specific Recommendations in the areas of XML data format standards (VOTable), VO Resource Metadata, Universal Content Descriptions, Space-Time Coordinate Metadata, unified Data Access Layer standards for spectra and images, VO resource registries, VO Query Language, unified astronomical Data Models, and Web Service technologies for the VO. The chairs of the Working Groups have also produced an overall architectural plan for an operational VO that identifies the critical areas for current and future development of standards and technologies. The IVOA has also sponsored two regional VO meetings in

China and India to ensure that small VO projects in these areas have a forum to share developments with each other and the larger projects in Europe and the US. In January 2003, 2004, and 2005, coordinated demonstrations of VO developments were held in the US and Europe which highlighted progressively more complex VO capabilities, new web-accessible services for the community, and down-loadable prototype software that proved capable of producing new scientific results in multi-wavelength astronomy. In July 2003, a coordinated set of demonstrations was held at the IAU General Assembly by ten VO Projects that highlighted the international scope of the VO effort.

The IVOA has also sought to form links to other communities, projects, and governing bodies in order to share technological approaches, gather scientific and technical requirements and to promote the importance of adequate funding for the scientific exploitation of data from new and existing facilities. In particular, the IVOA has initiated the formation of an astronomical Grid community Research Group within the Global Grid Forum, has encourage IAU Commission 5 to form a VO Working Group to facilitate IAU oversight and endorsement of IVOA recommendations, has made presentations to specific large project meetings (ALMA, LSST, and IAU Joint Discussions), and has actively participated in the OECD Global Science Forum workshops on Future Large-Scale Projects and Programmes in Astronomy and Astrophysics (April 2004). The OECD workshop summary noted: *The huge volume of digital information flowing from the new observatories raises the challenges of collecting, using, storing, and sharing data. The workshops identified a number of major issues in the context of a new community-based vision for a common research infrastructure: the "Virtual Observatory". Impressive progress has been made and the momentum of the International Virtual Observatory Alliance will ensure sustained progress, provided support and funding are made available.* The IVOA is also engaged in the OPTICON-sponsored study of Future Astronomical Software Environments, helping to define a framework in which legacy applications, data processing pipelines, custom analysis tools, and VO-enabled data access can be easily integrated together. The IVOA will seek to maintain its momentum, commitment, and level of success in the coming three years.