

Highlights: FY2005, through June 30, 2005.

Scientific. The project released new science applications at the January 2005 AAS meeting in San Diego, including the Registry Portal (for data location and discovery), NVO Datascope (data discovery, display, and integration), OpenSkyQuery (remote database queries and cross-matching), NVO Spectrum Services (display and analysis of ~1M spectra), and WESIX (Web-Enabled Source Identification with Cross-Matching, a web services wrapper for SExtractor combined with cross-matching against any available OpenSkyNode database). These applications were chosen with the advice of the NVO Science Steering Committee, which met in July 2004. The NVO SSC will again provide advice at a meeting to be held in July 2005.

A special session on VO-enabled science was held at the January 2005 AAS meeting (San Diego). The session featured papers highlighting new science results and new resources to be made available through the NVO.

Senior NVO team members are participating in the science organizing committee for an IAU Special Session entitled “The Virtual Observatory in Action: New Science, New Technology, and Next Generation Facilities.”

Technical. NVO team members participated in the IVOA Interop workshops in Pune, India (September 2004) and Kyoto, Japan (May 2005). Substantial progress on international VO standards was reached as a result of these meetings.

The Simple Spectral Access Protocol (SSAP) has matured and is supported by a Spectral Data Model. The SSAP presents a rich query interface and several response formats, reflecting the diversity of spectral data formats and representations. Version 1.0 of SSAP is to be presented as a Proposed Recommendation by the time of the fall Interop workshop (to be held in Madrid, Spain, following the ADASS Conference).

Many features of the SSAP will be incorporated into a more versatile Simple Image Access Protocol (SIAP). SIAP V1.1 is also planned to be ready for the Madrid Interop meeting.

A new protocol for access to spectral line databases, the Simple Line Access Protocol (SLAP) is also under development.

Work on the VO Registry in the past year has emphasized metadata quality, improved harvesting, and the development of a “registry of registries”. The latter will be a simple index of registry services that will make it easy for projects to determine where to harvest resource records. Experience with Resource Metadata V1.0 led us to modify a number of metadata element descriptions, to eliminate a few unused elements, and to add several others. These modifications have begun to work their way through the standard approval process.

The Astronomical Data Query Language (ADQL) V1.0 has been promoted to a Proposed Recommendation and will soon be available for general review through the RFC process. NVO's OpenSkyNode interfaces fully support ADQL V1.0, thus enabling generalized access to astronomical databases and object cross-matching. Discussions continue on incorporating ADQL-based queries into the Data Access Layer interfaces, SIAP and SSAP.

Significant progress has been made on the VOStore concept, by which users of the virtual observatory can store data files and tables in a distributed and secure manner. Results from remote services will have their results stored in VOStore, with location transparency, and the results can be shared with collaborators. VOStore motivates the implementation of authentication and authorization capabilities, and various approaches are being evaluated.

A new IVOA Working Group was formed in the fall of 2004 to develop a standard protocol for transient event notification. An IVOA VOEvent workshop was held at Caltech and concluded with an agreement by an international team on an information infrastructure to support the burgeoning field of event-based astronomy. The objective of the VOEvent working group is to build an open standard for exchanging messages about immediate astronomical events, including publication, archiving, query, subscription, and aggregation. The VOEvent standard was agreed in rough form at the workshop, and has buy-in from projects including GCN, LSST, Pan-STARRS, Palomar-Quest, LIGO, eStars, Raptor, Pairitel, ATEL, and Hands-On Universe. The standard was discussed and generally endorsed at the Kyoto Interop workshop in May.

The Space-Time Coordinates (STC) metadata specification and associated XML schema were promoted to Proposed Recommendation status. VOEvent discussions have helped to focus the development team on the importance of the STC and have led to comments during the open Request-for-Comments period.

Following the guidance of the NVO External Advisory Committee, we are starting to explore mechanisms and partnerships for supporting long-term data preservation. Of immediate concern are the digital data sets associated with the peer-reviewed literature, which often reside on the websites of individual researchers and often become inaccessible after a few years. We are participating in planning discussions, and investigating proposal opportunities, to develop support for these data sets in collaboration with the American Astronomical Society, the University of Chicago Press (publisher of the ApJ and AJ for the AAS), and the JHU Library.

Education and Public Outreach.

Funding has been secured from NSF and NASA to sponsor a second NVO Summer School, to be held 6-15 September 2005 at the Aspen Meadows Resort in Aspen, CO. Planning is well underway. Applications were received from 55 individuals and 40 have confirmed their participation. The Summer School program has been lengthened this

year in response to feedback from last year, and there will be strong emphasis on research applications of the VO tool and technology.

NSF has also provided funding for a program of small research initiatives. The NVO project will prepare an invitation for proposals and will select the most promising small projects through a peer review process that draws upon the expertise of team members and our external Science Steering Committee.

A new NVO education and outreach web portal is being set up, and partnerships with several external projects have been established. NVO personnel are collaborating with UC Berkeley on a NASA AISRP-funded project to publish press-release images via VO standard interfaces.

A proposal to NSF's Cyberinfrastructure-TEAM program to set up the EPO equivalent of the NVO Summer Schools was rejected without review owing to a misunderstanding about budget limits.

Management.

The project is in good fiscal health. Spending is at planned levels, with earlier year underspends being gradually utilized. We are on track for concluding the project at the end of Year 5 with a balanced budget.

Team meetings were held in Socorro (November 2004), Tucson (April 2005), and Pittsburgh (July 2005). The NVO Advisory Committee met in San Diego (January 2005) and submitted a very positive report. The NVO Science Steering Committee met in conjunction with the July 2005 team meeting. Members of the NVO Executive Committee continue to participate in International VO Alliance meetings and telecons.