

# VO/IVOA and The Astronomy Community

Dave De Young  
NOAO

# VO and The Astronomy Community

- Why Should We (VO) Care?
  - Mission of Most (if not all) VO Projects
  - Most Projects Entering Operational Stage
  - Most Funding Agencies
    - Care About Demographics
    - Respond to User Input
    - Will Not Continue to Fund Projects Seen as Irrelevant
- Why Should We (IVOA) Care?

# VO and The Astronomy Community

- Input From:
- US NVO Experience
  - Science Advisory Committee
  - VO Science Use Project
  - Summer Schools, "Test Particle" Projects
- Reports of Other IVOA Member Activities
  - Workshops
- Discussions with Astronomers
- - Not A Complete Sample

# NVO Portal Science Use Cases

- Test Particles for Portal Capability
- Need “Real” Scientific Inquiry Questions
- 31 Test Queries Received
  - 8 From Team Members
  - 23 From Science Advisory Cte Plus Others
- Topics Included Stellar, Galactic, Extragalactic, Theory

# Portal Science Use Cases

- Ranking of Queries – Not Ranked on Science
  - A: Simple, Well Defined, Portal Should Do Very Easily
  - B: MultiStep Inquiries; Otherwise Well Defined
  - C: MultiStep, Some Parts Not Well Defined
  - D: Not Well Defined; Need More Information
  - F: Not Applicable
  - A/D: Not Well Defined; Easily Fixed

# Portal Science Use Cases

- Ranking of Queries – Some Ambiguous
  - A: Simple, Well Defined, Portal Should Do Very Easily - 12
  - B: MultiStep Inquiries; Otherwise Well Defined - 5
  - C: MultiStep, Some Parts Not Well Defined - 3
  - D: Not Well Defined; Need More Information - 2
  - F: Not Applicable - 0
  - A/D: Not Well Defined; Easily Fixed - 9

# Portal Science Use Cases

## ■ Class A Queries

- In a sample of Chandra X-ray point sources, which have a counterpart at any other wavelength?
- Make me an SED of a galaxy of  $N \times 10^{12}$  solar masses and redshift  $z$  whose stars all formed at a redshift of 2.
- For all stars in a 1 degree circle around a given point in the sky that a) are in USNO-B, 2MASS, and SDSS, and for which b) the error in the star's proper motion is  $< 10$  mas/yr, please return the USNO proper motion, the 2MASS position, and the SDSS colors and  $r$  magnitude.

# Portal Science Use Cases

## ■ Class A/D Queries

- Make me an SED of a galaxy of  $N \times 10^{12}$  solar masses and redshift  $z$ , **most** of whose stars formed at  $z = 2$ , but is forming stars at a rate of 10 solar masses per year now.
- What is the sample of known X-ray quasars which are **even occasionally** bright enough to achieve a **decent** X-ray spectrum within  $1'$  of a known cluster of galaxies?



# Portal Science Use Cases

- Class A/D Queries – How Should the Portal Respond?
  - Which Abell clusters have steep spectrum radio sources and extended x-ray emission? Are there newly identified clusters (e.g., from SDSS) with similar properties?

# Portal Science Use Cases

- Class A/D Queries – How Should the Portal Respond?
  - Which Abell clusters have **steep spectrum** radio sources and extended x-ray emission? Are there newly identified clusters (e.g., from SDSS) with **similar** properties?
- Bad Response: “Poorly Defined – Go Away”
- Other Response: “Please Define Steep Spectrum”
  - Reply: “Alpha > 1” OR “Alpha < 1” - Conventions!
  - Between What Frequencies?

# US NVO Science Advisory Research Project

- Obtained *in situ* Feedback from Users
- Interviews, Observations (FOW), Surveys, Follow-Up Email
- Interviewed/Observed ~ 15 Astronomers from JHU & STScI plus ~ 10 Astronomers at Dec 2006 AAS Meeting

# US NVO Science Advisory Research Project - Results

- Keep Interface SIMPLE
- Keep Interface SIMPLE
- Use Contextual Help
- Consistency in Applications
- Eliminate Jargon – e.g., Forbidden Words:
  - Registry
  - Cone Search
  - Metadata
  - “Service” (e.g., web service), SIAP, etc.

# US NVO Science Advisory Research Project – Results (Cont'd)

- Need for Ability to Do Reconnaissance
- Applications Requiring Extensive Background Reading not Generally Useful
- Several NVO Specific Recommendations

# Evolution of NVO Web Page

## 2007 Page



## US National Virtual Observatory

Google Custom Search NVO

Home | Get Started with NVO | Tools | Data | Publish | Software Library | Education | Documents | Contact Us

### About

[What is the NVO?](#)  
[FAQ](#)  
[Who is Involved?](#)  
[Science Objectives](#)  
[NVO in Use](#)  
[Grid Computing](#)  
[Architecture](#)

### News

[2008 NVO Summer School Student Prizes](#)  
[NVO Newsletter Issue 2: June 2008](#)  
[NVO News Archive](#)

### Community

[NVO Mailing List](#)  
[NVO Meetings](#)  
[International VO Alliance](#)  
[NVO Summer School](#)

[Public Data Access Policy](#)  
[Privacy Policy](#)  
[Acknowledging NVO](#)



Supported by the National Science Foundation



Member of the International Virtual Observatory Alliance

[log in](#)

### NVO - Facilitating Scientific Discovery

NVO's objective is to enable new science by greatly enhancing access to data and computing resources. NVO makes it easy to locate, retrieve, and analyze data from archives and catalogs worldwide.

### NVO Community

[Subscribe to the NVO Mailing List](#) to receive occasional information on how NVO can help your astronomy, including new software and services, schools and workshops, etc.

### Start Using NVO

Browse **NVO-Ready Data Collections** to locate source catalogs, image archives, and other astronomical resources registered with the NVO

Keyword Search:   
(examples: Magnitude redshift SDSS DR4 quasar)

[Full Registry Interface](#)

Discover and Explore Data in the Virtual Observatory from archives and data centers around the world.

Object Name or Position:   
(examples: 3C273 12 29 06, +02 03 08.6 187.27, 2.05 )

[Full DataScope Interface](#)

View Catalog Coverage Maps and Source Inventories for the position or object name you are interested in.

Object Name or Position:   
(examples: 3C273 12 29 06, +02 03 08.6 187.27, 2.05)

[Full Coverage Maps Interface](#)

Please send any comments or questions to the [NVO help desk](#).

### The NVO Book



*The National Virtual Observatory: Tools and Techniques for Astronomical Research*, ASP Vol. 382, is NOW AVAILABLE. [Order your copy now!](#) Also available to [view online](#).

### NVO Newsletter



News, announcements, and a VO calendar. Subscribe to the [NVO Mailing List](#) to receive the Quarterly Newsletter in your inbox.

### NOVOSS 2008



The 4th NVO Summer School will be held 3-11 Sept, 2008 in Santa Fe, NM.

### More NVO Services...

Browse and analyze SDSS, 2dF, and your own spectra with the [NVO Spectrum Services](#)

[Query Databases and Cross-Match Object Lists](#) from some of the largest on-line catalogs in astronomy (Open SkyQuery).

[Explore the Multiwavelength Sky in the Vicinity of Transient Events](#) that have recently been observed (VOEventNet).

[Make mosaics](#) from 2MASS, DPOSS, or SDSS images (Montage).

Repair Image Coordinates in images with inaccurate or misaligned coordinate systems. [NOAO WCS fixer](#) [Pittsburgh WCS fixer](#)

Analyze or visualize your VOTable with [VOPlot](#) or [TOPCAT](#)

[Find, use, store, and edit sky footprints](#)

[Perform Source Extraction and Object Identification](#) by detecting objects in your own images and matching them with objects in the major survey catalogs (WESIX).

# Evolution of NVO Web Page

## Current Page

The screenshot shows the NVO website interface with a top navigation bar containing links like Home, About, and Search. The main content area is divided into several sections: 'NVO - Facilitating Scientific Discovery', 'NVO Community', 'Start Using NVO', and 'More NVO Services...'. Each section contains brief descriptions of the services and links to more information. A sidebar on the left provides additional context and contact information.



Discover, retrieve, and analyze astronomical data from archives and data centers around the world.



**Need help? Not sure how to start?**  
 >> Getting Started with NVO



Collect all data at a given position.  
 >> DataScope



Count matches between catalog entries and given positions.  
 >> Inventory



Query databases and cross-match object lists  
 >> Open SkyQuery



Find data collections and catalogs by searching their descriptions.  
 >> Directory



Integrate data from multiple positions and datasets.  
 >> VIM



Query the VO from the command line.  
 >> VO-CLI



Convert text tables to the VOTable format used by VO applications.  
 >> Table Tools



Do more with NVO.  
 >> Data Analysis & More



Supported by the National Science Foundation  
 Member of the International Virtual Observatory Alliance



Google Custom search the NVO website

Privacy Policy | Public Data Access Policy | Acknowledging NVO

what is the nvo  
 faq  
 the nvo book  
 behind the scenes  
 documents

### What's New?



Hot-wiring the Transient Universe 2: Real-Time Astronomy

Semantic Astronomy Workshop Call for Papers

2008 NVO Summer School Student Prizes

NVO Newsletter Issue 2: June 2008

2008 NVO Summer School: Now accepting applications!

NVO Newsletter Issue 1: March 2008

NVO Book Available to Purchase

News Archives

NVO News Feed

### Community

Subscribe to the NVO Mailing List

Restricted to NVO Development team  
 >> Internal Pages

# An Interesting VO Model

- US Virtual Solar Observatory (F. Hill)
  - Provides **Only** Data – 67 Data Sets
  - Imaging and Spectroscopy
  - Single-Point One Stop Access
    - Web Based – No SQL, XML, HTML
  - Uses “Shopping Cart” Software
  - Average Data Retrieval – 3000 Carts/Yr
  - User Community Worldwide ~ 500
    - Average Usage Per Solar Astronomer Per Year – **6**



# General Community Views

- Most Astronomers Very Focused on Their Research
- Not Interested in Learning New Applications that Do What They Can Do Now
- Not Interested in “Potential” Improvements
- Not Interested in “Do Everything” Applications

# General Community Views

- Most Astronomers DO NOT
  - Understand Java
  - Understand XML/HTML
  - Care About Elegant Code
  - Often Use SQL
- Most Astronomers DO
  - Want the Fastest/Easiest Way to Do **Their** Science

# Some Requirements for Community Acceptance

- Ease of Access – No Jargon, No TLAs
- Tools & Services
  - Simple/Useful
  - “90/10” Rule
  - Relevant/Reliable
  - Multi-wavelength Imaging
  - Direct Access to Data

# Some VO Related Workshops

- Spectroscopy – Euro-VO DCA/ESAC  
March 2007
  - Surveys, Standards, Visualization, Photometry
  - Successful Engagement of Astronomy Community
  - Meeting Driven by Astronomical Issues
  - Feedback to Projects?

# VO Related Workshops

- Multi-Wavelength Astronomy – AIDA/ESAC  
Dec 2008
  - Data Access, Tools, Surveys
  - See P. Padovani Paper
- Some Major Issues –
  - Too Many Tools, Some Duplication
  - Searches Difficult
  - Quick Checks on All Data Difficult/Impossible

# Relevance to IVOA

- IVOA Take-Up Committee
  - M. Allen, D. De Young (chair), E. Hatziminaoglou, A. Khembavi, A. Lawrence, P. Padovani
- Committee Recommendations to Date:
  - IVOA Should Promote Interface Between Astronomy and IT/Developer Communities
  - IVOA Should be a Clearinghouse for Workshop Information
  - IVOA Should Encourage Development of Useful Single Point Portals via Clearinghouse Activities

# Relevance to IVOA

- Is There an Issue of Simplifying IVOA Standards?
  - Will This Assist in Take-up?
  - Consequences?
  - Short Term? Long Term?
- Other Possible IVOA Initiatives
  - E.g., VO Implementation Initiative

# Conclusions

- Interaction with the Astronomy Community is Still a Critical Issue
- Sociological Changes in Astronomy –
  - ~ Experimental HEP
  - Long Time Scale
  - Does Not Remove the Problem
- IVOA Can Make Essential Contributions