Construction of Virtual Observatories through Global Collaboration and Standardization

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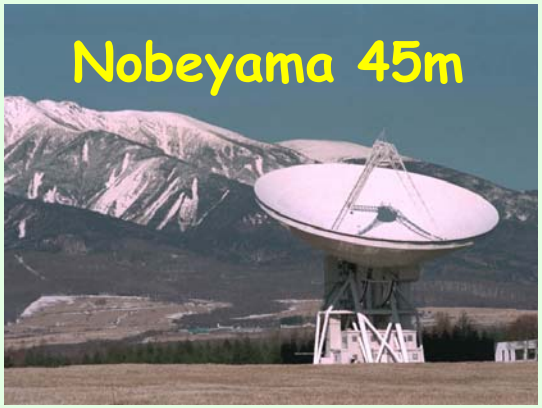
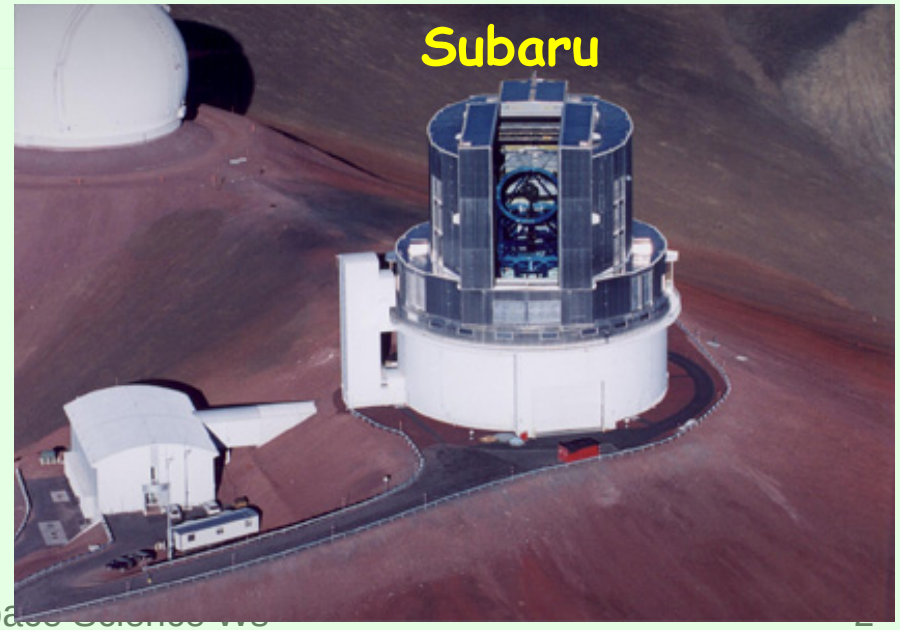
Data Resources in NAOJ

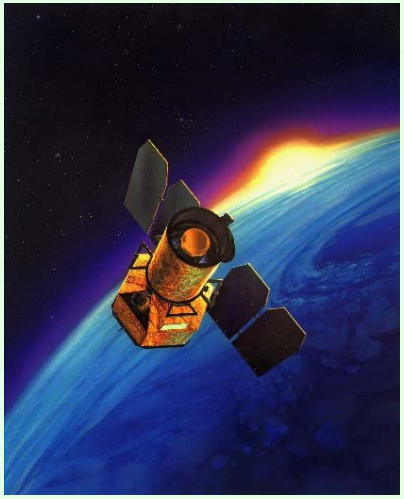
- Subaru 8.2m Optical-Infrared Telescope
- Kiso 105cm Schmidt Camera
- Okayama 188cm Optical Telescope
- Nobeyama 45m Radio Telescope
- Nobeyama Millimeter Array
- Nobeyama Radioheliograph
- VSOP
- VERA
- *ALMA*





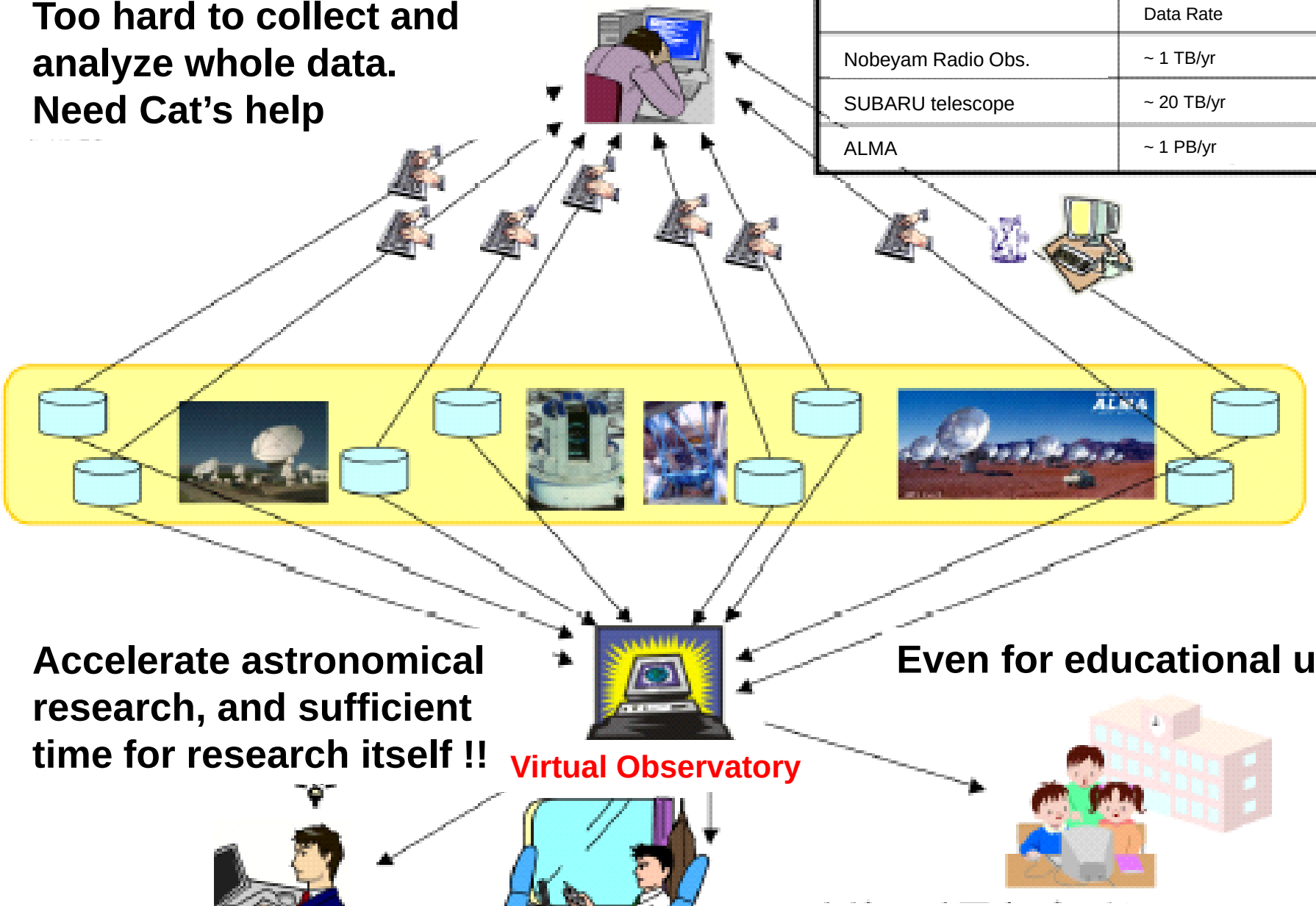
Data Resources in the World

- ESO VLT @ Paranal
- ESO telescopes @ La Silla
- Telescopes in Mauna Kea
  Subaru, Keck, JCMT, CSO, SMA,,,
- Telescopes on board satellites
  HST, GALEX,,,,



Too hard to collect and analyze whole data. Need Cat's help

	Data Rate
Nobeyam Radio Obs.	~ 1 TB/yr
SUBARU telescope	~ 20 TB/yr
ALMA	~ 1 PB/yr



Accelerate astronomical research, and sufficient time for research itself !!

Virtual Observatory

Even for educational use

Accessible from anywhere at any time

VO– New Research Infrastructure in the 21st Century

A collection of integrated astronomical data archives and software tools that utilize computer networks to create an environment in which research can be conducted.

http://www.encyclopedia.com/html/v1/virtobserv.asp

International Endorsements

- IAU XXVth GA Res. (2003 Jul.)
- OECD Rec. (‘04 Aug)
  - place archives that may be accessible via internet
  - provide adequate funding as long-term issues

VO Projects in the world

- 15 countries and a region (EU)
- International Virtual Observatory Alliance (IVOA)
  Standards to interoperate VOs

http://www.ivoa.net/

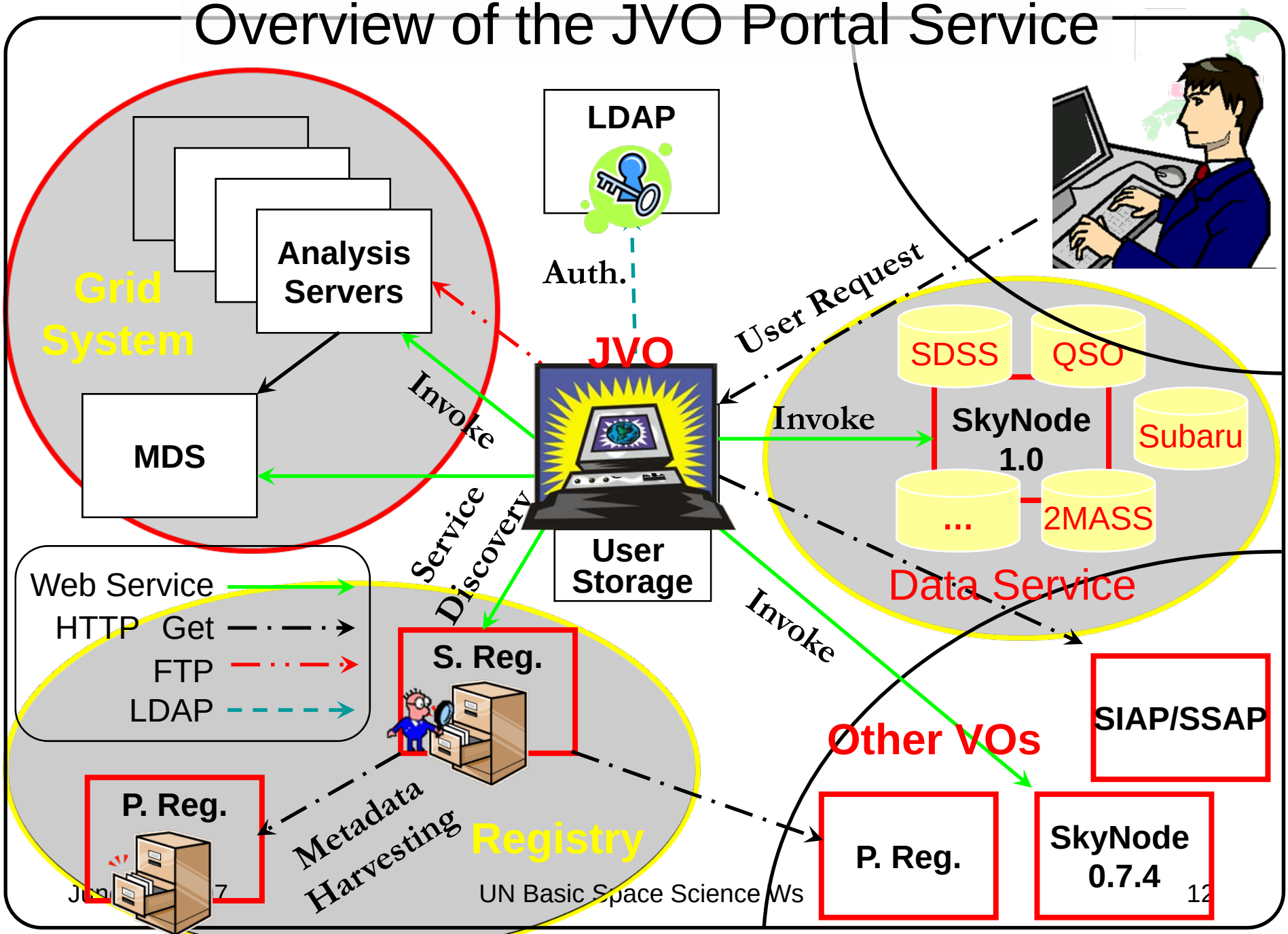
Standardization in IVOA

- Query Language to Federated DBs (VOQL)
- Access resource meta-data based on the OAI-PMH
- Access Images, Spectra, Catalogues, etc:
  SkyNode, SIAP, SSAP, STC, etc.
- Unified Attribute Names:
  UCD (Unified Contents Descriptions)
- Output format: VOTable (XML)
- and so on

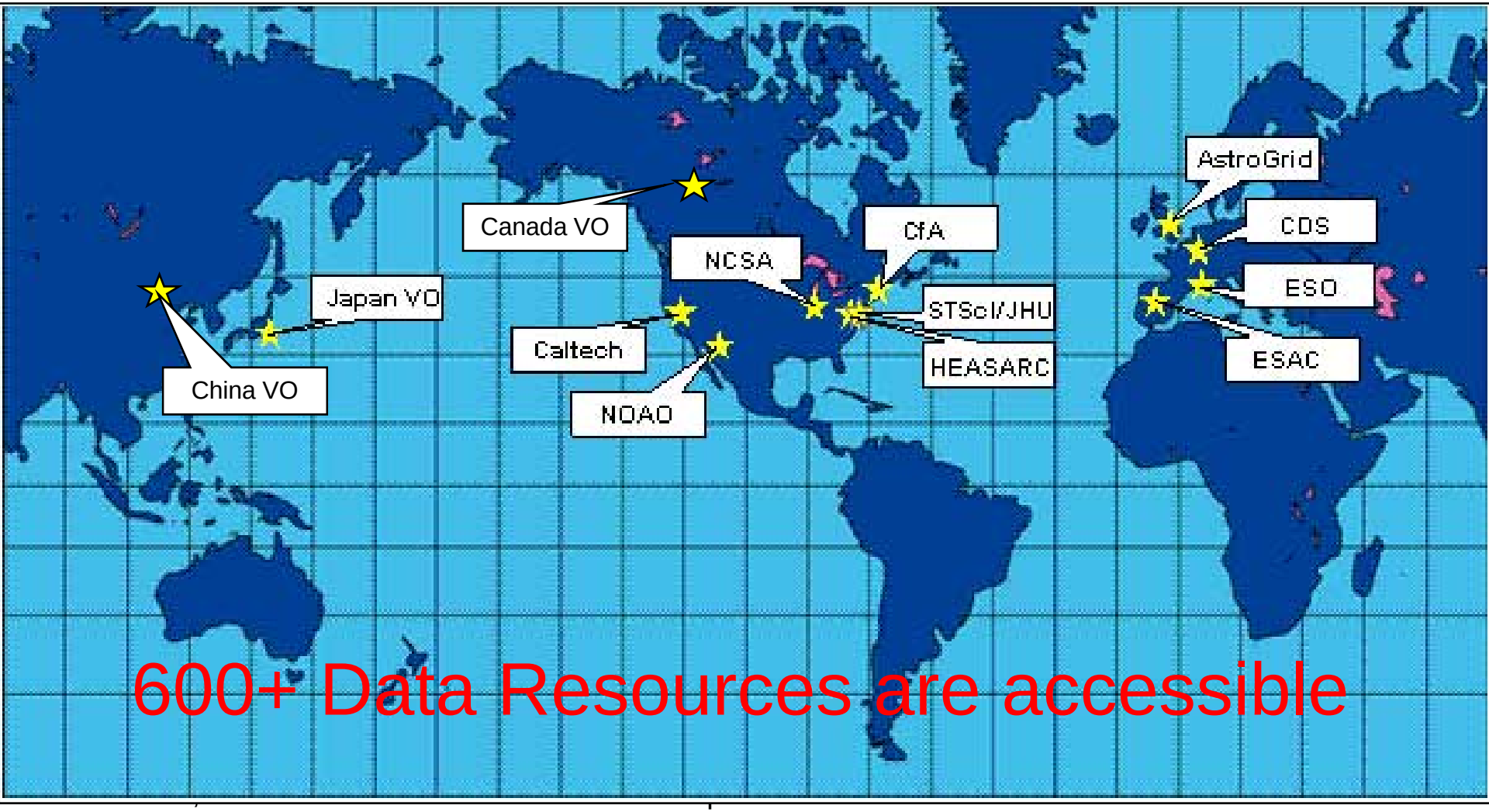
IVOA Interoperability WS

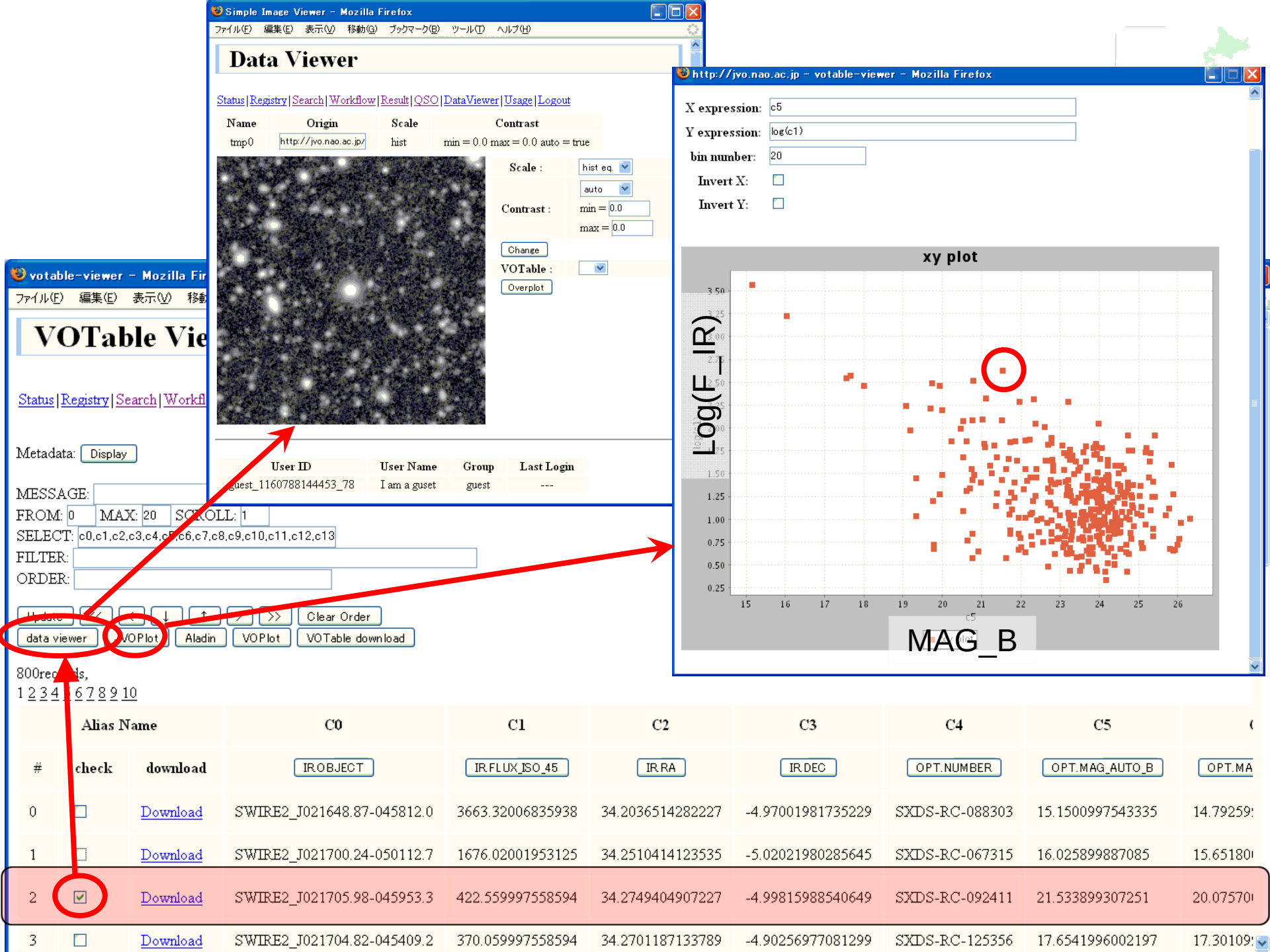
- Twice a year
- Discussions toward standardization
- Human network as a basis for cyber network

Overview of the JVO Portal Service



Interconnected VO Data services in the World

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Data Viewer
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Name
Origin
Scale
Contrast
tmp0
http://jvo.nao.ac.jp/
hist
min = 0.0 max = 0.0 auto = true
Scale :
hist eq.
Contrast :
auto
min = 0.0
max = 0.0
Change
VOTable :
Overplot
User ID
User Name
Group
Last Login
guest_1160788144453_78
I am a guset
guest
---
http://jvo.nao.ac.jp - votable-viewer - Mozilla Firefox
X expression: c5
Y expression: log(c1)
bin number: 20
Invert X:
Invert Y:
xy plot
Log(F_IR)
MAG_B
votable-viewer - Mozilla Fir
VOTable Vie
Status | Registry | Search | Workfl
Metadata: Display
MESSAGE:
FROM: 0 MAX: 20 SCROLL: 1
SELECT: c0,c1,c2,c3,c4,c5,c6,c7,c8,c9,c10,c11,c12,c13
FILTER:
ORDER:
Clear Order
data viewer
VOPlot
Aladin
VOPlot
VOTable download
800records,
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Alias Name
C0
C1
C2
C3
C4
C5
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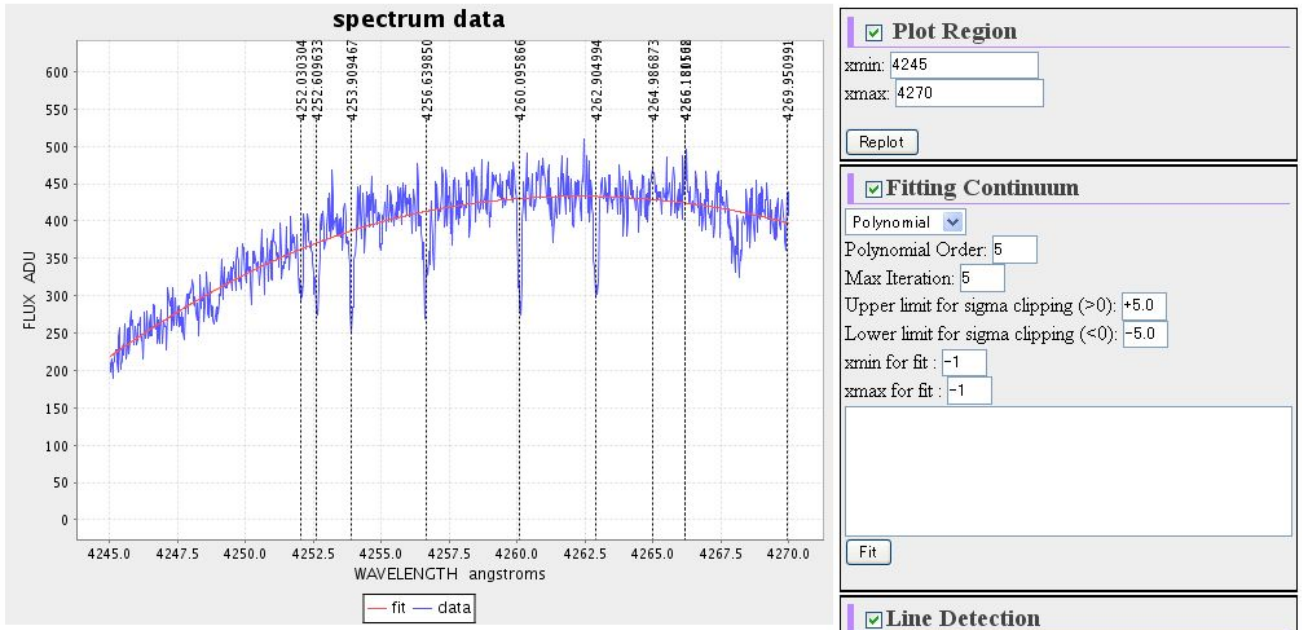
Spectral Data from Subaru



- queries
- display
- Baseline estimate
- Line detection
- VOSpec

High Dispersion Spectrometer

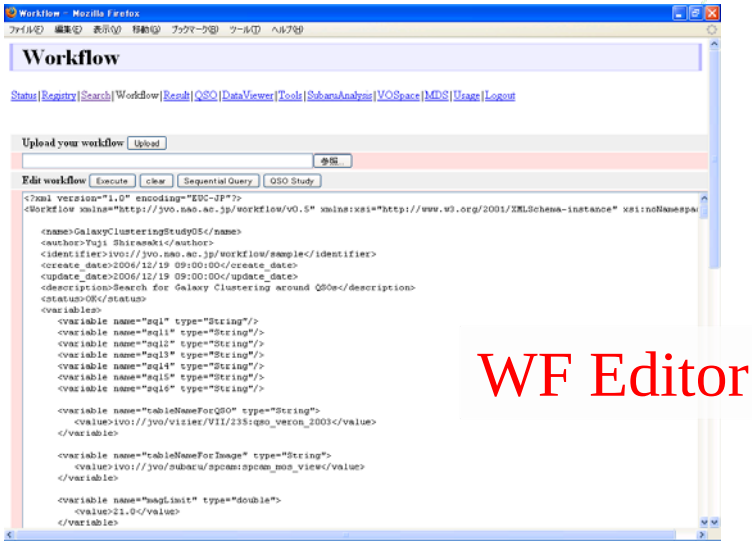
User ID	User Name	Group	Last Login
ohishi	Masatoshi Ohishi	jvo	2007-01-22 17:48:56

Total memory = 425197kB Used momory = 84917kB (19%)

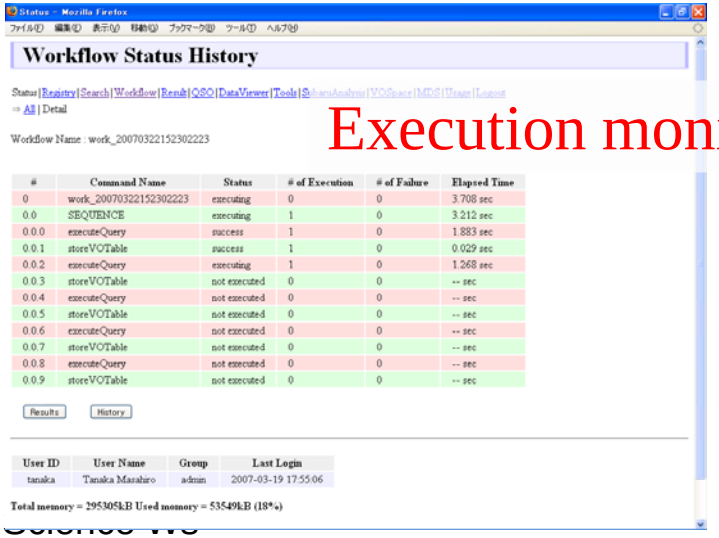
Improvement of Work Flow system

Items in FY2006

- Improvement of WFDL
  - Shorten the volume of DL
  - Array definition
  - Awk-like description (loop description in a single line)
  - and so on
- Built-in functions
  - Available to register and use built-in functions
- Status and Log system



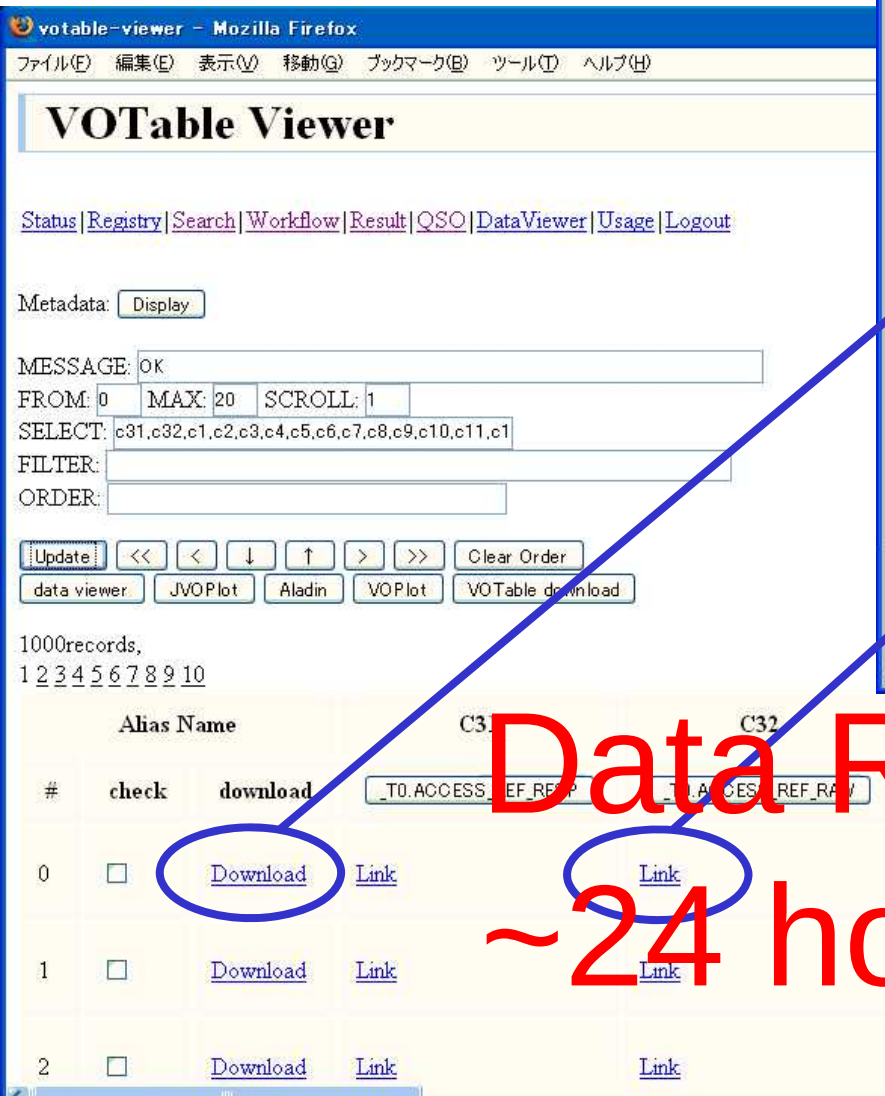
WF Editor

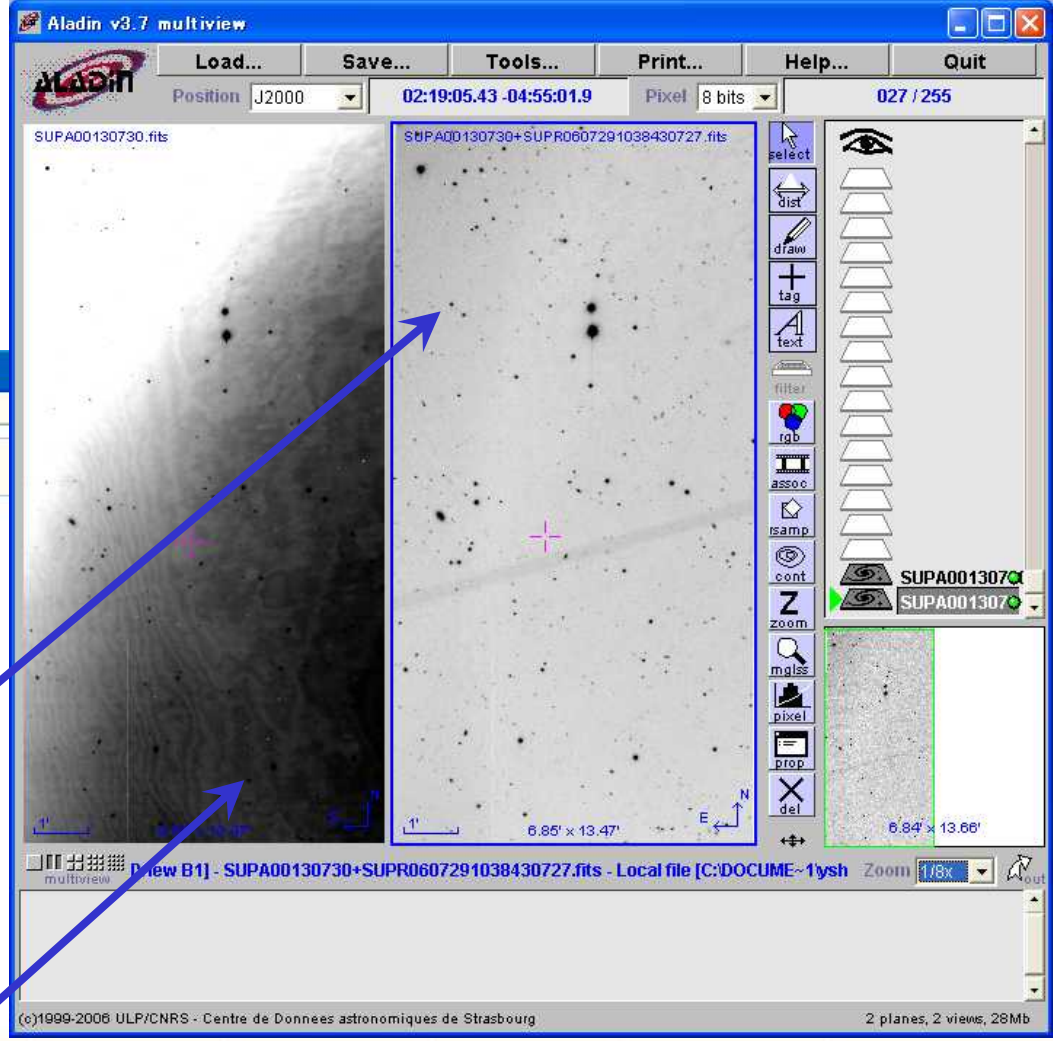


Execution monitor

– Reduction 10s
(Bias+Flat+Distortion+
Astrometory)

– Transfer 30s

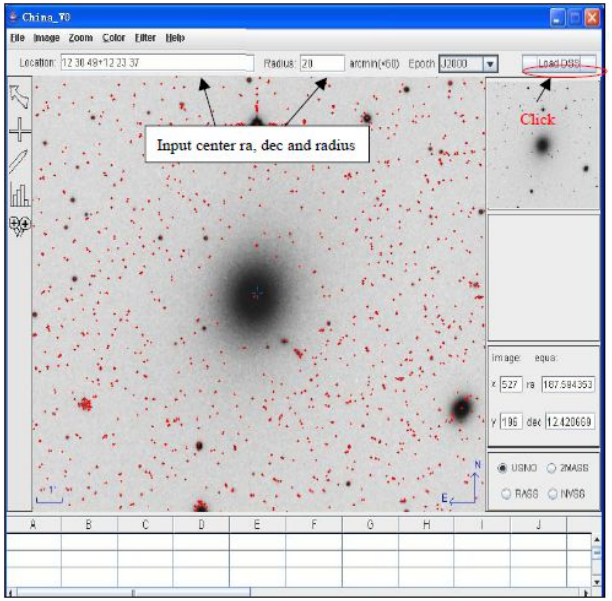


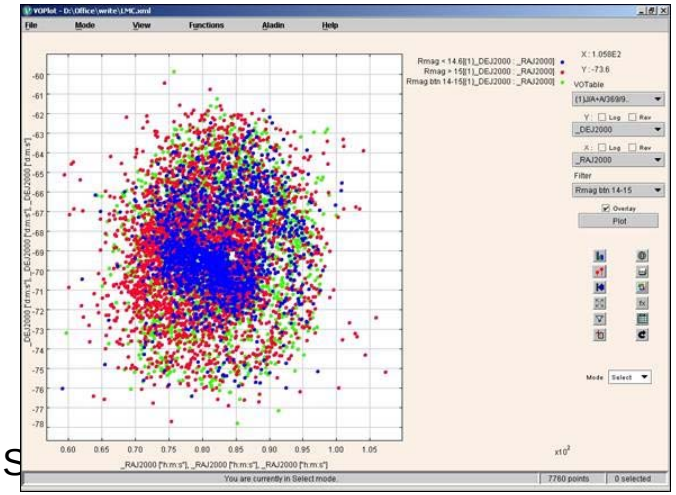


Data Reduction:
~24 hours → ~1 hour

Software Tool providers

- VO-China
  - VOFilter : VOTable → OpenOffice data
  - VOIMPAT : Image processing and analysis tool
  - ,,,
- VO-India
  - VO-Plot: to plot contents in VOTable
  - ,,,



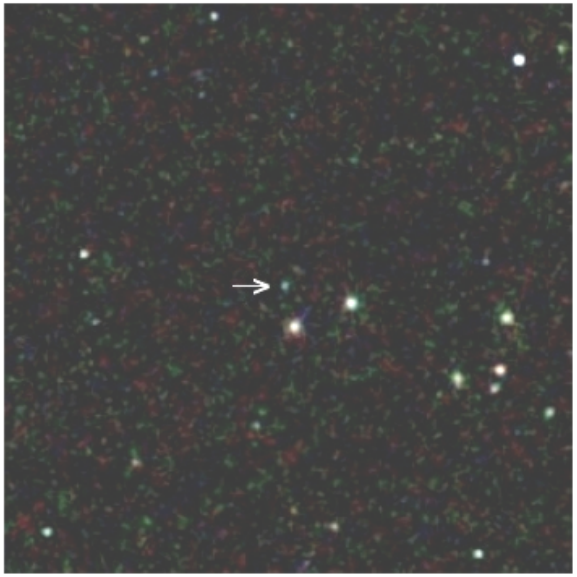


Discovery of a Brown Dwarf: SDSS/2MASS (US VO)

2MASSW J1217−03

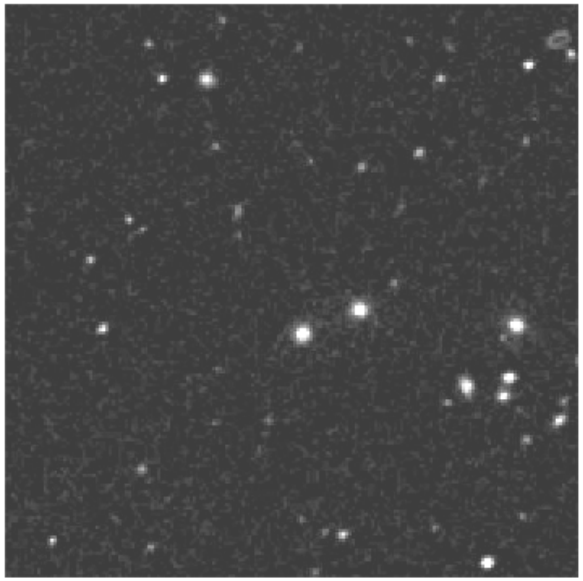
A methane (T−type) dwarf in the constellation Virgo

The near−infrared view



2MASS Composite JHK_s Atlas Image

The optical view



Palomar Digitized Sky Survey

2MASS 2 MICRON ALL-SKY SURVEY

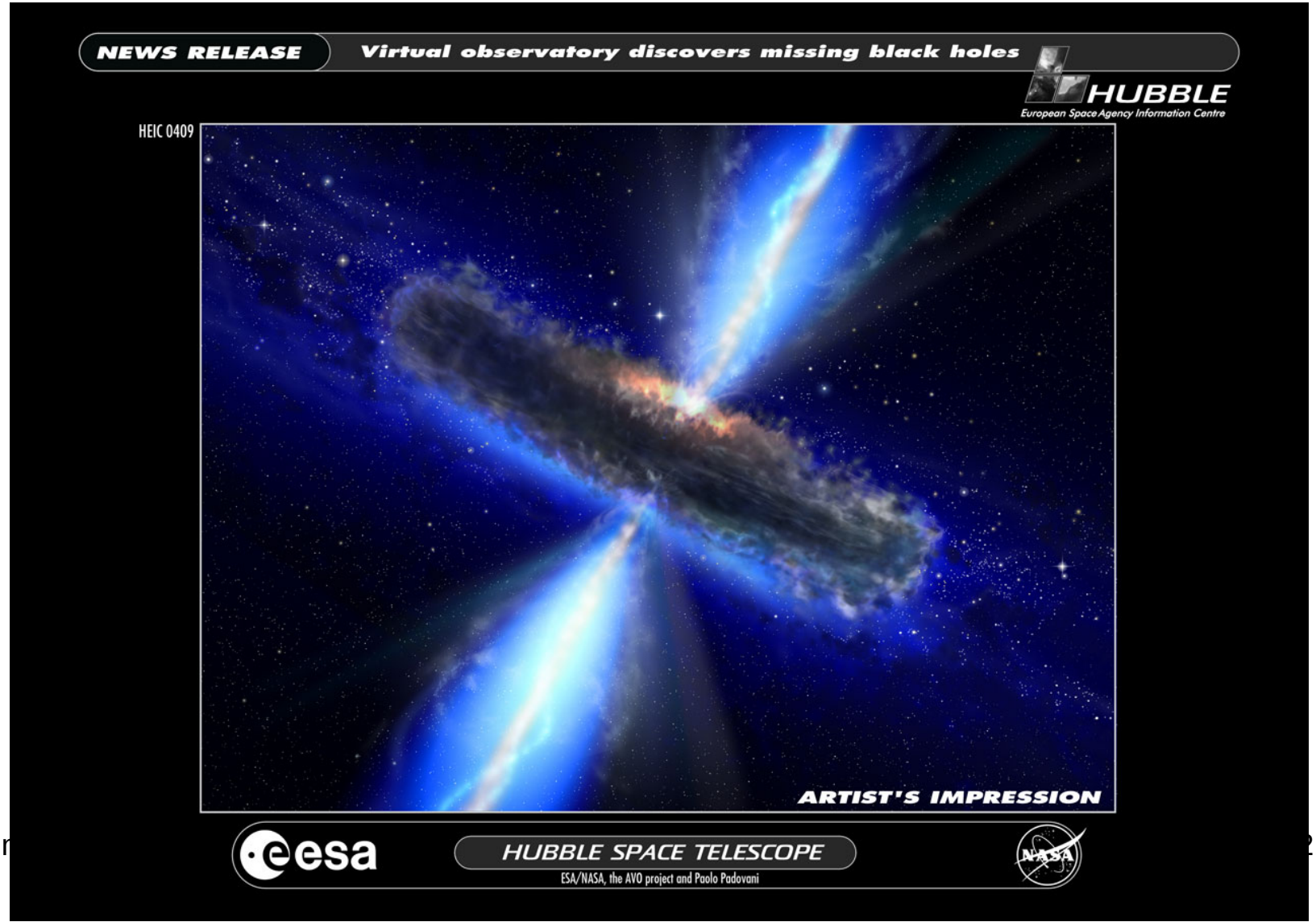
A.J.Burgasser (Caltech), J.D.Kirkpatrick (IPAC/Caltech), M.E.Brown (Caltech), I.N.Reid (U.Penn), J.E.Gizis (U.Mass), C.C.Dahn & D.G.Monet (USNO, Flagstaff), C.A.Beichman (JPL), J.Liebert (Arizona), R.M.Cutri (IPAC/Caltech), M.F.Skrutskie (U.Mass)

The 2MASS Project is a collaboration between the University of Massachusetts and IPAC

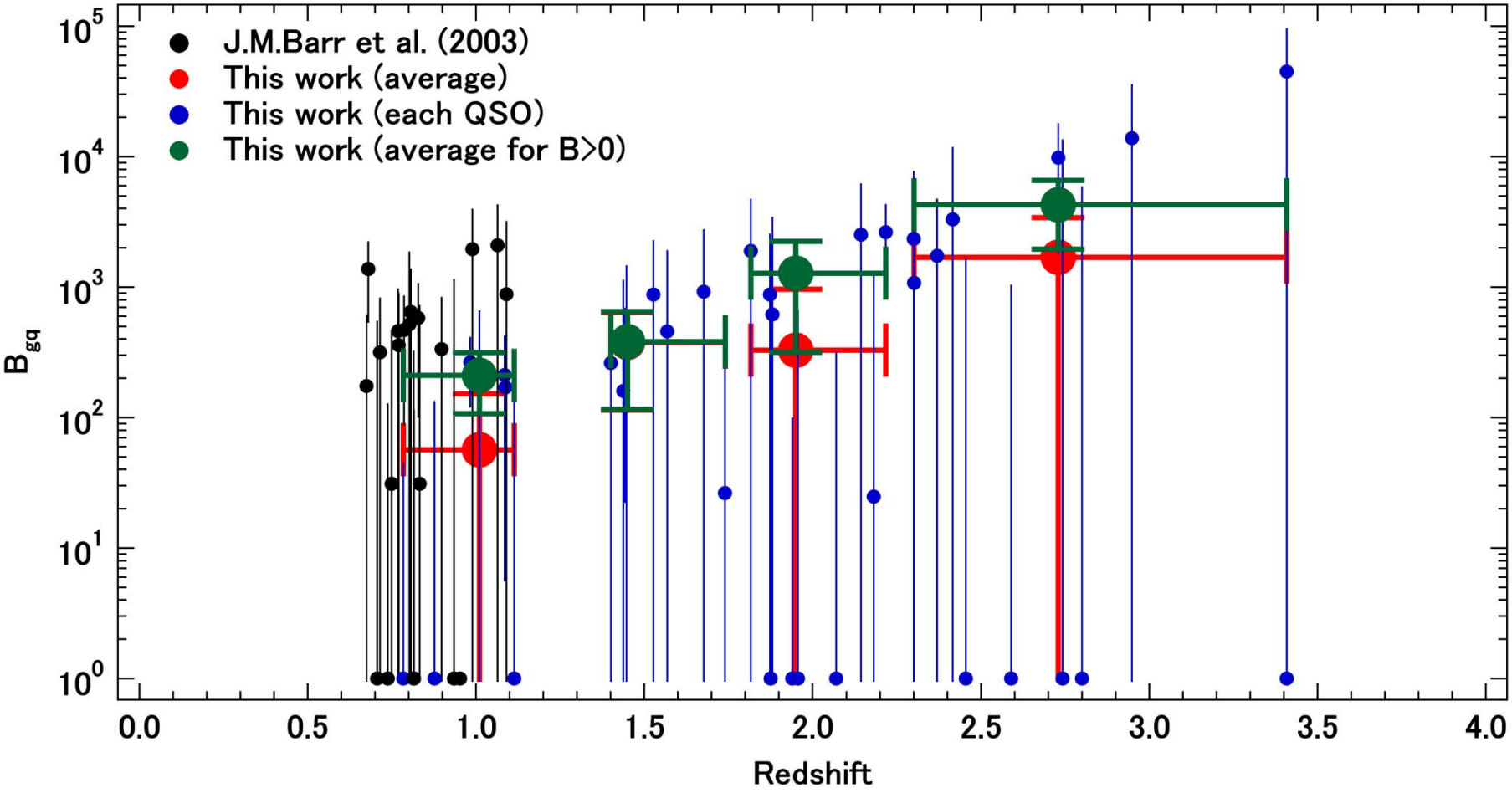
discoveries like this much easier if databases jointly queryable

SDSS

Detection of MANY Type II Quasars (EURO-VO)



Study on Environment around QSOs (Japan VO)



New Moves

- Some VO projects move from R&D phase to operations phase
  - UK, Japan, US, EU,,,
- New VO projects
  - Brazil, Chinese Taipei, Blugaria, Tagikistan, Ireland, Czech, Argentine,,,

Items to be done

- Distributed Storage to store query/analysis results
- Secure access to VOs : single-sign-on
- Other Standardizations
  - Standard application interface
- Advertisement to Data Centers
  - data centers need implement VO interfaces
- VO schools for astronomers

http://www.ivoa.net/

Contact Persons:

Francoise Genova (CDS) – chair

Dave de Jong (NOAO) – vice chair

M.Ohishi (NAOJ)

-- ex-chair