

# New VO-Related Features in TOPCAT

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# Outline

TOPCAT v3.5 release (Nov 2009)

STILTS v2.0-5, v2.1 releases (Oct, Nov 2009)

- Multiple table load
- Cone, SIA, SSA search improvements
- Multiple Cone, SIA, SSA joins
- VizieR load dialogue
- Higher profile for VO load operation (more visible in GUI)
- SAMP improvements
- VOTable updates

# Multiple Table Load

## Single load operation can now import multiple tables

- Motivation:
  - ▷ Long-standing user request
  - ▷ Previously only the first (or an explicitly numbered) table was loaded, any others ignored
  - ▷ Users could inadvertently miss packaged data
  - ▷ Necessary for proper operation of new VizieR dialogue
  - ▷ Required some backwardly incompatible changes to STIL API (more to come?)
- New behaviour:
  - ▷ When loading, all tables in container are loaded at once
- File formats affected:
  - ▷ Multi-Extension FITS files
  - ▷ Multi-TABLE VOTables
- Not done:
  - ▷ Select multiple files/services at once in load dialogues
  - ▷ Write multiple tables to single FITS/VOTable file

# DAL Service Table Load

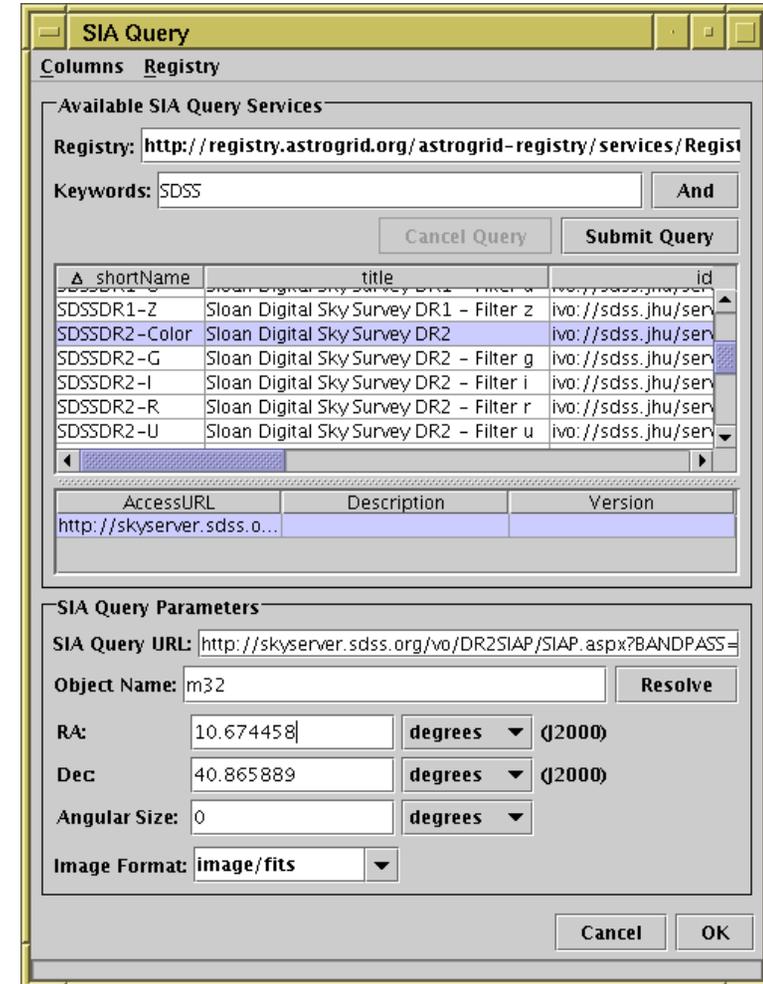
## Cone Search, SIA and SSA table load dialogues

- Improvements

- ▶ Can enter service URL by hand
- ▶ Resource table can be sorted by column
- ▶ Better feedback on registry search progress
- ▶ OutOfMemoryErrors reduced in registry search
- ▶ Common look and feel
- ▶ New SSA dialogue introduced
- ▶ Improved return metadata
- ▶ Image/Spectrum format selector

- Un-features

- ▶ Many SIA/SSA options not offered
- ▶ Registry resource display is minimal
- ▶ Registry registry search de-emphasized



# Multiple DAL Services

- Multiple Cone Search, SIA and SSA windows

- Motivation

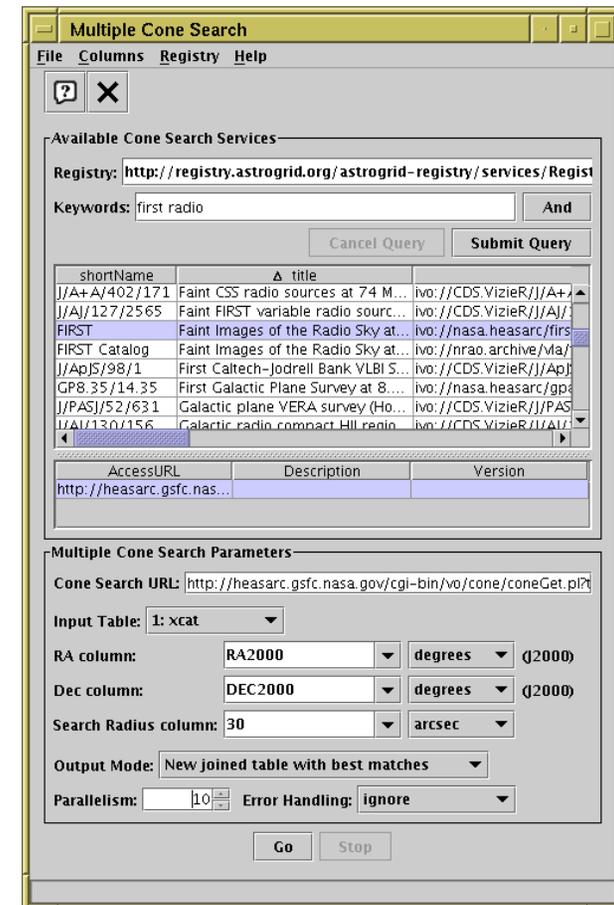
- ▶ Functionality previously in STILTS (for Cone) and VODesktop
- ▶ Common user requirement - usually requires scripting
- ▶ Cone search most often requested, but SIA/SSA useful too
- ▶ Table join between local and remote (DAL) tables

- Features

- ▶ Interface similar to single DAL search
- ▶ Search registry or enter URL by hand
- ▶ Search radius constant or column or expression
- ▶ Choice of join types (best, all, subset. . . )
- ▶ Configurable query parallelism
- ▶ Configurable response to errors

- Corresponding STILTS upgrades

- `coneskymatch` now does multi-SIA/SSA as well as multi-Cone



# VizieR Load Dialogue

## Direct table load from VizieR service at CDS

- Has some benefits over Cone Search:
  - ▷ Locate catalogues with coverage in given area
  - ▷ Consistent service and curation
  - ▷ Familiarity to some users
- Features:
  - ▷ By region or All rows
  - ▷ Different catalogue selection modes
  - ▷ Configurable row limit (including unlimited)
  - ▷ Partly configurable column list

Thanks to Thomas Boch for contributed code

**VizieR Catalogue Service**

**Row Selection**

Cone Selection

Object Name:

RA:   (J2000)

Dec:   (J2000)

Radius:

All Rows

Maximum Row Count:

**Column Selection**

Output Columns:

**Catalogue Selection**

By Category  By Keyword  Surveys  Missions

| Wavelength | Mission  | Astronomy           |
|------------|----------|---------------------|
| Radio      | ▲ ANS    | ▲ Spectrophotometry |
| IR         | ASCA     | ▲ Spectroscopy      |
| optical    | BeppoSAX | Stars               |
| UV         | ▼ CGRO   | ▼ Stars:Emission    |

| Δ Name         | Category | Density | Description                 |
|----------------|----------|---------|-----------------------------|
| III/148A       | IR       | 5       | Interstellar lines catal... |
| III/198        | optical  | 1       | Palomar/MSU nearby ...      |
| III/251        | optical  | 1       | ELODIE library V3.1 (...)   |
| J/A+A/414/825  | Radio    | 1       | Mid-infrared spectros...    |
| J/A+AS/139/359 | IR       | 1       | B3-VLA sample. II. Th...    |

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Radius:

All Rows

Maximum Row Count:

**Column Selection**

Output Columns:

**Catalogue Selection**

Keywords:

| ▲ Name           | Category   | Density | Description                      |
|------------------|------------|---------|----------------------------------|
| J/A+A/497/497    | Physica... | 0       |                                  |
| J/AJ/121/2843    | IR         | 1       | QSOs in 2MASS second incr...     |
| J/AJ/126/2421    | Radio      | 1       | 2MASS-Selected sample of...      |
| J/AJ/127/2856    | IR         | 1       | Brown dwarfs in the 2MASS...     |
| J/AJ/134/26      | IR         | 1       | Binaries with white dwarf in...  |
| J/ApJS/169/62    | GRB da...  | 0       |                                  |
| J/MNRAS/374/...  | IR         | 1       | Infrared star clusters with  ... |
| J/other/BSAO/... | IR         | 1       | 2MASS-selected Flat Galax...     |
| J/other/NewA/... | IR         | 1       | 2MASS observation of BL L...     |
| J/other/NewA/... | IR         | 1       | 2MASS photometry of cata...      |

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**Row Selection**

Cone Selection

Object Name:

RA:   (J2000)

Dec:   (J2000)

Radius:

All Rows

Maximum Row Count:

**Column Selection**

Output Columns:

**Catalogue Selection**

| ▲ Name    | Description  | KRows    |
|-----------|--|----------|
| 2MASS-... | The 2MASS Point Source Catalogue (2003)            | 470993   |
| 2MASX     | The 2MASS Extended Source Catalogue (2003)         | 1648     |
| AC2000.2  | Astrographic catalog (mean epoch around 1900)      | 4622     |
| ASCC-2.5  | All-Sky Compiled Catalog of 2.5M* (2003)           | 2501     |
| B/DENIS   | The DENIS database (3rd Release 2005 version)      | 355220   |
| CMC14     | The Carlsberg Meridian Catalog 14 (-30<Dec<...     | 95858    |
| GSC-ACT   | The HST Guide Star Catalog reduced on Tycho (...)  | 25242    |
| GSC1.2    | The HST Guide Star Catalog 1.2                     | 25242    |
| GSC2.2    | The GSC-II Catalog, Version 2.2.01 (obsoleted ...) | 455851   |
| GSC2.3    | The GSC-II Catalog, Version 2.3.2 (2006)           | 945592   |
| HIP       | The Hipparcos Catalogs                             | 1058     |
| IRAS      | IRAS catalogs                                      | 500      |
| NOMAD1    | The NOMAD Catalog (USNO-B1, UCAC2, 2MASS)          | 11176... |

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**VizieR Catalogue Service**

**Row Selection**

Cone Selection

Object Name:

RA:   (12000)

Dec:   (12000)

Radius:

All Rows

Maximum Row Count:

**Column Selection**

Output Columns:

**Catalogue Selection**

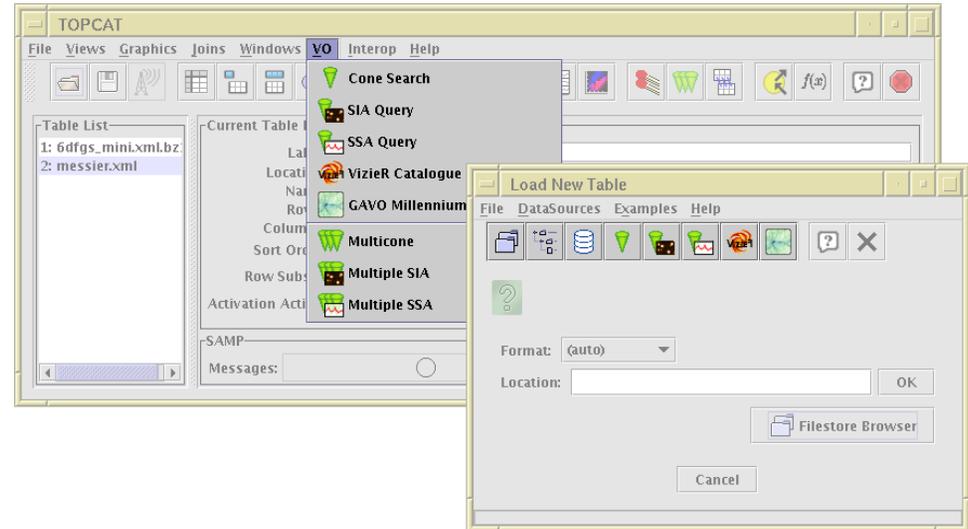
By Category  By Keyword  Surveys  Missions

| △ Name     | Description                                 | KRows     |
|------------|---|-----------|
| CFHT       | Log of CFHT Exposures                       | 550       |
| Chandra    | Log of Chandra X-ray Satellite              | 11        |
| ESO        | Archives @ ESO                              | 563       |
| FUSE       | Log of FUSE (Far-UV Spectroscopic Explorer) | 3         |
| HST        | Hubble Space Telescope Archives             | 402       |
| HUT        | Log of Hopkins Ultraviolet Telescope        | 1         |
| INT        | The Isaac Newton Telescope observation log  | 8         |
| <b>ISO</b> | <b>Log of ISO validated data</b>            | <b>23</b> |
| IUE        | IUE Ultraviolet Spectra                     | 109       |
| MERLIN     | The MERLIN interferometer at Jodrell Bank   | 2         |
| XMM        | Log of XMM X-ray Satellite                  | 10        |

# Table Load GUI Changes

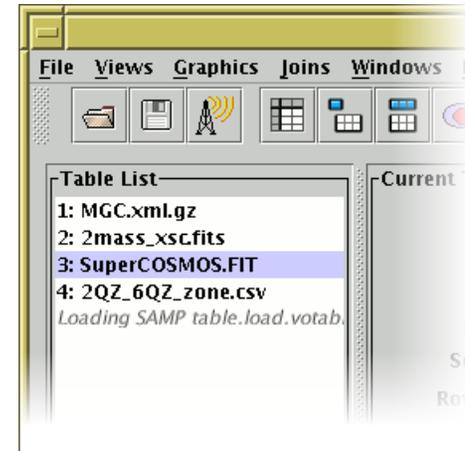
- Higher profile for VO-related import options:

- New top-level **VO** menu
- Load window now has toolbar



- Visual indication in table list when table is loading

- Useful to see when a SAMP load is in progress



# SAMP

## SAMP-related improvements to TOPCAT

- JSAMP upgraded to v1.0
  - ▷ Server port etc controllable via system properties (`jsamp.server.port`, `jsamp.lockfile`, `jsamp.localhost`, . . . )
  - ▷ Default XMLRPC endpoint now 127.0.0.1 (from bitter experience at workshops)
  - ▷ Minor bugfixes and behaviour changes
- Better use of SAMP viewers in Activation Actions
  - ▷ **View URL as Image** and **View URL as Spectrum** actions can send via SAMP
  - ▷ Works nicely with (especially multi-) SIA and SSA service queries
- Can use `-jsamp` flag to run JSAMP for convenience
  - ▷ e.g. `topcat -jsamp hubrunner`

# VOTable

## VOTable enhancements; applies to STIL/STILTS as well

- VOTable 1.2
  - ▷ Following late changes to **INFO** element (withdrawn content model change), little change to table parsing required (thanks François!)
  - ▷ Adjustments to STILTS **votlint**
  - ▷ Does not write VOTable 1.2
    - not much difference apart from the declared namespace and version number
    - should it write VOTable 1.2? as an option? by default?
- XML namespacing
  - ▷ Now handles elements in different namespaces better (but not perfectly?)
  - ▷ Processing configurable using **votable.namespacing** system property:
    - none**: no namespacing; namespaced elements will probably confuse parser
    - lax**: best guess at what author meant
    - strict**: VOTable elements must be correctly declared in VOTable namespace
  - ▷ STILTS **votlint** warns about incorrect namespace usage