

TOPCAT version 4

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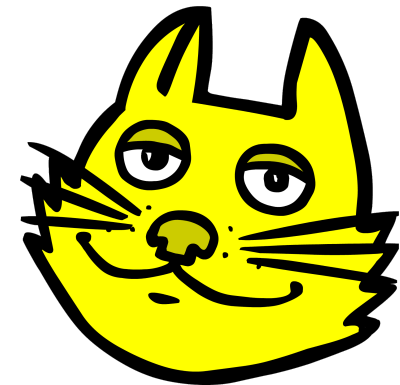
`$Id: tc4.tex,v 1.9 2013/05/14 07:32:18 mbt Exp $`

Outline

- Summary of miscellaneous enhancements
- New Visualisation windows

Miscellaneous Enhancements

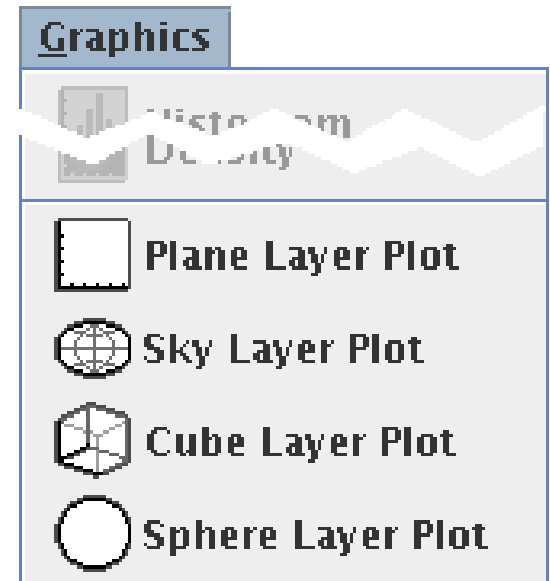
- VOTable 1.3 (PR) compatible:
 - ▷ Reads BINARY2 and all other defined 1.0–1.3 VOTable formats
 - ▷ Writes your choice of VOTable version as per `votable.version` system property
 - E.g. `topcat -Dvotable.version=1.3`
 - Default output version is VOTable 1.2 (was 1.1)
 - — but note still no STC
- Improved ADQL parsing in TAP window (can now label multiple syntax errors per query)
- MOC for multi-cone search (see Apps/Reg Coverage session after coffee)
- New KCorrections functions in expression language (Igor & Ivan calculations)
- New IPAC output format (previously only IPAC on input)
- First public release for almost 2 years
 - ▷ ... lots of bug fixes
- New logo!



New Visualisation

Overview

- Existing (v3) plotting windows work fairly well, but are hard to enhance:
 - ▷ contours, footprints, vectors, (all-)sky coordinates, new plot types, multi-threading, external control, better axis labelling, ...
- Re-write from scratch
- Big job (~ 40kLOC so far)
- Still some work to do:
 - ▷ user interface issues
 - ▷ missing features (histogram, stacked line plot, ...)
 - ▷ bugs
- Experimental release (v4.0b)
 - ▷ new plot windows don't replace classic plot windows (yet) — use main **Graphics** menu
 - ▷ for enthusiasts, early adopters, special viz. needs
 - ▷ feedback very welcome
- New capabilities a bit harder to drive, but offer more possibilities



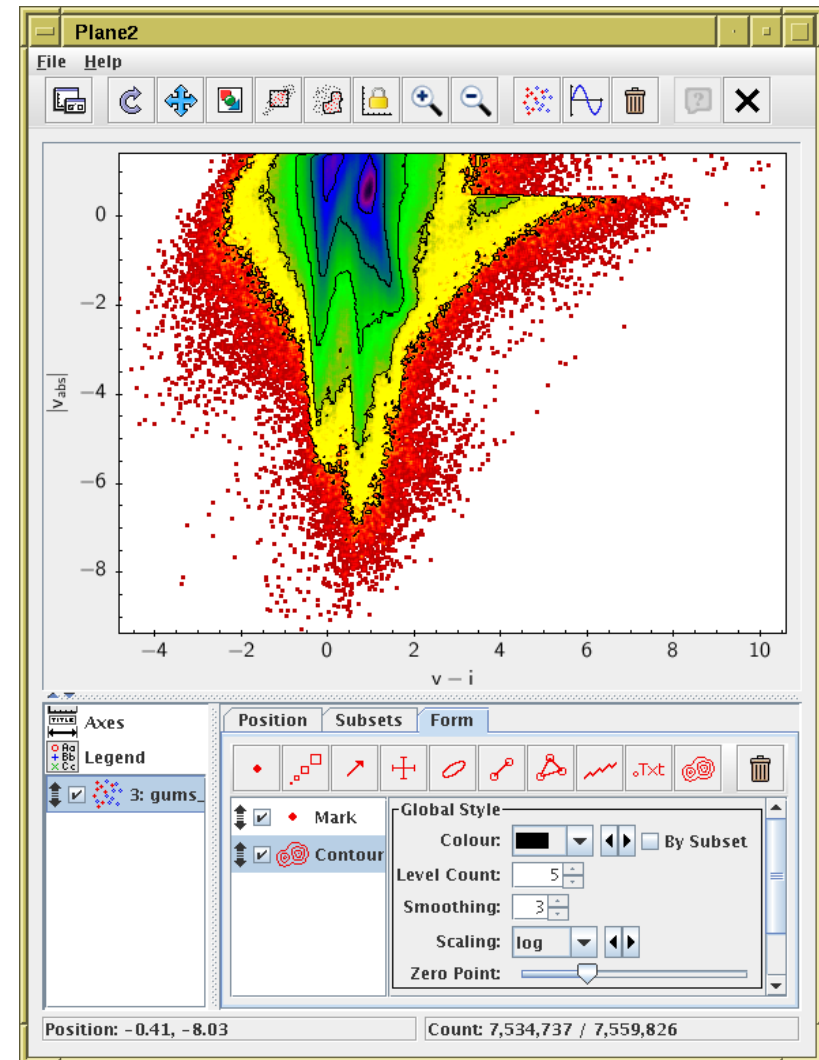
New Visualisation Features

- Sky coordinate plot
 - ▷ labelled grid lines, all-sky plots, easy projection selection
- Improved interactive response
 - ▷ drag plots around, zoom with mouse wheel, sliders cause instant replot
- Improved 3D navigation
 - ▷ zoom data inside cube, re-centre cube on right-click
- New plot colouring modes
 - ▷ combined scatter/density plot
- More data plot shape options
 - ▷ vectors, ellipses, sized markers, point-point links, ...
- Better axis labelling
 - ▷ select font type and size, full \LaTeX typesetting available
- Overlay different plot types on same axes
 - ▷ scatter plots, density maps, contours, more??
- Better capabilities for very large data sets
 - ▷ meaningful Mpoint viz options, better memory management, multithreading hooks
- Analytic function plotting
 - ▷ $x=f(y)$, $y=f(x)$ using expression language
- Extensibility

Example: Large data set

8 million point colour-magnitude diagram

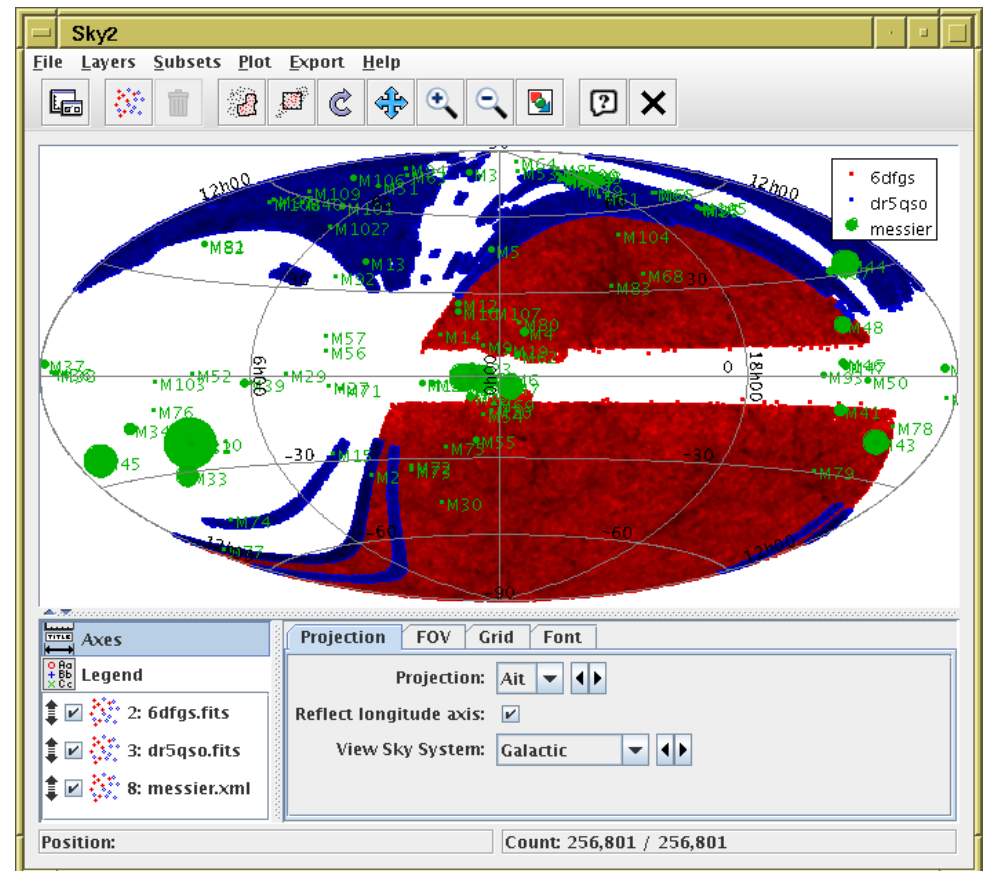
- Hybrid scatter plot/density map shows dense regions while outliers still visible
- Option to overplot contours
- Sweep cut levels/contour boundaries interactively



Example: All sky plot

Multiple data sets on all-sky view

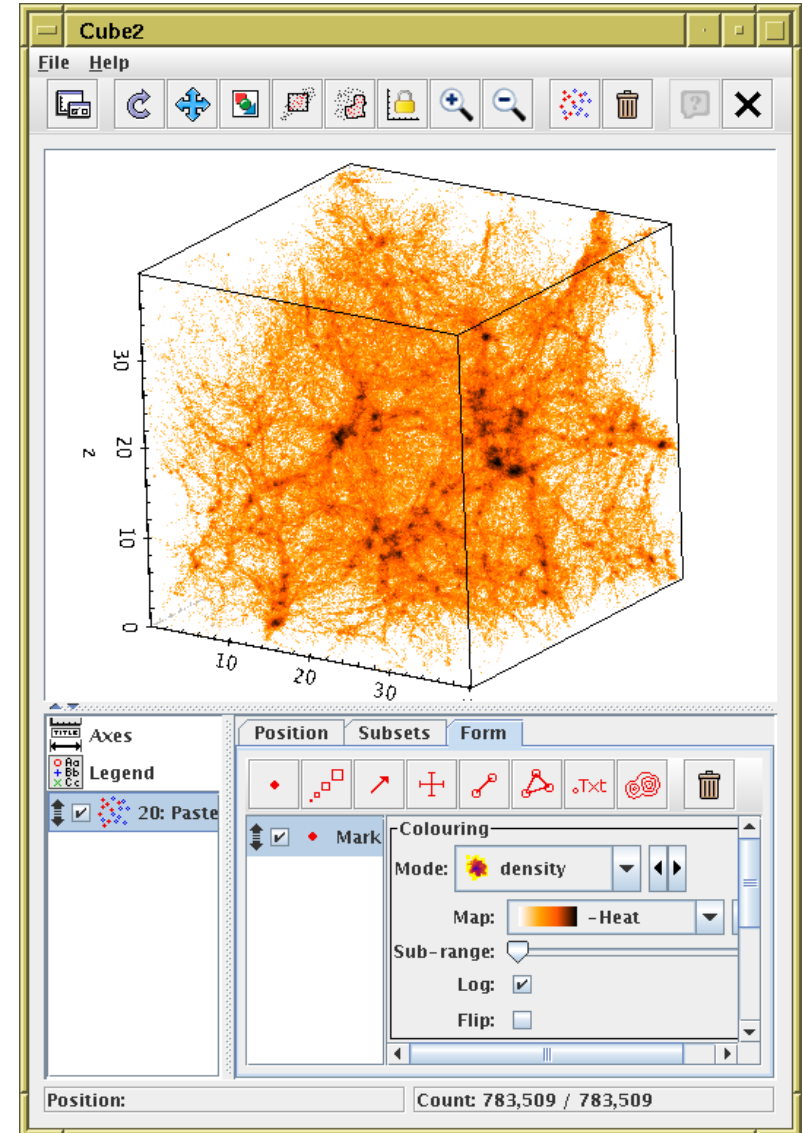
- Select data & view projections (equatorial, galactic etc) separately
- Scale plot point sizes by object radius
- Choose projection (Aitoff, sin, Plate Carrée)



Example: 3D Navigation

Simulation x , y , z data

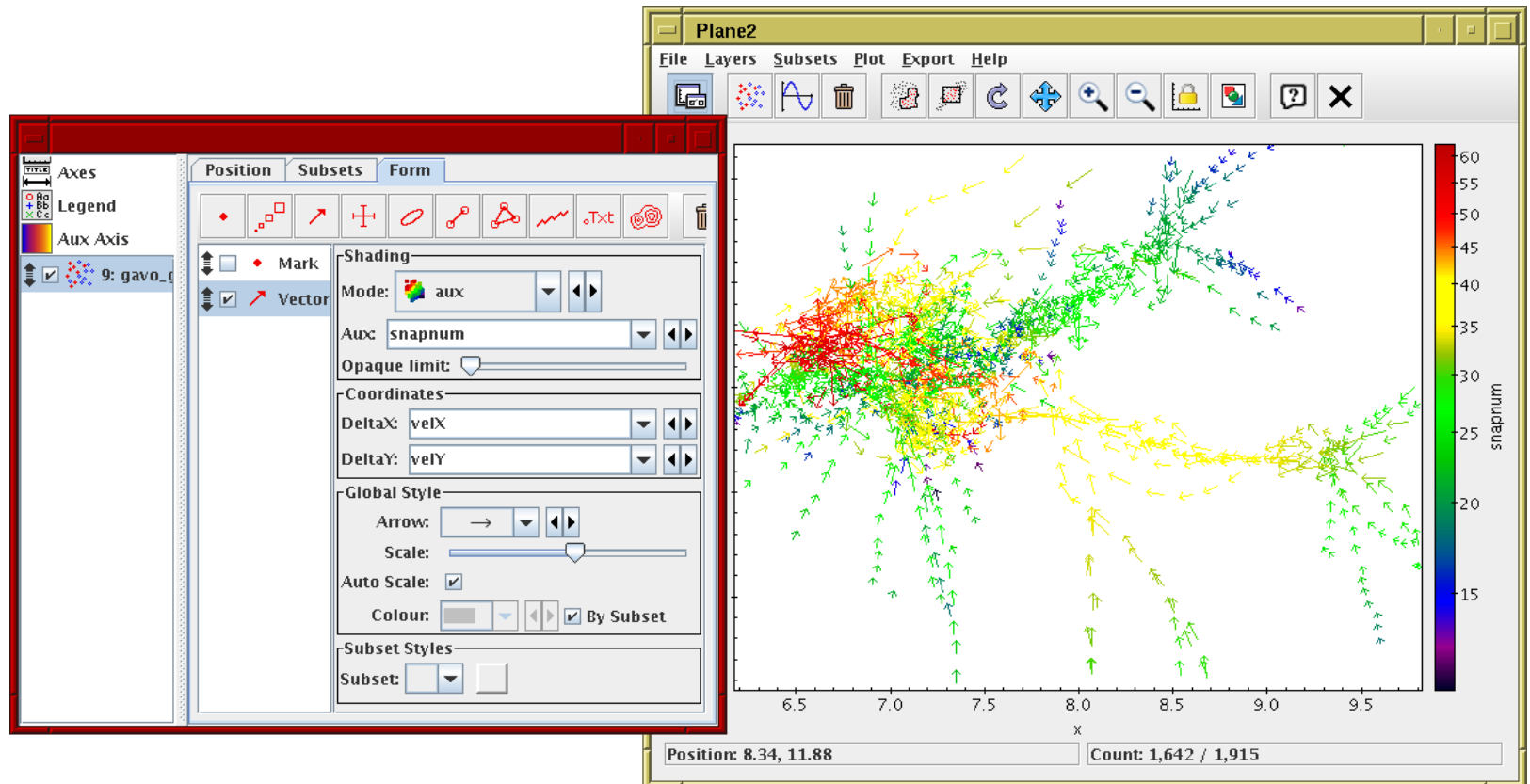
- Mouse wheel zooms in/out — cube wire frame stays fixed, but data volume decreases/increases around centre
- Right-click moves indicated point/region to cube wire frame centre



Example: Vector Drawing

Simulation $x, y + v_x, v_y$ data

- Use vector option and give velocity components
- Vector size by default automatically scaled to sensible size
- Can interactively rescale to taste with a slider
- Works in 3D as well



Future Plans/Possibilities

Capabilities opened up by new visualisation framework:

- Overlay coverage display on sky plots
- Overlay image postage stamps on scatter plots
- Overlay image or image-like data on plots
- Immediate visual representation of crossmatch results
- Grid of scatter plots (like R `sp10m`)
- Animations
- Interactive subset adjustment
- Interactive STILTS plots
- External control of plots
- Better capabilities/docs for embedding plots in 3rd party code
- Fitting

Feedback

Feedback wanted for new visualisation:

- User interface
 - ▷ Experiences — how easy/hard is it to learn and use?
 - ▷ Documentation — is it adequate?
 - ▷ Suggestions for improvements
- Capabilities
 - ▷ Are new features useful? Worth the additional effort to use?
 - ▷ Suggestions/Requirements for new plot types
 - ▷ Missing features
- Bugs . . .

More information:

Introduction:

http://www.starlink.ac.uk/topcat/v4_graphics.html

Full documentation:

<http://www.starlink.ac.uk/topcat/sun253/plot2.html>