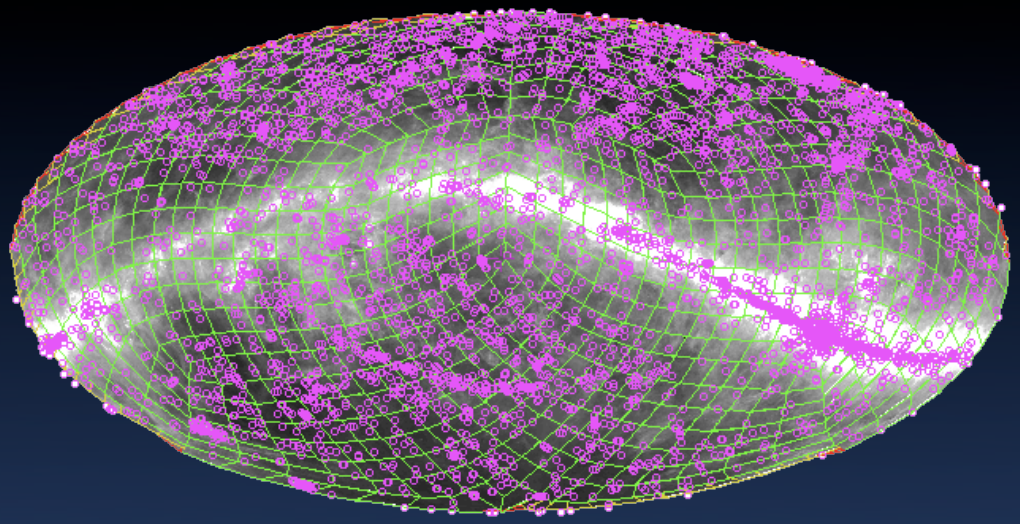


All-sky data and the VO

Thomas Boch [CDS]

On behalf of:

Pierre Fernique

François Bonnarel

Anaïs Oberto

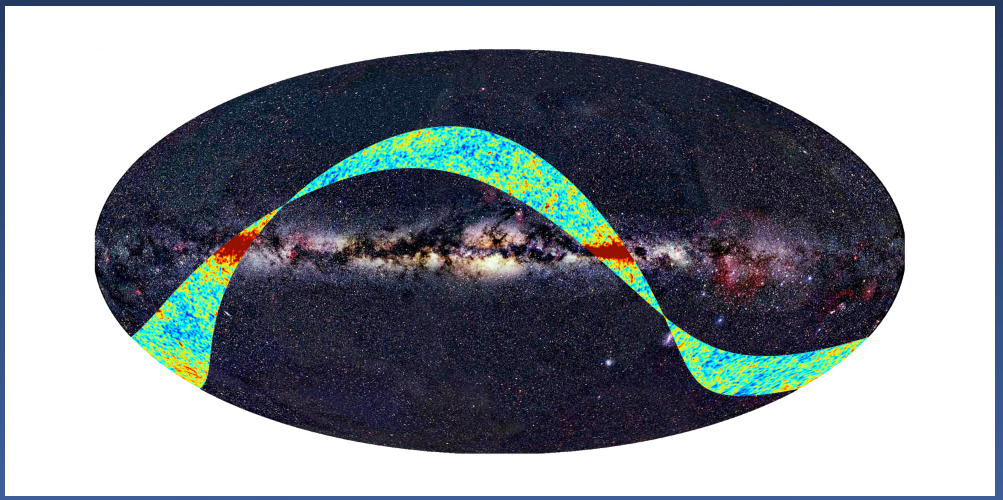
All-sky data in Aladin

- Latest developments include:
  - Access to and visualization of pre-computed all-sky image surveys
    - 2MASS, DSS, IRIS, …
  - Support of Healpix format
  - Ability to download entire VizieR catalogue
- Demo

All-sky data

All-sky data

- *Planck first light*, 17 September 2009
  - Data delivered as HEALPix maps



All-sky data

- *Planck first light*, 17 September 2009
  - Data delivered as HEALPix maps
- All-sky multi-resolution image surveys
  - Accessed in *all-sky browsers*
    - Google Sky
    - WWT
    - Stellarium
    - Aladin
    - …

All-sky data

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  - Data delivered as HEALPix maps
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    - Google Sky
    - WWT
    - Stellarium
    - Aladin
    - …
- All-sky catalogues

VO standards for all-sky data

- Which VO standards are there to access:
  - HEALPix maps
  - All-sky image surveys
  - All-sky catalogues
    - Access
    - Cross-match

HEALPix in the VO (1/2)

HEALPix in the VO (1/2)

- Existing standards
  - **STC** : HEALPIX is one of the coordinate flavors
  - **UCD** : *pos.healpix* word
- SIA2
  - dedicated format value for field with `utype="Access.Format"` to flag data as "Healpix" in **query response**
    - Healpix maps are not regular FITS images
    - Stored as binary tables which might have multiple fields

HEALPix in the VO (1/2)

```
XTENSION= 'BINTABLE'           /Written by IDL:  Sun Jul 27 12:46:42 2003
BITPIX  =                    8 /
NAXIS   =                    2 /Binary table
NAXIS1  =                    4 /Number of bytes per row
NAXIS2  =              3145728 /Number of rows
PCOUNT  =                    0 /Random parameter count
GCOUNT  =                    1 /Group count
TFIELDS =                    1 /Number of columns
COMMENT
COMMENT  *** End of mandatory fields ***
COMMENT
EXTNAME = 'H-alpha intensity'  /
DATE    = '2003-07-27T16:46:43' / Table creation date
PIXTYPE = 'HEALPIX '           / Pixel algorithm
ORDERING= 'NESTED  '           / Ordering scheme
NSIDE   =                  512 / Resolution parameter
NPIX    =              3145728 / # of pixels
FIRSTPIX=                    0 / First pixel (0 based)
LASTPIX =              3145727 / Last pixel (0 based)
TUNIT1  = 'R       '           / Map is in Rayleighs
COMMENT
COMMENT  *** Column names ***
COMMENT
TTYPE1  = 'TEMPERATURE '       /
COMMENT
COMMENT  *** Column formats ***
COMMENT
TFORM1  = 'E       '           /
```

avors

ble fields

HEALPix in the VO (2/2)

- **Allow for non-positional queries**
  - Discover all-sky images
- **Input parameters**
  - request Healpix map as query result
    - Specify output resolution (NSIDE), parameters of interest (flux, polarization, etc)

- Generic DataSet / ObsTAP ?

All-sky image surveys and the VO

Thomas Boch - IVOA Interop meeting -
Garching - Apps 2 - 11 November 2009

All-sky image surveys and the VO

- Different all-sky browsers use different formats, different projections, different ways of dividing the sky
  - WWT: TOAST/PNG/HTM
  - Google Sky : KML/WGS 84 Datum
  - Aladin : JPEG or FITS/HEALPix

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  - Aladin : JPEG or FITS/HEALPix
- Service description in registry
  - In Aladin :
    - Image surveys are described in a GLU record

All-sky image surveys and the VO

```
%A                Test71.hpx
%Description      Survey en JPEG couleur
%Url              http://alasky2.u-strasbg.fr
%Aladin.Profile   >=6.010 beta hpx
%Aladin.Survey    DSSColor
%Aladin.HpxParam  3 8 color
%Aladin.Label     Colored DSS2
```

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```

Base URL

Survey name

Min/Max Healpix resolutions
NSIDE=8/NSIDE=256

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  - In Aladin :
    - Image surveys are described in a GLU record
    - Individual cells can be accessed through simple URLs:
      - http://alasky2.u-strasbg.fr/DSSColor/Norder4/Dir0/Npix169.jpg
      - http://alasky2.u-strasbg.fr/DSSColor/Norder6/Dir0/Npix2709.jpg

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- Is there a need to standardize this ?

All-sky catalogues and the VO (1/2)

- DAL : Footprint effort to describe service coverage
  - Catalogue coverage footprint as HEALPix map ?
    - Include info in registry
- Use case 1: give me all sources of this catalogue
  - **Cone search** : `myserver.org/myCS?RA=0&DEC=0&SR=180`
    - Works (if requested cat has positional info), but inelegant
  - **TAP**
    - `SELECT * FROM myTable`

All-sky catalogues and the VO (2/2)

- Use case 2 : cross-match
  - Would be really useful if services delivering huge cats could answer to “give me sources within this Healpix/ HTM cell”
  - Might sound unrealistic to impose a given sky indexing scheme
    - Each service uses its own internal indexing scheme
  - At least, we should be able to describe that *service xxx supports query by this indexing scheme*