The new CDS Portal, powered by HiPS and MOC

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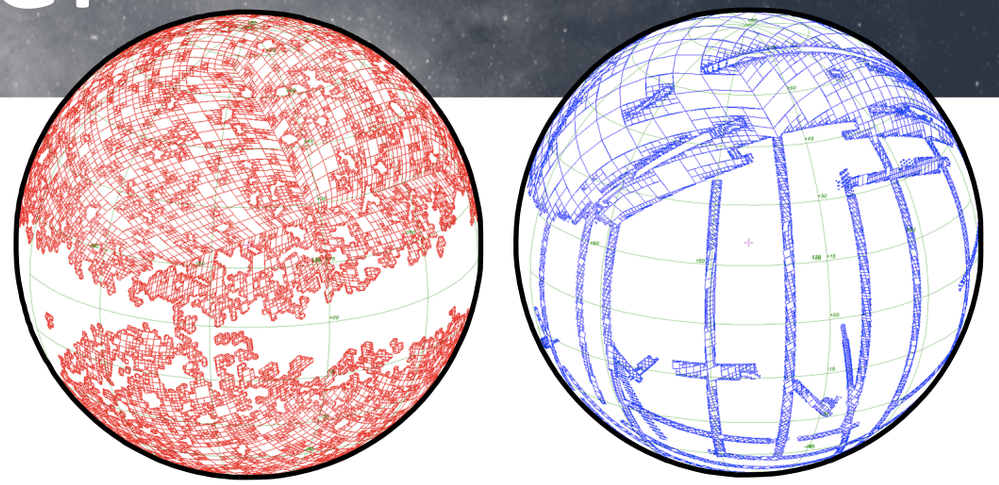
Context

- New CDS portal: access by position/object name to various data in CDS services
- Powered by MOC and HiPS technologies which allow:
  - Discovery: locate datasets of interest
  - Filter datasets
  - Preview data
  - Access data

MOC and MOCServer

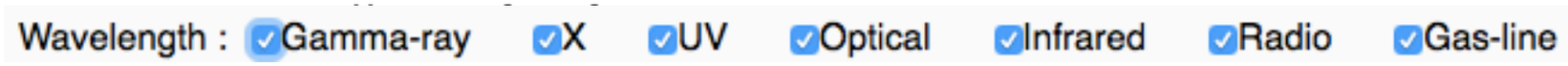


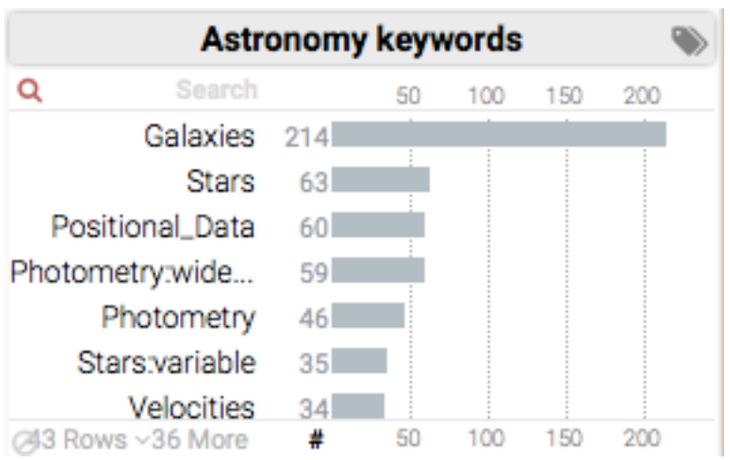
- MOC
  - IVOA standard to describe a dataset coverage
  - allows for fast comparison of coverages
  - based on HEALPix tessellation
- MOCServer
  - collection of 15,000 MOCs for:
    - all image HiPS published by CDS & partners (ESAC, JAXA, IRAP, etc)
    - all VizieR tables with positions (1.7 arcmin resolution)
    - Simbad
  - queriable by cone, polygon, MOC
    - give me resources available in this region

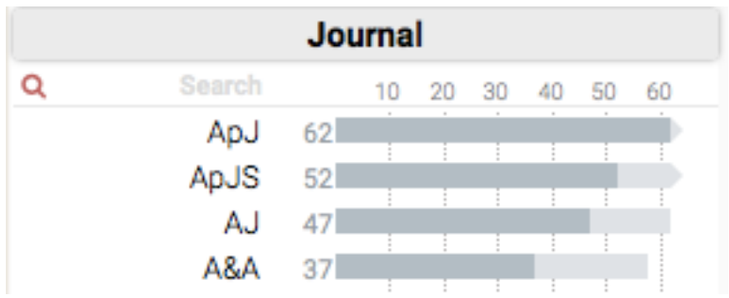
MOCServer

- spatial indexation
  - which data collections are available in this sky region?
    - *eg:* image HiPS in a 5 degrees cone around M31
      alasky.unistra.fr/MocServer/query?RA=10.68&DEC=41.273&SR=1&dataproduct_type=image&get=record
  - fast: spatial query <100ms
- metadata provider

Discovery



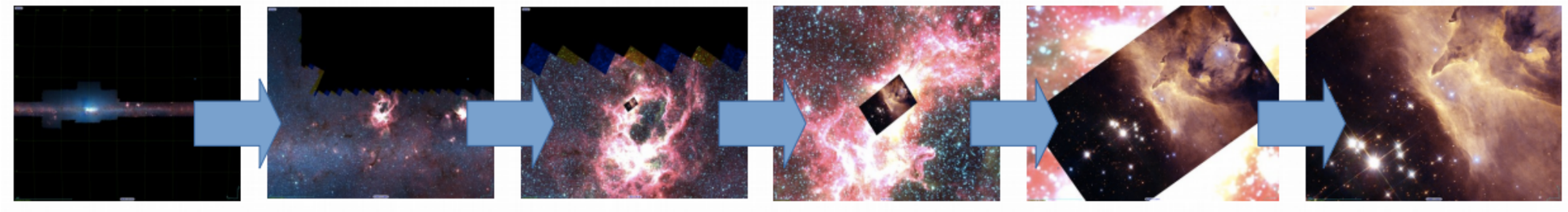




Filtering

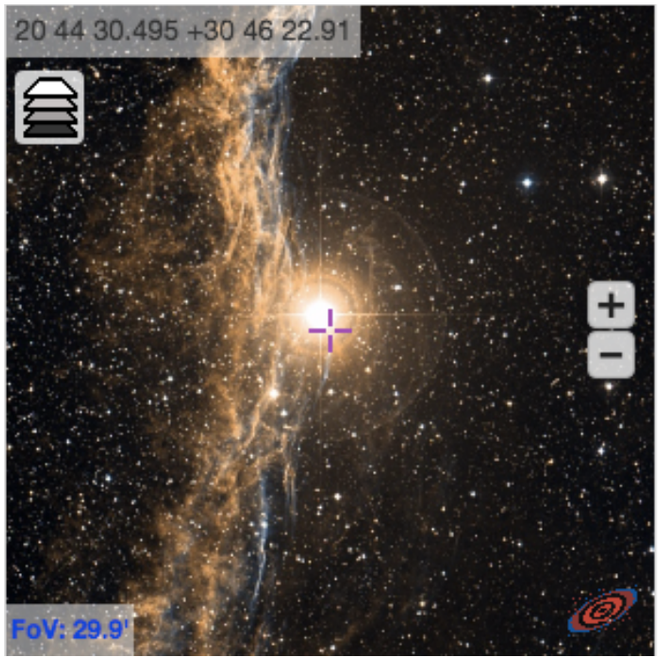
HiPS and Aladin Lite

- HiPS: Hierarchical Progressive Surveys
  - Multi-resolution data structure



  - IVOA note at http://www.ivoa.net/documents/Notes/HiPS/

- Aladin Lite: HiPS visualizer
  - Easy to embed
  - Controllable through a JS API



Preview
Access to data

Portal demonstration

Target:

M33

J2000 position: 01 33 50.904 +30 39 35.79

Images

193 HiPS images available around 01 33 50.904 +30 39 35.79 :

Wavelength : Gamma-ray X UV Optical Infrared Radio Gas-line

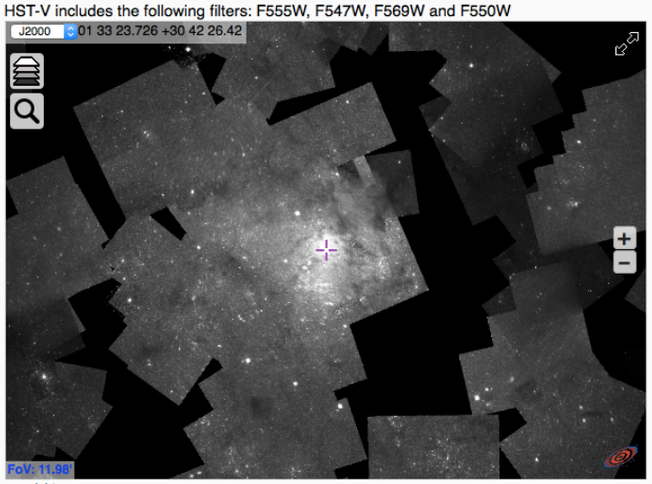
Show : All HiPS Most popular

Filter: continuous update

title	wavelength	Sky fraction
and F342W		0.02 %
HST-V includes the following filters: F555W, F547W, F569W and F550W		0.02 %
HST-I includes the following filters: F814W, F791W, F785LP and F775W		0.03 %
HLA-wideV includes the following filters: F606W and F600LP		0.05 %
HST-wideV includes the following filters: F606W and F600LP		0.06 %
HLA-I includes the following filters: F814W, F791W, F785LP and F775W		0.07 %
SCUBA 450um emission maps	Radio	0.31 %
		0.82 %
SCUBA 850um emission maps	Radio	0.9 %
SCUBA 850um emission maps - extended dataset	Radio	0.99 %
SCUBA2 450um observations	Radio	1.75 %
SCUBA2 850um observations	Radio	1.8 %
XMM-Newton stacked EPIC images		5.06 %
Arches PN Colored		5.31 %
X-ray images on band 0.5-1Kev		6.69 %
X-ray images on band 1-2Kev		6.69 %

Showing 193 entries

HST-V includes the following filters: F555W, F547W, F569W and F550W

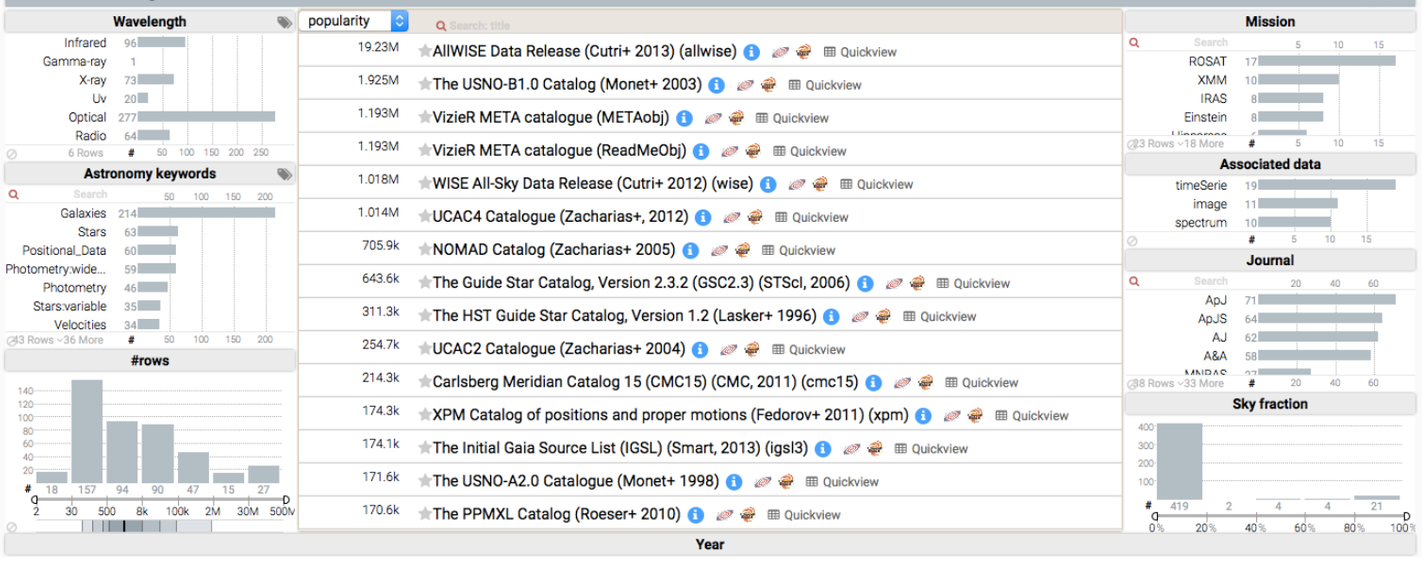


copyright

share thumbnail update

Catalogues

450 Vizier Catalogs



Modular components

- Each component is independent
- Has no knowledge of other components
- Interactions between components through a message bus
  - SAMP-like, but within the web page
  - *postal.js* pub/sub library

```
postal.subscribe({
                topic: "table.load.votable",
                callback: function(data, envelope) {
                    self.aladin.addCatalog(A.catalogFromURL(data.url,
{name: data.name, onClick: 'showTable'}));
                }
            });
```

```
postal.publish({
              topic: "table.load.votable",
              data: {url: 'http://.../table.vot', name: 'myTable' }
               });
```

Other libraries used

- **keshif.js**
  Javascript library for easy exploration, facets-filtering of datasets
  http://keshif.me/

- **votable.js**
  Javascript library to parse VOTable
  Developed at CDS
  https://github.com/aschaaff/votable.js

Extension to VO portal

- IVOA-registered resources can describe their associated MOC

```
<coverage>
<footprint ivo-id="ivo://mocivod">
  http://alasky.u-strasbg.fr/footprints/cats/vizier/I/221?
  product=MOC&amp;nside=512</footprint>
<waveband>Optical</waveband>
</coverage>
```

  - currently only some of the CDS resources have a MOC attached to the coverage in the VO registry
    - VizieR catalogues
  - MOCServer could ingest non-CDS IVOA resources exposing their MOC
  - Granularity of resources in the registry?

Perspectives and conclusion

- HiPS, MOCServer and Aladin Lite allow for creation of a data portal in the browser
  - easy to develop (HTTP queries, JSON response)
  - interactive and fast
- This approach extendable to integrate other VO resources
  - MOC not limited to HiPS, can describe the spatial coverage of any dataset
- New CDS Portal in production this summer

Links

- MOC and MOCServer
  - MOC IVOA standard: ivoa.net/documents/MOC/
  - Query the MOCServer: alasky.unistra.fr/MocServer/query
- HiPS
  - introduction: aladin.u-strasbg.fr/hips/
  - current IVOA note:
- Aladin Lite
  - General doc: aladin.u-strasbg.fr/AladinLite/doc/
  - API doc
    - aladin.u-strasbg.fr/AladinLite/doc/API/
    - examples: aladin.u-strasbg.fr/AladinLite/doc/API/examples/
  - *Build a sky chart* tutorial: tiny.cc/AL-tutorial
- postal.js: github.com/postaljs/postal.js