



Workshop on How to publish data to the VO  
ESAC, 22-26 june 2009

# Metadata in the VO

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# Importance of metadata

- If you plan to publish data to the VO: don't forget to provide metadata !
- Metadata:
  - give description of the pixel/table/spectra contents, or service capabilities
  - are used to locate/search datasets
  - are much smaller than data!

# Example: VOTable

```
<?xml version="1.0"?>
<VOTABLE version="1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.ivoa.net/xml/VOTable/VOTable/v1.1">
  <COOSYS ID="J2000" equinox="J2000." epoch="J2000." system="eq_FK5"/>
  <RESOURCE name="myFavouriteGalaxies">
    <TABLE name="results">
      <DESCRIPTION>Velocities and Distance estimations</DESCRIPTION>
```

METADATA

```
<FIELD name="RA" ID="col1"
  ucd="pos.eq.ra;meta.main" ref="J2000"
  datatype="float" width="6"
  precision="2" unit="deg"/>
```

```
  datatype="int" width="3" unit="km/s"/>
  <FIELD name="R" ID="col6" ucd="phys.distance" datatype="float"
  width="4" precision="1" unit="Mpc">
    <DESCRIPTION>Distance of Galaxy, assuming H=75km/s/Mpc</DESCRIPTION>
  </FIELD>
  DATA
  <TABLEDATA>
    <TR>
      <TD>010.68</TD><TD>+41.27</TD><TD>N 224</TD><TD>-297</TD><TD>5</TD><TD>0.7</TD>
    </TR>
    <TR>
      <TD>287.43</TD><TD>-63.85</TD><TD>N 6744</TD><TD>839</TD><TD>6</TD><TD>10.4</TD>
    </TR>
    <TR>
      <TD>023.48</TD><TD>+30.66</TD><TD>N 598</TD><TD>-182</TD><TD>3</TD><TD>0.7</TD>
    </TR>
  </TABLEDATA>
  DATA
</TABLE>
</RESOURCE>
VOTABLE
```

DATA



# Describing quantities

- Heliocentric radial velocity = 1234.56km/s
- This quantity consists of
  - a UCD (spect.dopplerVeloc;pos.heliocentric)
  - a value (1234.56)
    - with datatype (float)
    - and format (%7.2f)
  - a unit (km/s)
- All this can be put into a <FIELD> or <PARAM>

# Metadata in the VO

- Data models: conceptualization of domains, list of attributes
  - utypes: pointers into the DM
- Use in protocols:
  - SIA
  - SSA
- format=metadata, getCapabilities VOSI
- Standardized metadata formats for interoperability : structure and/or contents!

# UCDs

- Semantic description of quantities
- Standard list of words: controlled vocabulary
- e.g., this is a right ascension:  
ucd="pos.eq.ra"
- Used in:
  - VOTable (FIELD, PARAM)
  - Registry Table description
  - VOEvent PARAM, ...
  - Applications (e.g. Aladin filters)

# UCDs

- Standard
  - <http://www.ivoa.net/Documents/latest/UCD.html>
  - <http://www.ivoa.net/Documents/latest/UCDlist.html>
- Tools
  - <http://cdsweb.u-strasbg.fr/UCD/>
- The first word carries most of the meaning
  - **phot.mag**;em.opt.V

# Units

- Not yet a VO unit standard (being discussed)
  - DM progress
    - <http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/UnitsDesc>
  - follow IAU recommendations
  - online service
    - <http://vizier.u-strasbg.fr/cgi-bin/Unit>
    - <http://vizier.u-strasbg.fr/cgi-bin/Unit?%3f>
  - Conversion library
    - <http://cdsweb.u-strasbg.fr/cdsdevcorner/units.gml>



# Utypes

- **utypes: pointers to specific data models**
  - `utype="stc:AstroCoords.Time.TimeInstant.ISOTime"`
  - `utype= "stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C1"`
- **Example in the SSA protocol:**

<b>Data.FluxAxis</b>
<u>Data.FluxAxis.Value</u>
Data.FluxAxis.Ucd
Data.FluxAxis.Unit
Data.FluxAxis.Accuracy.StatError
Data.FluxAxis.Accuracy.StatErrLow
Data.FluxAxis.Accuracy.StatErrHigh
Data.FluxAxis.Accuracy.SysError
Data.FluxAxis.Quality
Data.FluxAxis.Quality.n
<b>Data.TimeAxis</b>
Data.TimeAxis.Value
Data.TimeAxis.Ucd
Data.TimeAxis.Unit
Data.TimeAxis.Accuracy.BinSize
Data.TimeAxis.Accuracy.BinLow
Data.TimeAxis.Accuracy.BinHigh
Data.TimeAxis.Accuracy.StatError

# Metadata structures

- Grouping of metadata elements in standardized structures
  - VOResource for registry resource description
  - SIAP protocol
    - with extensions for instrument footprints
  - STC for coordinates description
  - ...

# Metadata in the registry

- Description of Resources:
  - Curation
  - Subject
  - Coverage (spatial, spectral)
  - ...
- Query tools

The screenshot shows a 'Registry Browser' window with a search bar containing 'cea'. Below the search bar are three dropdown menus: 'Type' (set to 'Authority'), 'Content - Subject' (set to '???'), and 'Authority' (set to 'CDS'). A list of search results is displayed in a table with columns for 'Status', 'Title', and 'Date'. The results include various solar and helioseismology related entries, all dated 2006-09-14. Below the table, a 'Details' tab is active, showing information for a resource titled '2XMMp Pre-release Catalogue (LEDAS)'. The details include the IVO identifier, type, further information link, and service capability information.

Status	Title	Date
●	Coronal Dimming Region Recognition	2006-09-14
●	Coronal Loop Recognition	2006-09-14
●	Global Helioseismology Mode Parameters	2006-09-14
●	Local Helioseismology Inversion	2006-09-14
●	Local Helioseismology Perturbation Map Generation	2006-09-14
●	Local Helioseismology Subsurface Flow Analysis	2006-09-14
●	Solar Helicity Computation	2006-09-14
●	Solar Magnetic Extrapolation	2006-09-14

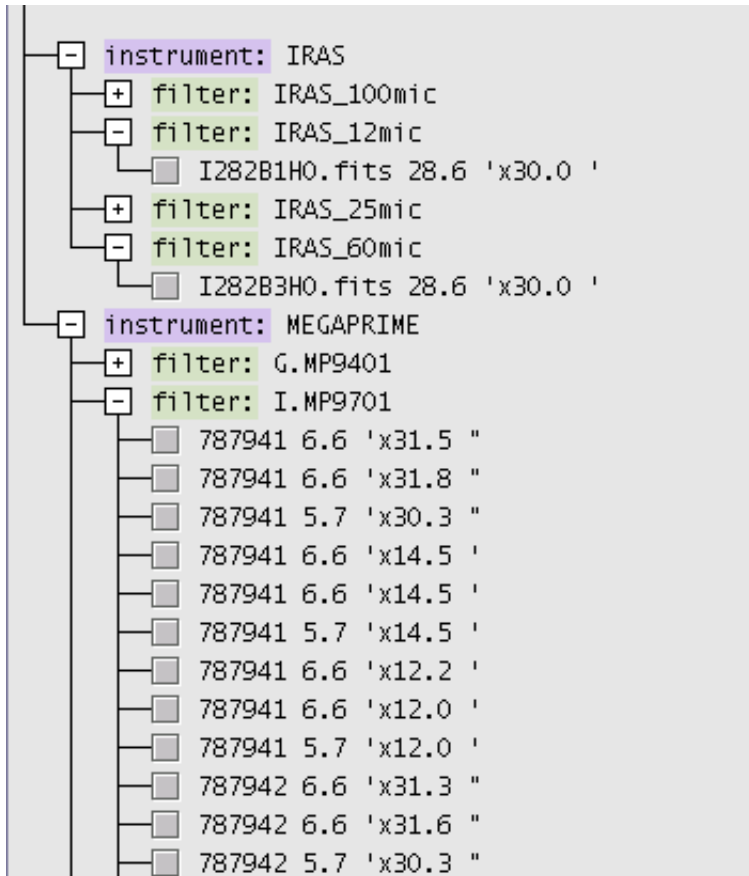
**2XMMp Pre-release Catalogue (LEDAS)**  
ivo://uk.ac.ledas/2xmp-ledas/ceaService  
Type: CeaServiceType

Further information - <http://camelot.star.le.ac.uk:8080/dsa/2xmp/>  
Type - Catalog

**Service Capability vs:WebService**  
Provides Tasks - ivo://uk.ac.ledas/2xmp-ledas/ceaApplication

- Interface type - vs:WebService
  - full - <http://camelot.star.le.ac.uk:8080/dsa/2xmp/services/CommonExecutionConnectorService>

# Metadata trees

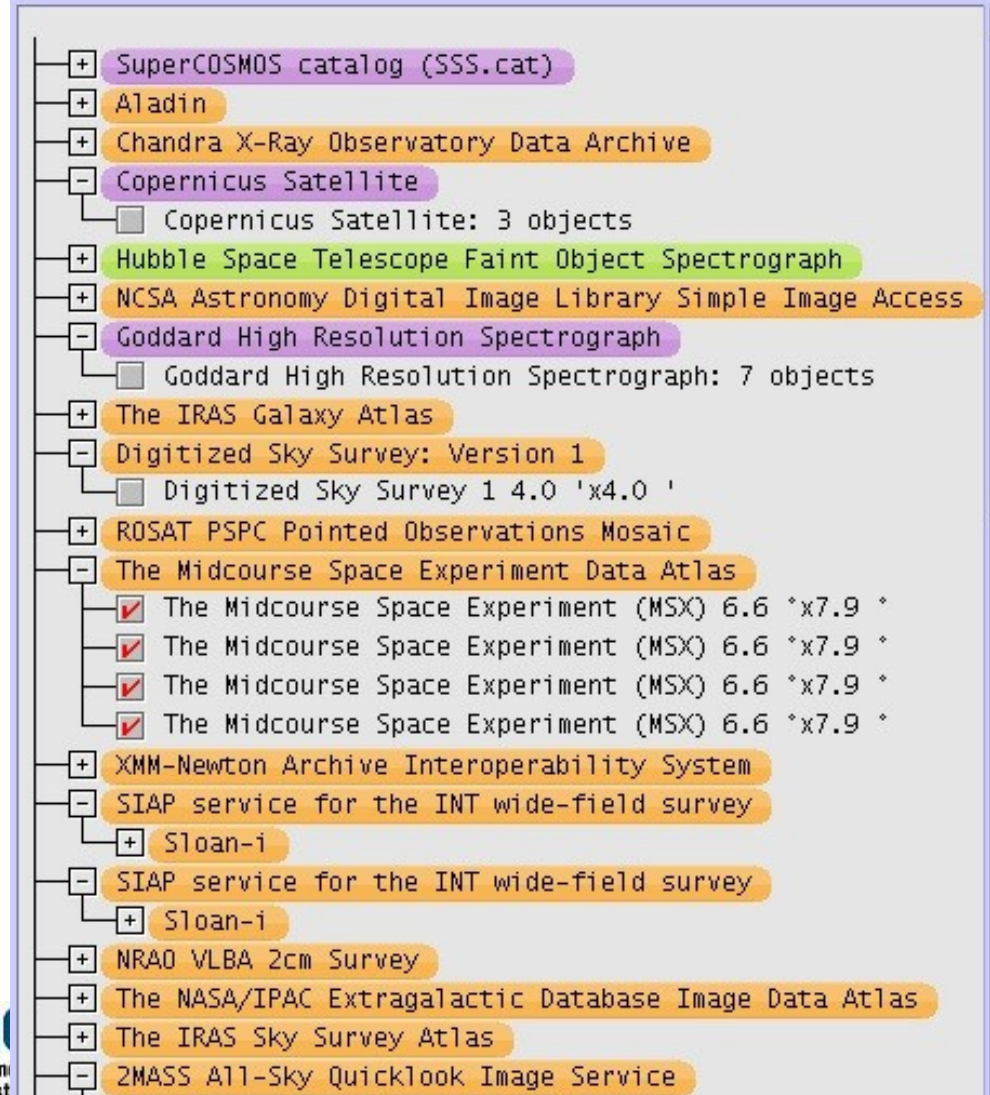


VO discovery tool ?

Target.....  Grab coord

Radius.....

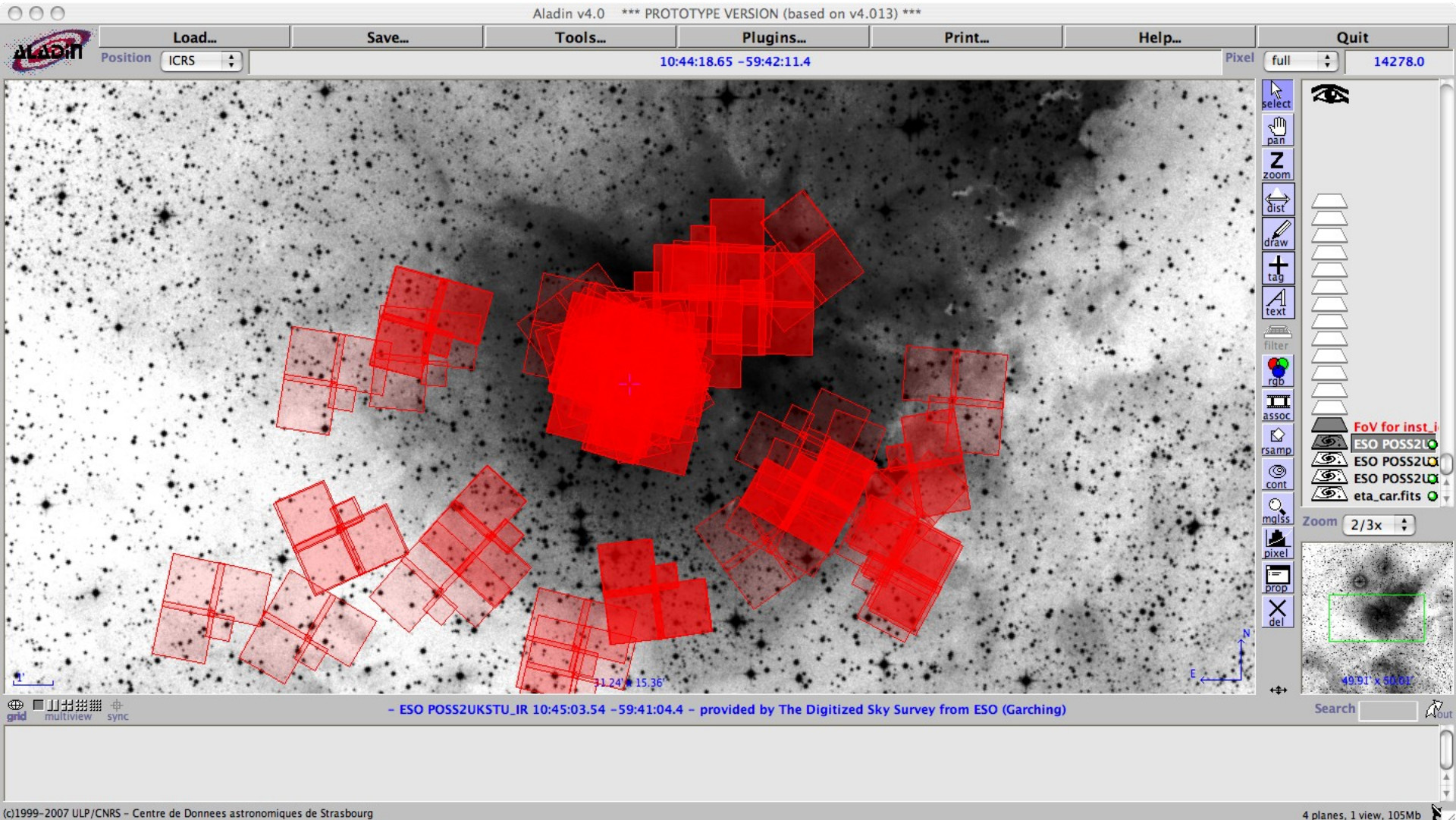
Servers  Images  Catalogs  Spectra Detailed list..



How to publish data to the VO



# SIA extension: footprints



How to publish data to the VO



S. Derriere - Metadata in the VO