

Towards SIAP2-next and SODA-next

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on behalf of DAL working group
and DAL chair/vice-chair



SIAP2 and SODA feedback

A bit of history

- Feedback on mailing list + presentations in Victoria, College Park , Paris + IVOAO note « recent DAL protocol feedback in 2018 »
- SIAP2.0 adopted 2015/12/23 (4.5 years!!!)
- SODA1.0 adopted 2017/05/17 (3 years)
- Services :
 - SIAP2 services at CADDC, GAVO, NED, INAF, CASDA, ALMA, etc. (generally Parameter server-side interface to ObsTAP)
 - SODA services at CADDC, GAVO, CASDA
 - Others ?
- Clients :
 - SIAP2/SODA client functionality in Aladin Desktop since Aladin 10
 - PyVO interface recently (see below)
 - TOPCAT has SIA1. SIA2 ???
 - Others ?



SIAP2 and SODA feedback

Where it can be discussed ?

- SIA on GitHub : <https://github.com/ivoa-std/SIA/>
- SODA on GitHub : <https://github.com/ivoa-std/SIA/>
- SIA-SODA-next page on the IVOA Twiki :
https://wiki.ivoa.net/twiki/bin/view/IVOA/SIAP-2_0-Next
- GitHub and the Twiki have essentially the same content but I consider the twiki more accessible for non-github « addicts » ;-)



SIA2 errata

- POS=RANGE examples inconsistent with spec (Pat Dowler)
 - The spec clearly states that RA is in [0,360] and DEC is in [-90,90] but some POS=RANGE ... examples use -Inf and +Inf (probably copied the idea from use of open ended intervals in other params).
- Possible confusion between FORMAT and RESPONSEFORMAT parameter to be clarified (Alberto Micol)
 - Clarify that the RESPONSEFORMAT is the format of the service response, FORMAT is the one of the described datasets



SIAP2 parameters: availability of list of possible values

Several SIAP2.0 parameters have a limited list of possible values

- Some have lists limited by protocol (and obscure)
 - POL (Stokes, LINEAR, etc..)
 - DPTYPE (image, cube, visibility, timeseries ;..)
 - CALIB : levels
 - FORMAT : fits, jpeg , png, etc..
- Some have free string values
 - COLLECTION (HST, WISE, etc...), FACILITY (VLT, Keck, Chandra), INSTRUMENT (ACS, MEGACAM, etc.)
- PARAMETERS less useful if we have no prior idea of their possible values. **This information is often missing in services**

Proposal to change MAY in SHOULD or MUST in the sentence below :

Question : how do we retrieve that ? Query without parameter ? MAXREC=0 ? Other ?

2.1.20 Service PARAMETER self description

Any service may include a DataLink [8] service descriptor in the VOTable output to describe itself. This descriptor would describe the supported query parameters (standard and custom), including list of values for those with a fixed list (e.g. COLLECTION, INSTRUMENT, FACILITY, DPTYPE, CALIB, and FORMAT).



PyVO support for SIA2 and SODA

As far as I understood

(*Christine, Tom, Stefan, JJ, Pat,...* shoot me if i'm wrong) :

- Developped by Adrian Damian (and others) for CADC archibe and ALMA archive (*is that OK?*)
- A new module in pyvo.dal package « sia2.py »
- Changes in module « adhoc.py » for DataLink and SODA interface
- *Something wrong above ?*
- PR accepted available here :
<https://github.com/astropy/pyvo/pull/206>



PyVO support for SIA2 and SODA experience

- Due to some issues with SIAP2 protocol CADC had to move to ObsTAP in order to « astroquery » ALMA archive.

Is that a wrong statement ?

- See details on the 3 issues described by Adrian on next two slides



Lack of release_date parameter (PyVO / CADC)

- ObsCore has an optional release date parameter.
- SIAP2 doesn't provide corresponding QUERY PARAMETER
- If we add it how do we manage PARAMETERS for querying on optional content ?
 - See what we do for empty mandatory parameters ?



Lack of flexibility
on parameter value « style »
(PyVO /CADDC)

STRING QUERY PARAMETER don't allow wild carding or incompleteness.

- > things like COLLECTION = HST_* not allowed
- Is there a price to pay to add it ?
 - How to do it ? Wild cards ?

STRING QUERY PARAMETER are case sensitive only

- Is there a price to pay to allow it?
- How to do it ? Case sensitive queries should remain also.



SIAP 2 Discovery and access :

SIAP1 versus SIAP2 : virtual data versus axis completion

- SIAP1 had « cutout » and « mosaic » modes beside « archive » mode
 - 1 shot before access but only spatial
- We now have :
 - SIAP2.0 or ObsTAP
 - + SODA : for cutouts only (all axes)
 - + DataLink (Service descriptor and/or {links} table)
 - → 2 shots before access (instead of 1)



SIAP2 Discovery and access

SIAP1 versus SIAP2 : virtual data versus axis completion

Physical axis
Completion
For query and description

	space	spectral	time	polarization
Archive	SIAP1 / SSA / SIAP2 + ObsTAP	SSA SIAP2+ObsTAP	SIAP2+ObsTAP	SIAP2+ObsTAP
Cutout	SIAP1 cutout SIAP2-ObsTAP + SODA	SSA ? +DataLink,SODA	+DataLink,SODA	+DataLink,SODA
Rebinning reprojection	SIAP1 mosaic	+DataLink +custom service (or SODA-next)	+DataLink +custom service (or SODA-next)	+DataLink +custom service (or SODA-next)

From archived data to
More and more complex
Virtual data



SIAP 2 Discovery and access :

SIAP1 versus SIAP2 : virtual data versus axis completion

- perfectly possible to provide functionality by replacing the full retrieval or datalink url in « access_url » by a SODA url.
 - SODA URL parameters are common with SIA.
 - When SIA Parameters values constrain the discovery, SODA parameters force the cutout dimensions.
- A capability "virtual data generation" would have to be added to the service.
- how do we choose to provide these cutouts
 - by a new "VIRTUAL" boolean parameter ?
 - Or by providing two lines in the response with the same obs_id ?
 - The obscure values will be different, including publisher_id, but the observation will be the same



SODA errata (1)

- Example for polarization parameters values is syntacticaly wrong (Alberto Micol)

```
<PARAM name="POL" ucd="meta.code;phys.polarization" datatype="char" arraysize="*" value="">  
  <DESCRIPTION>Polarization states to be extracted.</DESCRIPTION> <VALUES>  
  <OPTION>I</OPTION>  
  <OPTION>V</OPTION> </VALUE>  
</PARAM>
```

SHOULD BE :

```
<PARAM name="POL" ucd="meta.code;phys.polarization" datatype="char" arraysize="*" value="">  
  <DESCRIPTION>Polarization states to be extracted.</DESCRIPTION> <VALUES>  
    <OPTION value="I"/>  
    <OPTION value="V"/>  
</VALUE>
```



SODA errata (2)

- Wrong example for BAND interval MIN and MAX values

(Alberto Micol /Markus Demleitner)

MIN and MAX cannot be single values as in the example

It should be an array. But an array of what ?

- An array of minimal values and an array of maximal values (Markus)
- An array of minimal length interval and an array of maximal length interval (Alberto)



SODA simple enhancement

- pixel cutouts (instead of world coordinates) on all axes
 - Considered for version 1.0 but delayed to stay simple (due to syntax problems)
 - Asked by CASDA , others
 - Ranges can be given by SODA service descriptor or computed from ObsCore



Beyond simple cutout :

a proposal for « rebinning/regridding » in SODA-next

- No such possibility to control output WCS exist in SODA.
 - ADD standard parameters to SODA for
 - Spatial resolution : SPATRES
 - Rotation : ROTA
 - Sky Projection : PROJ
 - Alternatively : WCS = (full text of WCS part of FITS header)
- Skyview + CDS (SIA on top of Hips2FITS)



Beyond simple cutout : OPEN questions

- Could be extended to SIA in virtual mode (same additional SIA parameters).
- Do we extend rebinning/reprojection beyond spatial axis ?
 - Maybe useful for TimeSeries access
 - For spectral and polarization axis
- How do we simulate this new behavior in ObsTAP context ?
 - dedicated Extension of ADQL ?
 - Can ObsTAP discover virtual data ?
- Should we allow SIAP2/SIAP1 mixture in the meantime?
 - This is possible : add new parameters in the query and FIELDS in the response.
 - In that case it doesn't have to be normalized
- What is the border between standard service, custom service and « code to the data » on science platforms to do such things ?
 - Cube generation from visibility data is probably NOT a SODA thing



Virtual SIAP2 CDS interface

The screenshot displays the Virtual SIAP2 CDS interface. The main window shows a star field with a bright star highlighted by a blue circle and crosshairs. The interface includes a menu bar (File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help), a toolbar, and a sidebar with various tools and data sources. A 'Server selector' dialog box is open, showing the 'HIPS2FITS CDS SIAv2 virtual data prototype' configuration. The dialog box contains the following fields:

- Target (ICRS, name): 05 41 12.96268 -02 15 18.6480
- Radius: 8.09'
- wl interval (m):
- Epoch interval (MJD):
- Polarisation states:
- Image format: application/fits
- collection:
- facility:
- instrument:

The dialog box also includes 'Reset', 'Clear', 'SUBMIT', and 'Close' buttons. The background image is a color image of a star field, likely from the DSS2 survey, showing a bright star with a blue circle and crosshairs. The interface also shows a 'Last news' section on the right side, listing updates and releases.

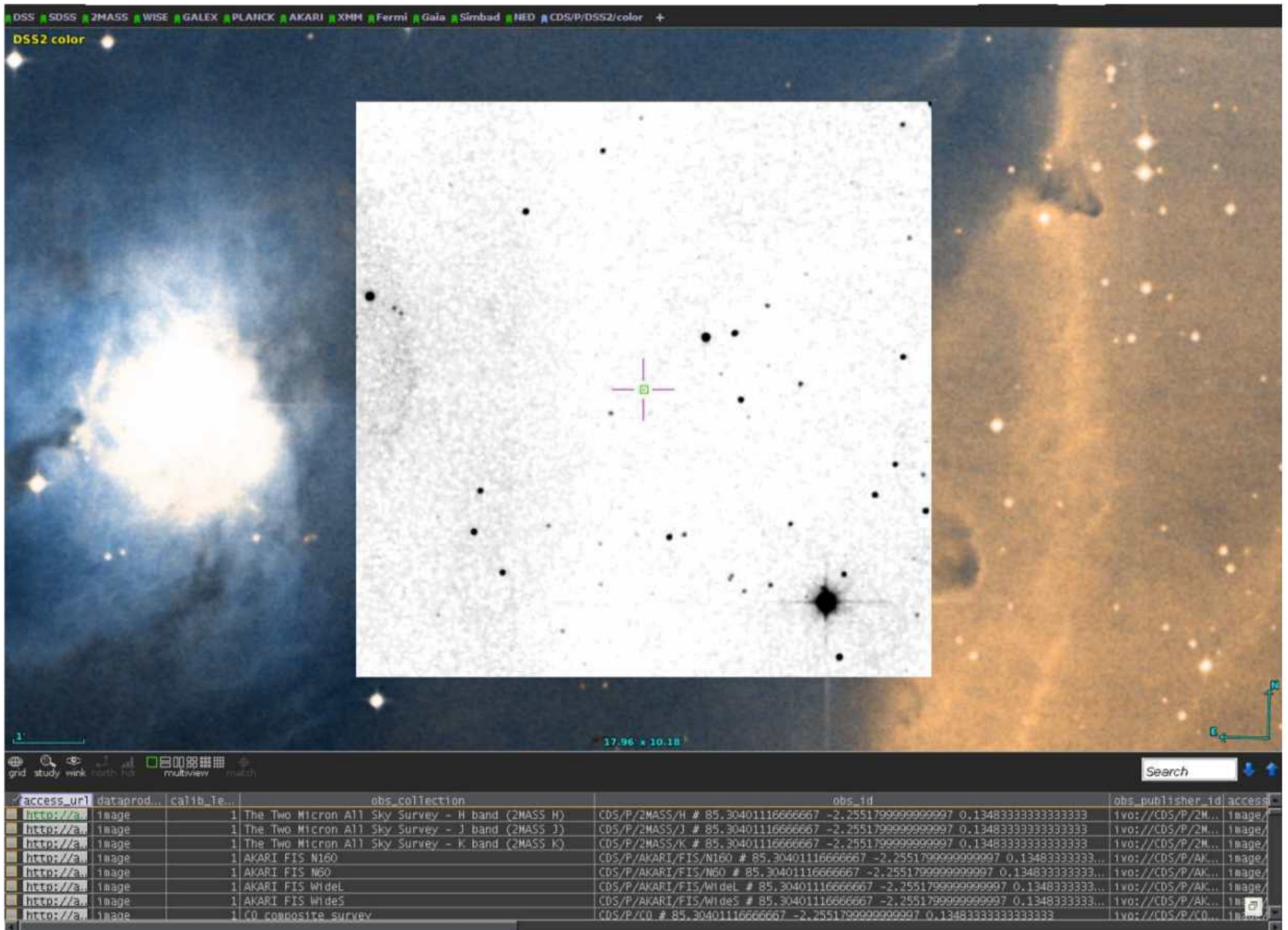


CDS Virtual SIAP2 response

The screenshot displays the ALADIN web interface. At the top, there is a menu with options: File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help. Below the menu, the command bar shows "Command 05:41:12.96 -02:15:18.6". The main window displays a star field with a bright star highlighted by a green crosshair. The interface includes a toolbar on the right with various tools like select, pan, zoom, and filter. At the bottom, there is a data table with columns: access_url, dataprod..., calib_te..., obs_collection, obs_id, and obs_publisher_id. The table lists various astronomical surveys and their corresponding data products.

access_url	dataprod...	calib_te...	obs_collection	obs_id	obs_publisher_id	access...
https://cds.cern.ch/ftp/2MASS/	image		The Two Micron All Sky Survey - H band (2MASS_H)	CDS/P/2MASS/H # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/2M...	image/
https://cds.cern.ch/ftp/2MASS/	image		The Two Micron All Sky Survey - J band (2MASS_J)	CDS/P/2MASS/J # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/2M...	image/
https://cds.cern.ch/ftp/2MASS/	image		The Two Micron All Sky Survey - K band (2MASS_K)	CDS/P/2MASS/K # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/2M...	image/
https://cds.cern.ch/ftp/2MASS/	image		AKARI FIS N160	CDS/P/AKARI/FIS/N160 # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/AK...	image/
https://cds.cern.ch/ftp/2MASS/	image		AKARI FIS N60	CDS/P/AKARI/FIS/N60 # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/AK...	image/
https://cds.cern.ch/ftp/2MASS/	image		AKARI FIS WideL	CDS/P/AKARI/FIS/WideL # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/AK...	image/
https://cds.cern.ch/ftp/2MASS/	image		AKARI FIS WideS	CDS/P/AKARI/FIS/WideS # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/AK...	image/
https://cds.cern.ch/ftp/2MASS/	image		CO composite survey	CDS/P/CO # 85_3040111666667 -2.2551799999999997 0.1348333333333333	1vo://CDS/P/CO...	image/

retrieved CDS Hips2FITS 2MASS image



Conclusion

- DAL WG members can start reviewing these issues on GitHub or on the twiki
- Document source to be ported on Github ivoa-std/SODA and ivo-std/SIA repositories
- Changes and Pull Requests can be created along some of the issues

