HiPStoFITS prototype

(and ideas for SIAP2 and SODA-next)

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How to give access to standard FITS and JPEG images in the age of HiPS ?

Rationale of « classical » images distribution :

- Direct access to non resampled images (original data) for specific science cases
- Comparison with external standard image servers (with same WCS)
- CDS : Follow-ups of previous functionalities for non HiPS clients
  - JPEG thumbnails for CDS portal (replacing Aladin preview..)
  - Local usage for XMM ACDS cross identification pipe-line (originally done with legacy Aladin image server)
- Etc...

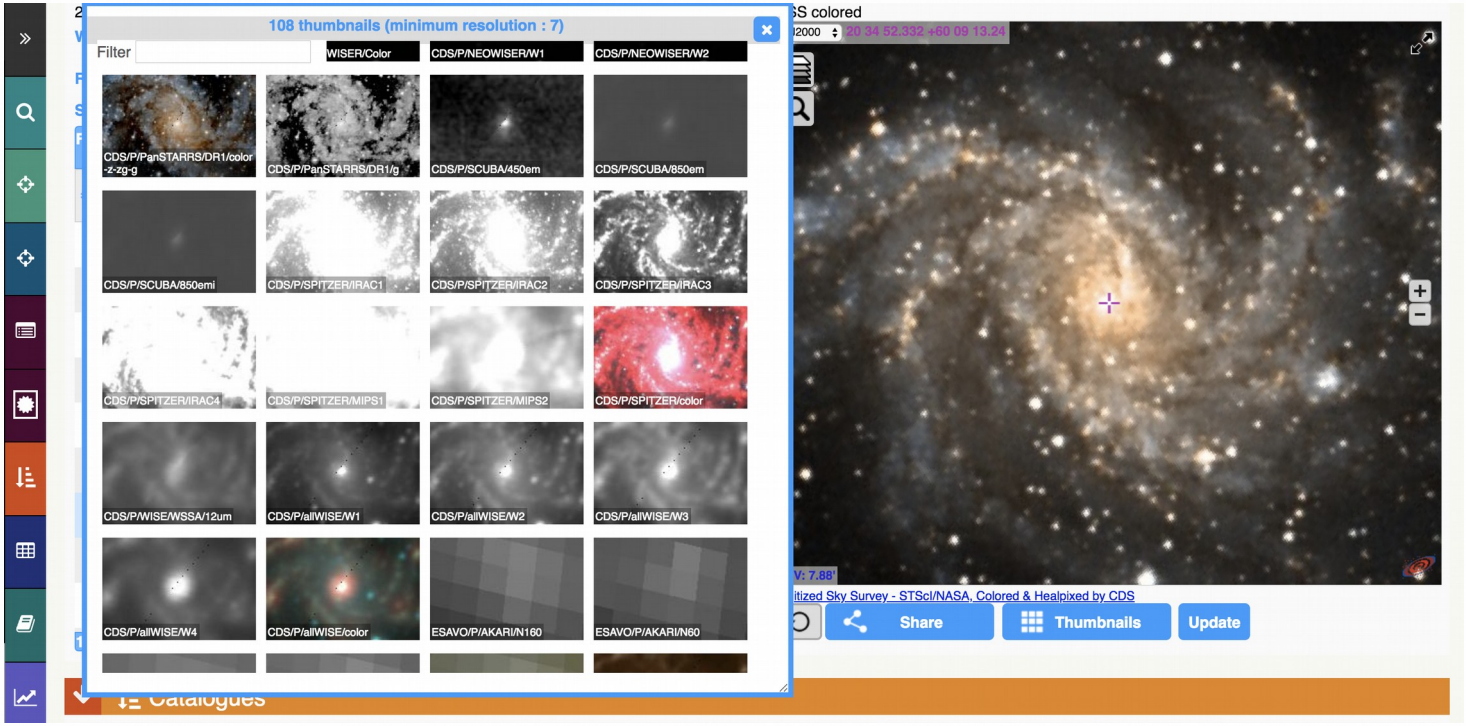
How to give access to standard FITS and JPEG images in the age of HiPS ?

- Classical solution : create an image server with original images (VO compliant : ObsTAP, SIAP2.0, SIAP1.0)
  - CDS : VizieR associated images, legacy Aladin server images and others
  - not easily extensible to new collections and virtual data generation
- HiPS-based solution : create images on the fly by reprojecting HiPS pixels on a 2D grid of pixels
  - Already partially operational !!!

Thumbnails generation

for CDS Portal -and other purposes- (T.Boch)

- Based on a python code, used in cgi mode
  - See Thomas presentation in « Apps2 » on Friday



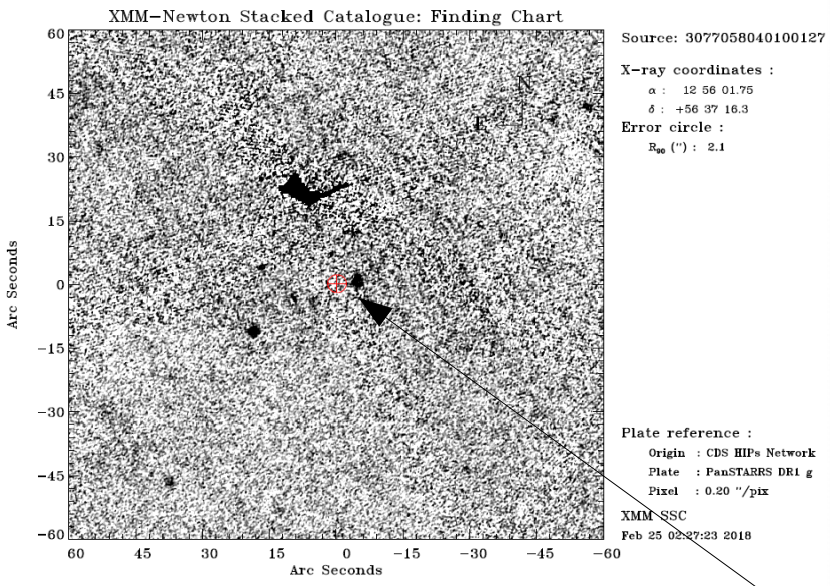
HiPStoFITS for XMM ACDS (Laurent Michel + Pierre Fernique)

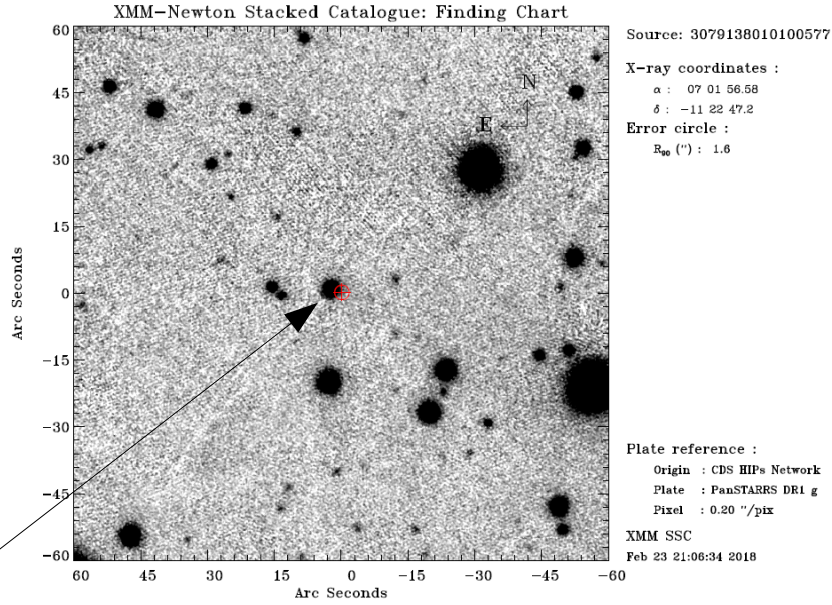
- Based on an extension of Aladin java code
  - Generates FITS images from HiPS for a preselected list of HiPS
  - TAN projection
  - Web Server = servlet technolog.
  - Works for any spatial extent by adapting resolution
- Operational in SSC XMM since 2018 January

  Image Quality well received by ACDS astronomers

  Reused by other SSC partners (eg Pan-Starrs finding charts for Stacked XMM catalog)

HiPStoFITS for XMM ACDS (Laurent Michel)





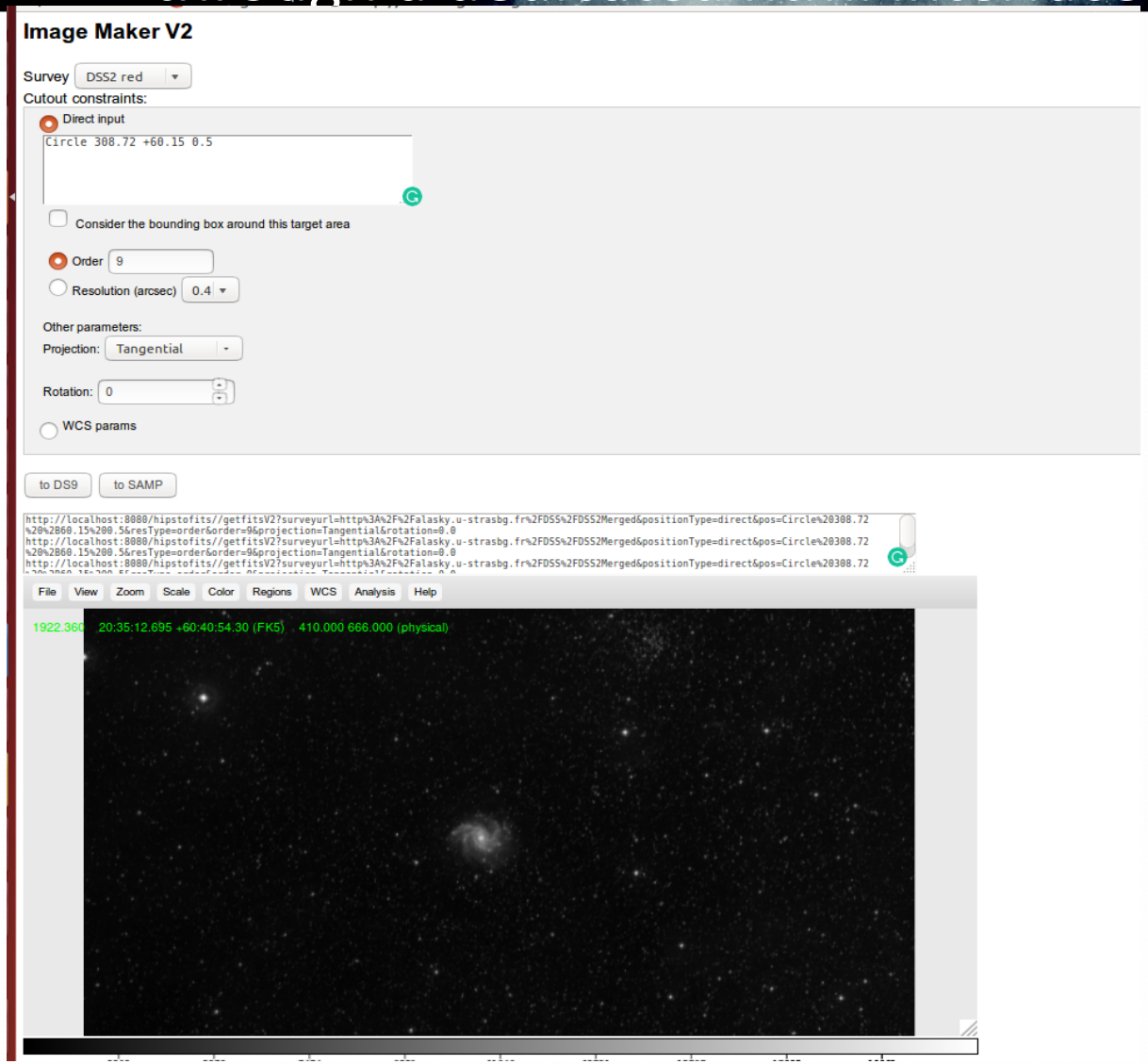
XMM source

Pan-Starrs finding charts for Stacked XMM Catalogue (3XMMdr7s catalogue, Iris Traulsen et al. A&A submitted)

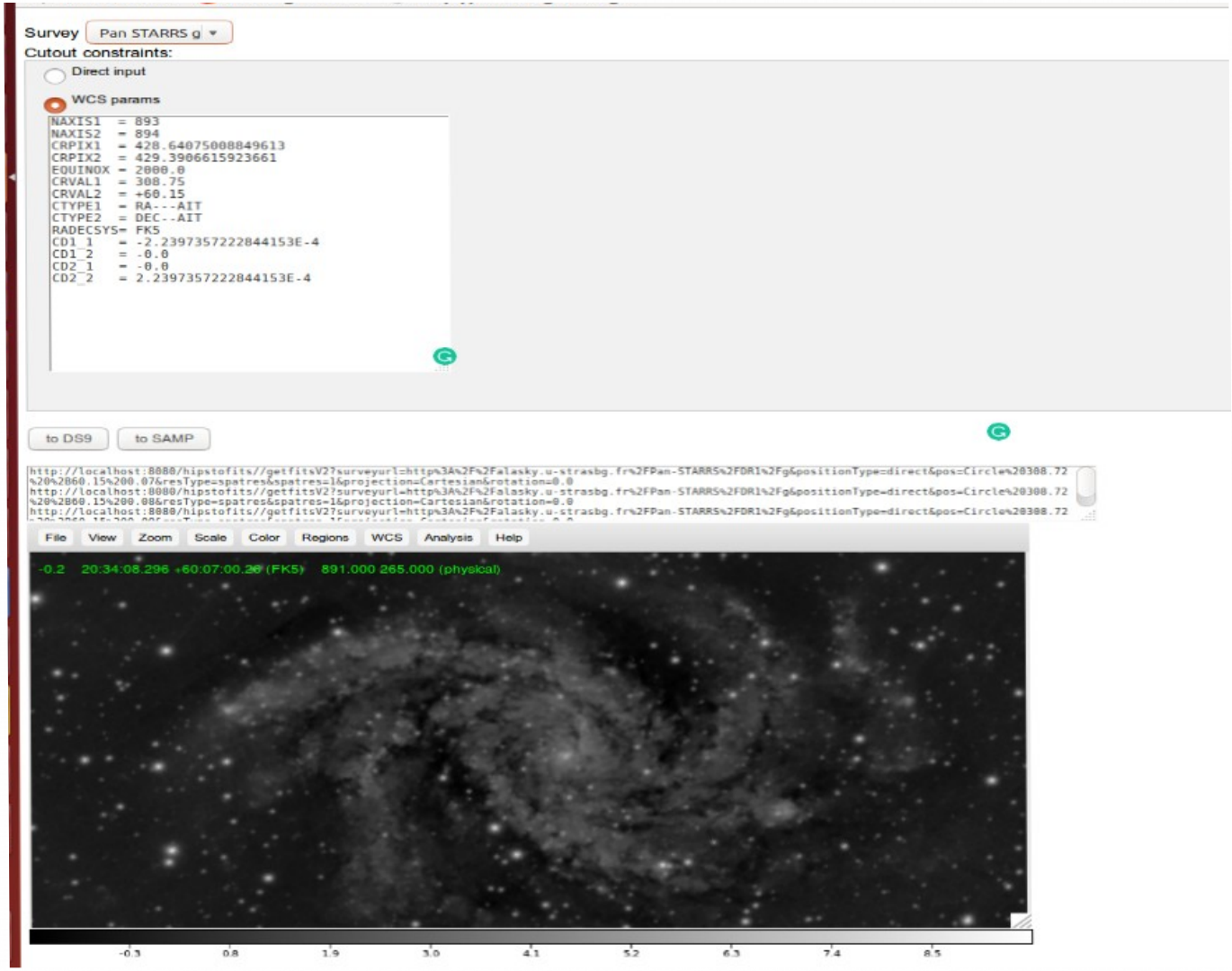
HiPStoFITS version 2 : extended functionalities (Chaitra)

- All WCS projections available
- More flexibility in the interface parameters (Polygon, Circle, resolution…)
- Force output via WCS
- HiPStoFITS becomes a testbed fo IVOA protocol prototype for virtual data generation (« SODA »)
- Integration of HiPStoFITS in CDS SIAP-2 interface (virtual image server combined with archived standalone images)

Access to DSS2 red image generated by hipstofits with position, size and resolution selected by the user through a dedicated html interface



Same interface, Pan-STARRS, driven by WCS header



Proposal for SODA-next interface reconsidering parameters

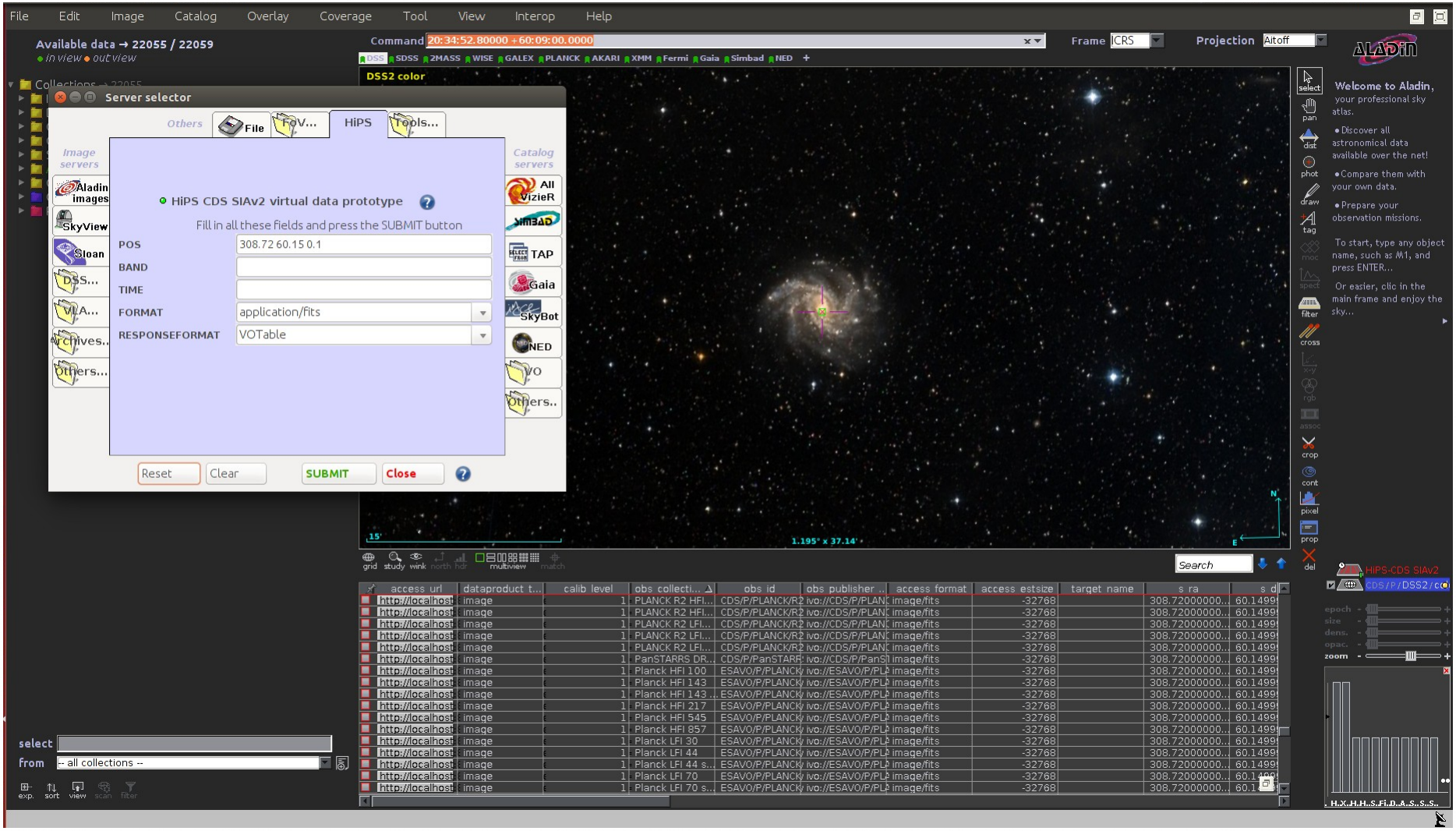
- Proposal based on HiPStoFITS experience
  - Non spatial parameters as in SODA1.0 (selection on the axis)
  - ID = may be an image identifier or a HiPS identifier/url
  - POS = as in SODA1.0 .
  - SPATRES = spatial resolution (or HiPS order as non standard parameter)
  - PROJECTION = sky projection
  - PA = position angle of the North direction
- OR alternatively to above
  - WCS = wcs fits header keywords list
- BOUNDS = TRUE/FALSE

  → bounding box of the shape / exact shape

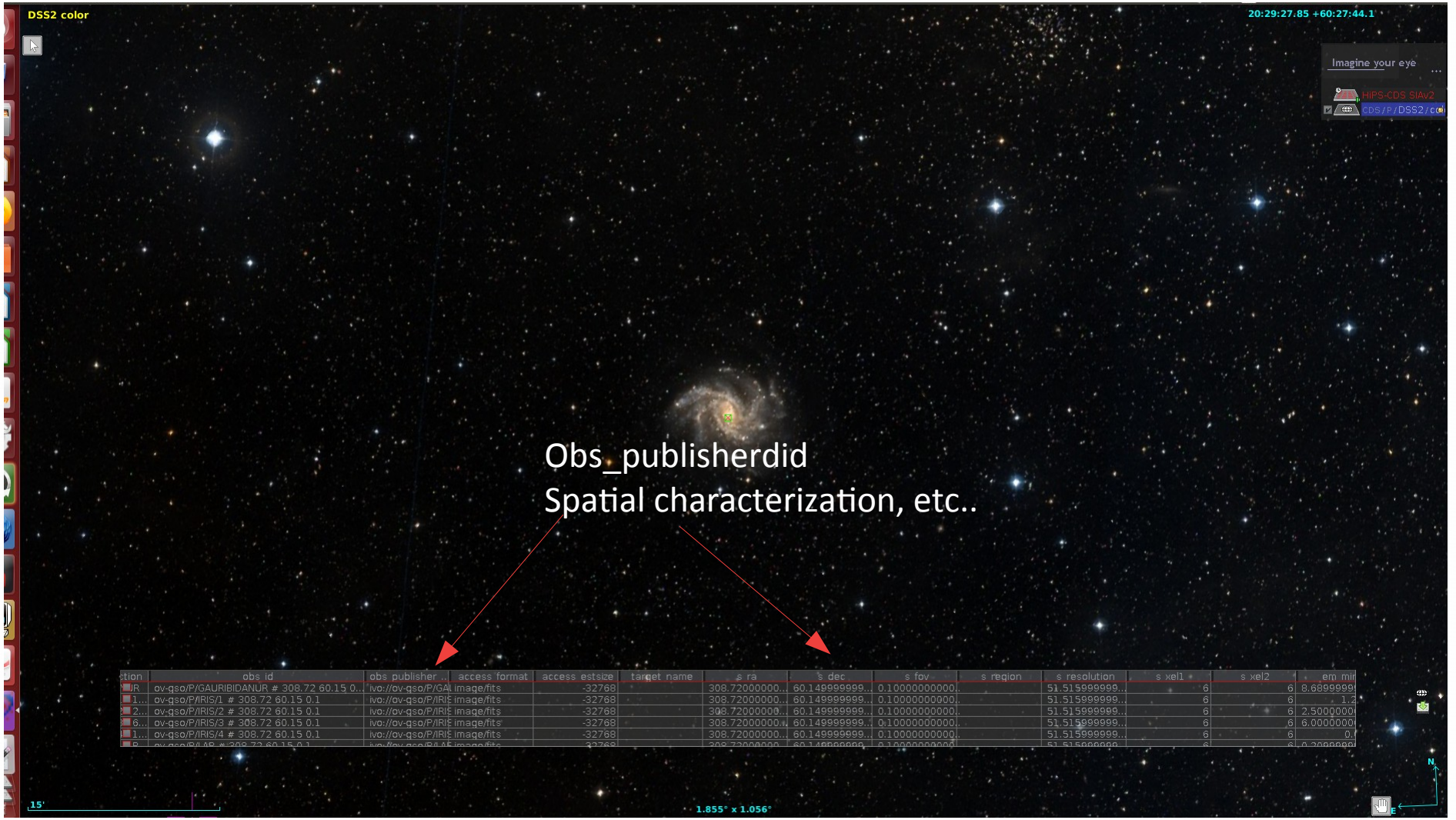
Proposal for SODA-next interface discovery and access (FB developments)

- Can be accessed in several ways :
  - direct URL in SIAP2.0 consistent with SIAP2.0 Parameters (POS, SPATRES, etc …)
  - Or via DataLink and a dedicated interface
    - Next slides → Aladin GLU interface
    - Retrieved images could be stored or sent to another application via SAMP

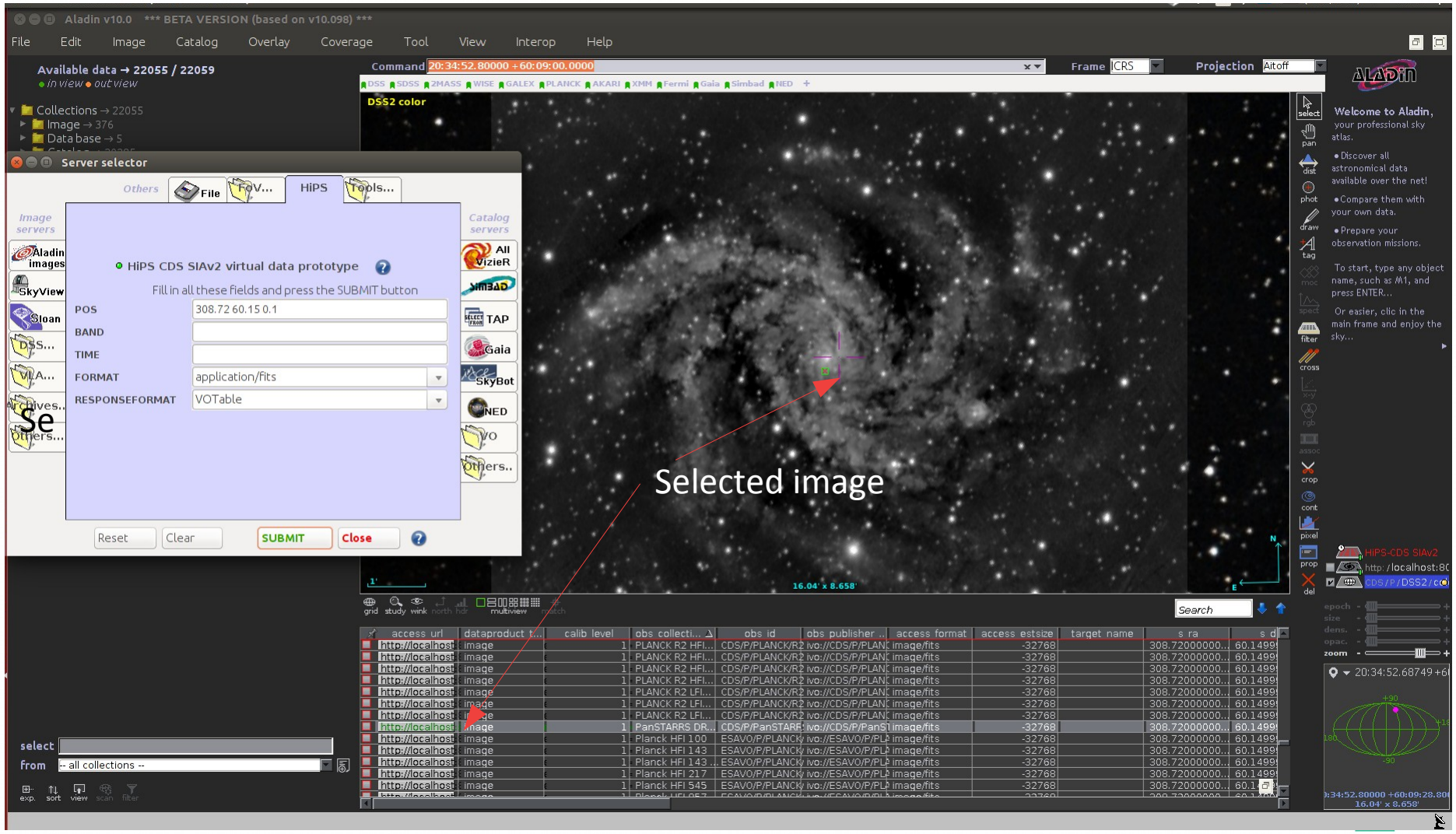
Mode 1 :SIAP2 interface through Aladin GLU menu and query response showing links to dynamicaly generated HiPStoFITS url



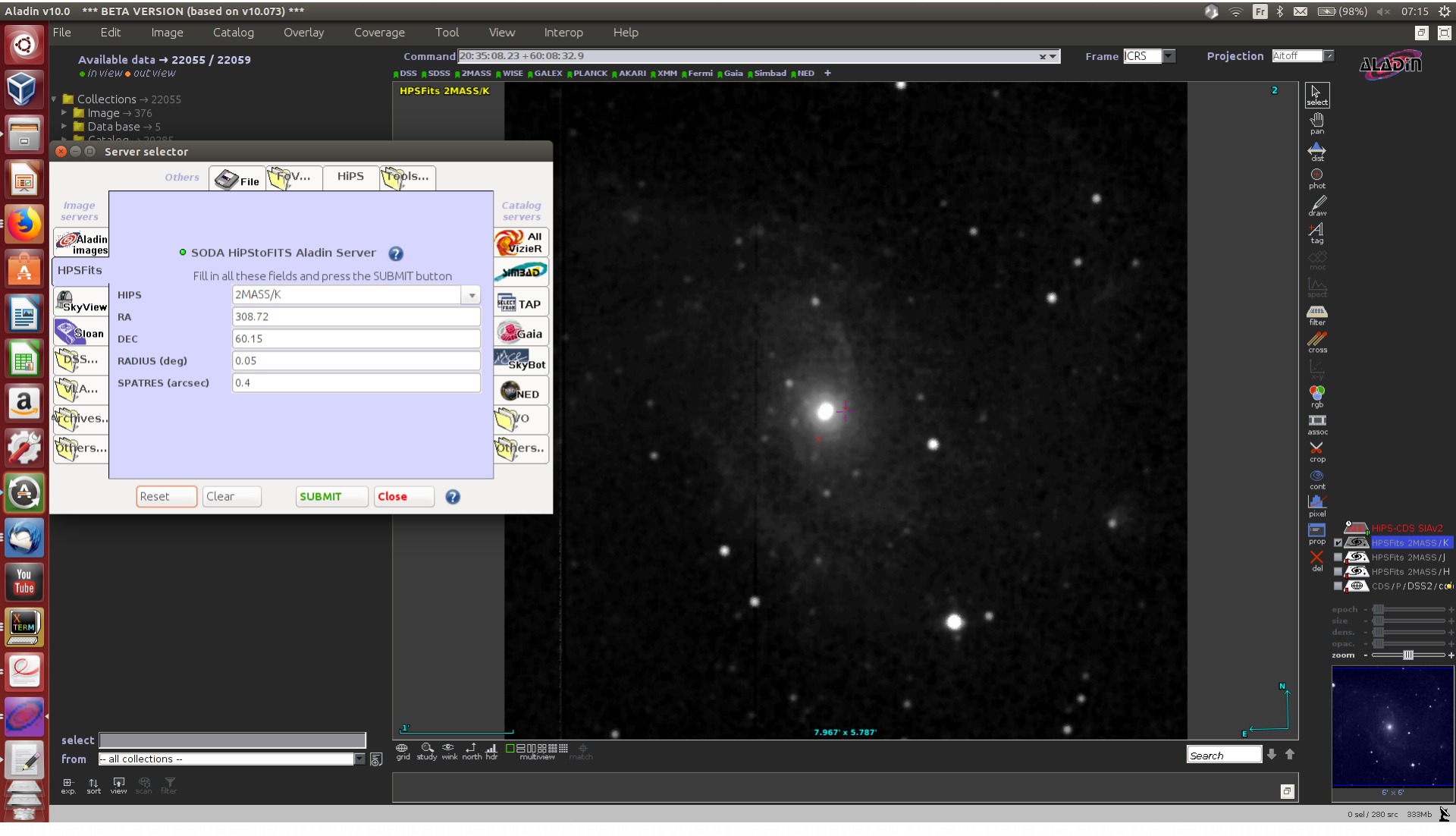
Mode 1 :SIAP2 Obscore metadata for hipsfits virtual images



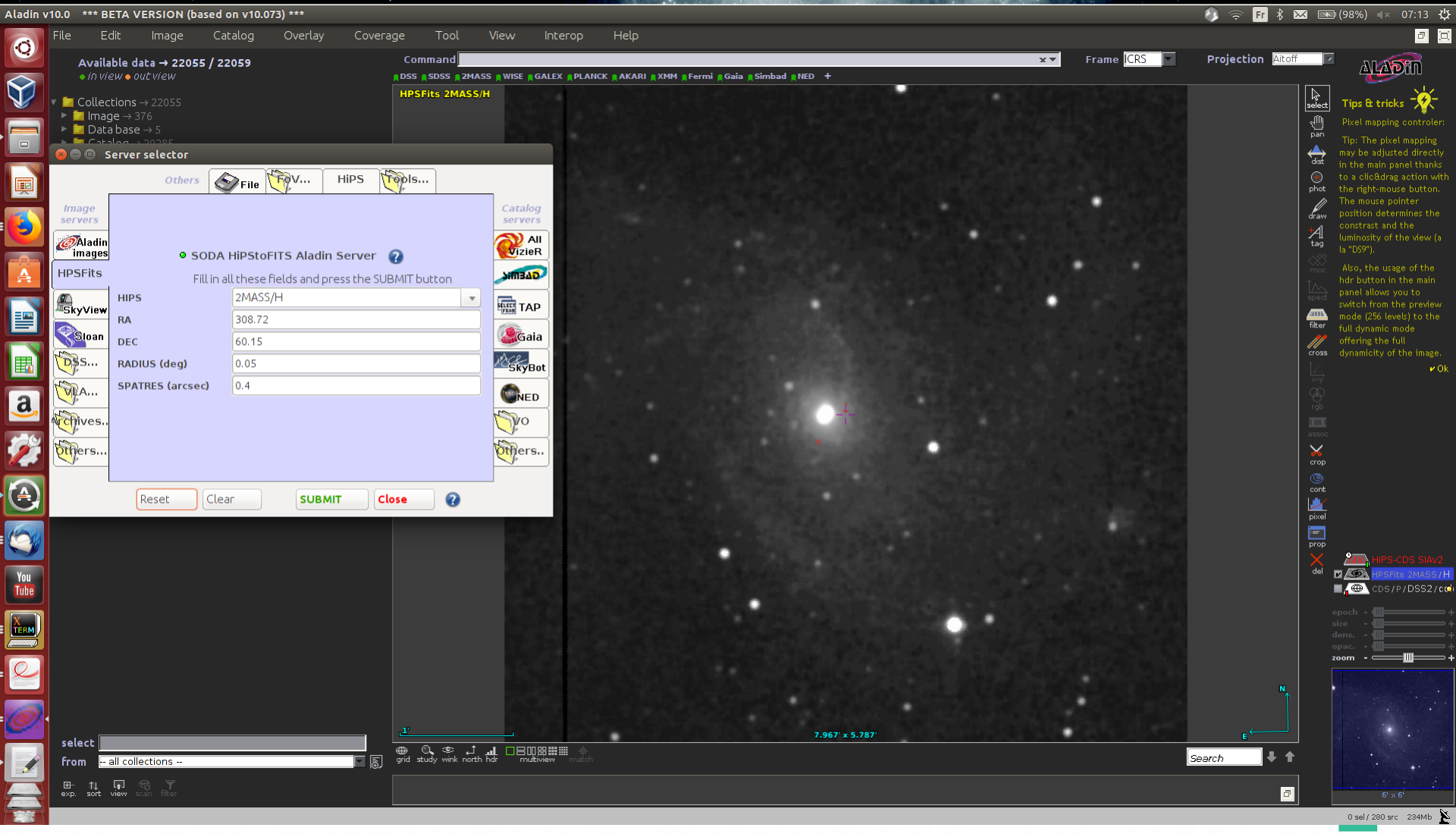
Mode 1 : SIAP2 HiPStoFITS Pan-STARRS retrieved image



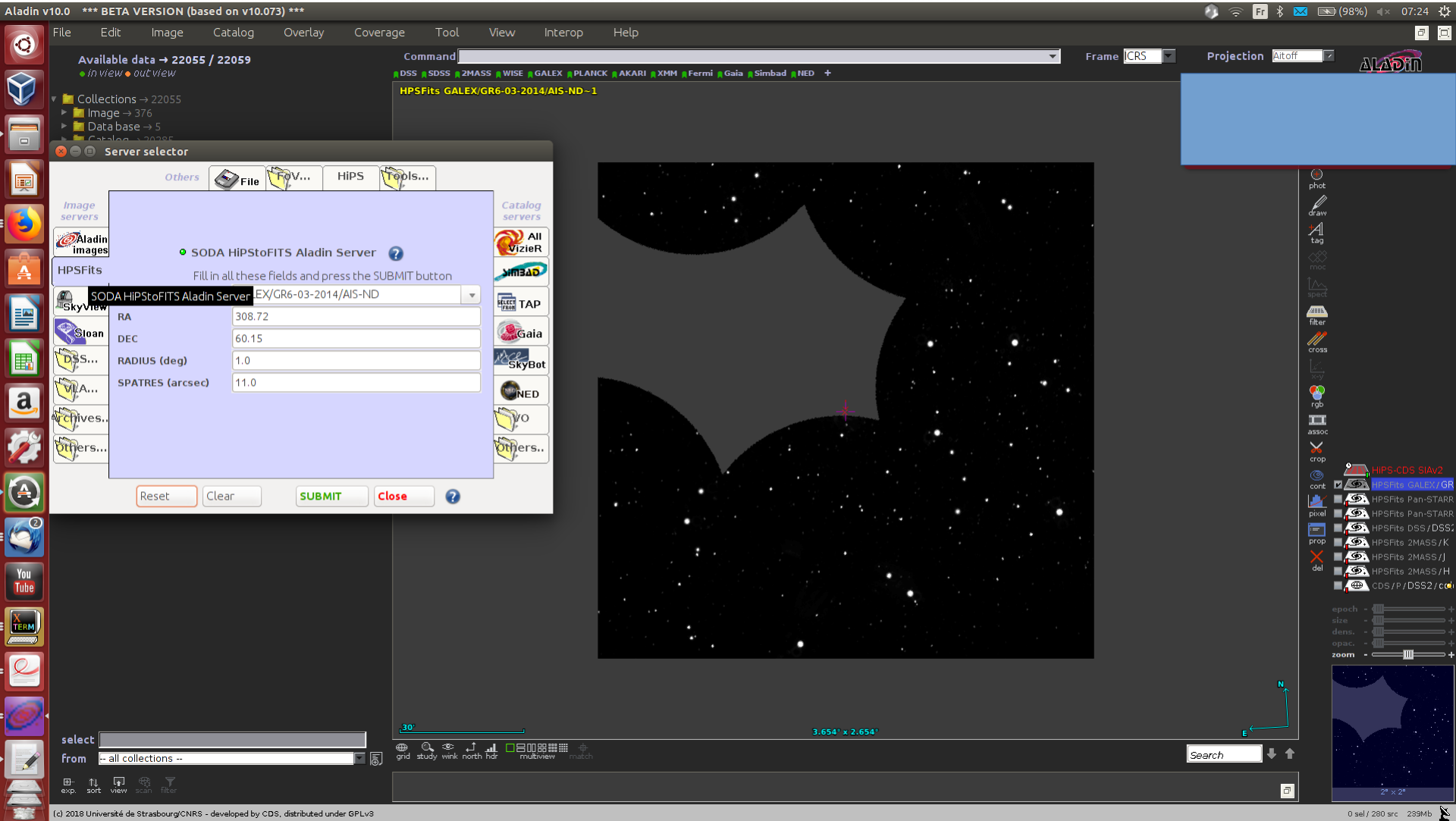
Mode 2 : Access to 2MASS K image with position, size and resolution selecetd by the user through Aladin GLU menu



Mode 2 : Switching to 2MASS H



Mode 2 : Switching to GALEX and enlarging the size to 1 deg



HiPStoFITS version 2 and SIAP2 next steps

- Finalize code
- Release SIAP2 and HiPStoFITS external access next year (before next interop)
- IVOA : Propose the HipsToFits interface for virtual data « SODA-next » protocol and SIAP2.x virtual data generation option