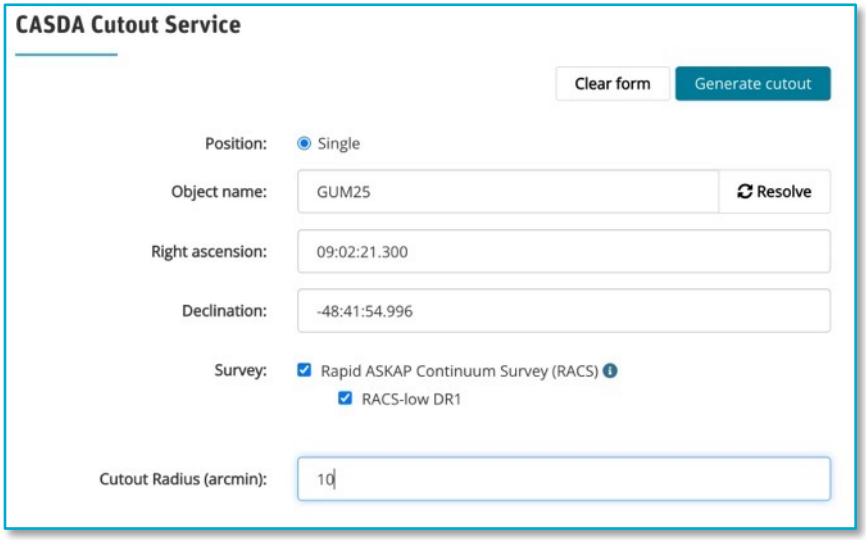
Image Credit: Alex Cherney

Implementing an SIA1 service for CASDA

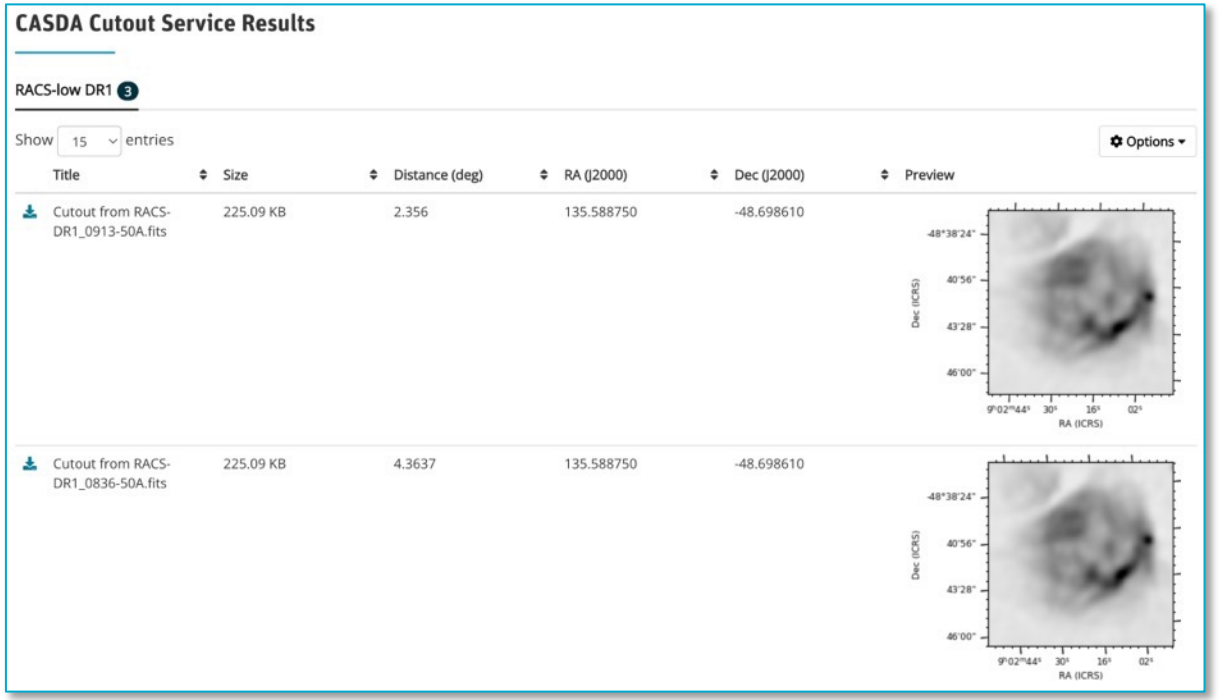
James Dempsey | 20 Oct 2022

CASDA Cutout Service - Query

- Provide cutouts from curated survey datasets
- User only needs position
- Initial dataset – Rapid ASKAP Continuum Survey (RACS) Low DR 1 (Hale et al 2021)



CASDA Cutout Service - Results



- Show cutouts from any overlapping images
- Preview generated on demand
- Immediate download

Implementation

- SIA1 – Query
  - Survey – obscore query for images
  - Base URL includes custom survey parameter
  - A few iterations to understand parameters and meaning of output fields
- SIA1 – Retrieval
  - Keep survey images online
  - Produce cutouts and previews on demand
  - Uses a sync endpoint so would not be suitable for large cubes

Motivation - why SIA1?

- Already run SIA2/Datalink/SODA service – well used
- Needed a survey-oriented not image-oriented service
- Guide users to best data for science use
- Supports UI but can be used elsewhere
- Other clients with SIA1 support not keen on using SIA2 service

Comparison of interactions

SIA1

1. GET query (with cutout spec)
2. For each matching image
    1. Read URL of preview row and GET
    2. Read URL of FITS cutout row and GET

SIA2

1. GET query (with cutout spec)
2. For each matching image
    1. GET datalink
    2. Find cutout preview service row and descriptor
    3. Build SODA cutout preview URL and GET
    4. Find FITS cutout service row and descriptor
    5. Build SODA FITS cutout URL and GET

See https://github.com/ivoa-std/SIA/issues/6

Speed hump 1

Rounding (in Postgres)

- ROUND(distance, 4) => "No function matches the given name and argument types. You might need to add explicit type casts.”
- Postgres doesn't implement round for doubles
- Possibly an issue for VOLTT - could have this mapped to
  - round(CAST(distance as numeric), 4)
- Fell back to PostgreSQL specific
  - to_char(distance, 'FM990.9999')

Speed hump 2

Creating array values using concatenation

- ceiling(109.2)||' '||ceiling(51.123) => "Unable to interpret query”
- Fell back to PostgreSQL specific
  - ceil(109.2)||' '||ceil(51.123) => ‘110 52’
- Is there a better way to do this in ADQL?

Speed hump 3

Support for SQL VALUES syntax

- https://www.postgresql.org/docs/current/queries-values.html
- SELECT * FROM (VALUES ('fits', 'image/fits'), ('png', 'image/png')) AS t (format, content_type)
- Instead created a new table in our TAP service to support the formats

Thank you

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What about SIA2

- Could have
  - Add SURVEY custom keyword
  - Add cutout and cutout preview to datalink
  - Either:
    - Calculate SODA query for cutout/preview in interface layer; or
    - Include cutout spec in access URL to datalink, precalculate URLs for cutout/preview in datalink result
  - Provide same data to UI