



Intro to CASDA

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Australia's National Science Agency





CSIRO ASKAP Science Data Archive

- Archive for Australian Square Kilometre Array Pathfinder (ASKAP)
- Science-ready data products
- Data formats:
 - Images & Image cubes (FITS)
 - Spectra (FITS)
 - Catalogues (VOTable)
 - Visibilities (CASA Measurement Sets)

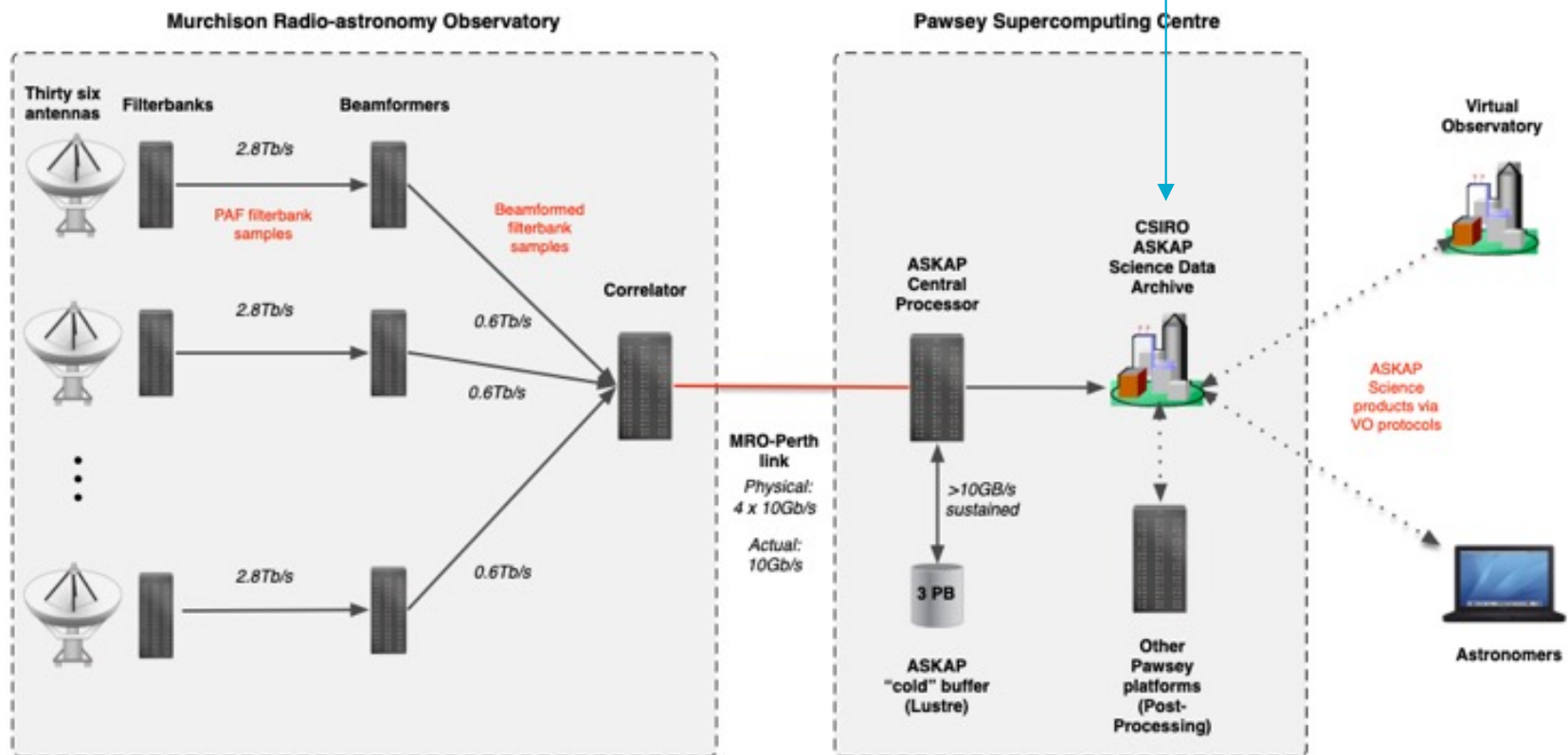
Credit: CSIRO





ASKAP and all its wonderful data

5 PB / yr





ASKAP and CASDA Glossary

SST = Survey Science Team. There are 8 main survey science teams. See resources on next slide.

SBID = Scheduling Block ID. Observations are performed and processed in scheduling blocks.

Project ID = OPAL and CASDA project codes. ASKAP Project codes are in the form “AS---”.

DAP = Data Access Portal. This is CSIRO’s enterprise-wide portal for data.

VO = Virtual Observatory.

Observational Data = Science data processed by the observatory with ASKAPsoft. Can be released or unreleased.

Unreleased Data = Deposited and available to project team members.

Released Data = Deposited and validated data. Publicly available to all.

Derived Data = Value-added data uploaded by users.



Resources

- CASDA webpage <https://casda.csiro.au>
- ATNF ASKAP webpage
<https://www.atnf.csiro.au/projects/askap/index.html>
- ASKAP newsletter
https://www.atnf.csiro.au/projects/askap/commissioning_update.html
- ASKAP Survey Science confluence space
<https://confluence.csiro.au/display/askapsst/ASKAP+Survey+Science>



CASDA Aims



Data Discovery

Find data useful to you
Minimal radio astronomy
knowledge assumed
Query data products
Query source catalogues



Data Access

Download entire data
products
Extract small parts of very
large cubes (up to 3.5 TB)



Data Publication

Science team 'value-added'
data
Legacy surveys
DOIs assigned



ASKAP Data on DAP

- ASKAP data is served through CSIRO's Data Access Portal
- These web tools also interact with the VO services
 - Downloads
 - Cutouts
 - Spectra generation
 - Catalogue queries

data.csiro.au

The screenshot shows the CSIRO Data Access Portal (DAP) website. The header includes the CSIRO logo, the text "Data Access Portal", and navigation links for "SEARCH", "BROWSE", "DOMAINS", "CONTACT US", and "HELP". A blue banner at the top contains the text "Access research data, software and other digital assets across a range of disciplines." Below the banner are three search options: "Search by keyword", "Search by location", and "Search by domain". A section titled "The domain searches target specific areas of scientific research." lists five domain-specific search tools: "Virus Image Search" (ACDP), "Pulsar Observation Search" (ATNF), "Observations" (CASDA), "Skymap" (CASDA), and "Cutout Service" (CASDA). Each tool has a brief description of its function. Below this is a "Featured collections" section with three images: a chicken in a coop, three brown eggs on a surface, and a group of chickens in a coop.



What is the Virtual Observatory?

The Virtual Observatory (VO) is a set of services and standards that allow astronomers to query data centres in a seamless and transparent way.

- Analogous to world wide web and internet



International effort is International Virtual Observatory Alliance (IVOA)

Australia's effort is the All-Sky Virtual Observatory (ASVO).

<https://asvo.org.au/>

Five nodes:

- Skymapper,
- Data Central,
- MWA ASVO,
- CASDA,
- Theoretical Astrophysical Observatory (TAO).





Why Virtual Observatory?

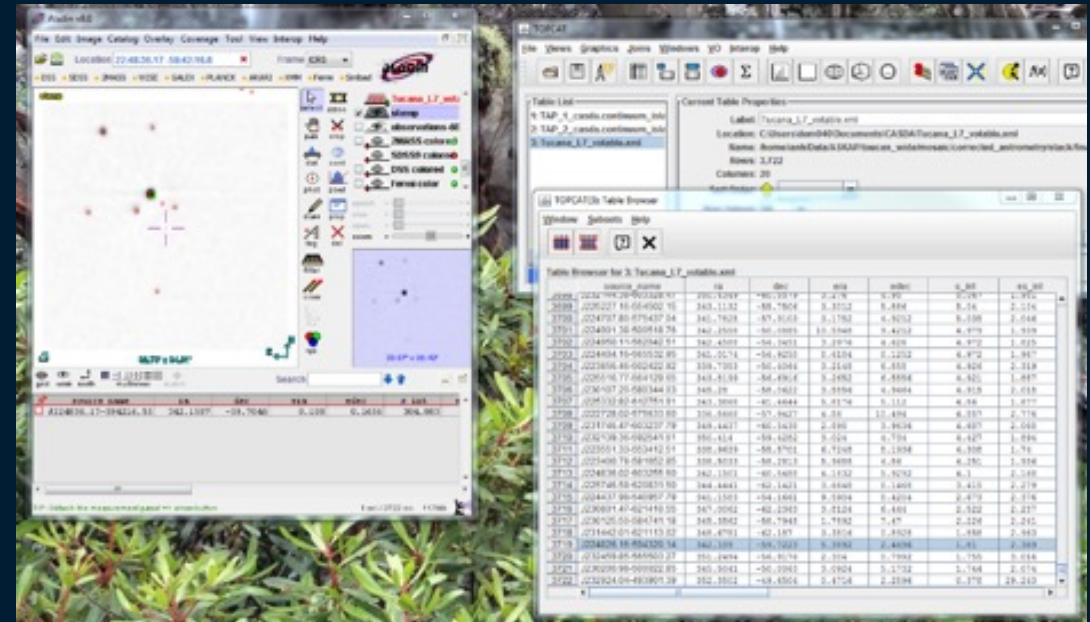
Virtual Observatory (VO) services increase FAIRness of CASDA data.

Access data directly in well known astronomy applications such as TOPCAT and Aladin.

Allows scripted (e.g. python) queries, downloads and cutout generation

- Python's Astroquery

Backbone of web portal e.g. UI cutout service





CASDA Virtual Observatory Demo

- Simple cone search of RACS and global catalogues for radio sources: [Simple Cone Search \(SCS\)](#)
- Simple cone search for images/cubes: [Simple Image Access \(SIA2\)](#), [Datalink](#)
- Complex queries of catalogues and observations: [Table Access Protocol \(TAP\)](#) and [Astronomical Data Query Language \(ADQL\)](#)
- Astroquery CASDA python module
 - Image search and download ([SIA2](#))
 - Cutout of RACS image [SIA2 + Server Side Operations for Data Access \(SODA\)](#)
 - Cutout of Eridanus cube ([SIA2 + SODA](#))



CASDA Dataset Highlights

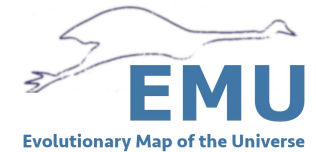
- Rapid ASKAP Continuum Survey (RACS)
 - First all-sky continuum survey with ASKAP at 888 MHz
 - All 903 fields primary data deposited and released (McConnell et al. 2020)
 - First all-sky combined catalogue recently published and also released, >2M radio sources (Hale et al. 2021)
 - Includes images/tiles mosaiced with overlapping regions
 - <https://research.csiro.au/racs/>
 - RACS-mid (1.4 GHz) primary data released (Duchesne et al. 2023), consolidated catalogue and mosaiced tiles available very soon





ASKAP Survey Science Teams

- All-sky (2Pi sr) continuum and HI surveys (EMU and WALLABY)
- Study of cosmic magnetism with all-sky polarization survey (POSSUM)
- Deep HI (emission) survey to study gas in distant galaxies (DINGO)
- Blind survey of HI absorption in distant radio galaxies (FLASH)
- Survey of gas (HI and OH) in Milky Way and Magellanic Clouds (GASKAP)
- Search for variable and transient radio sources (VAST)





ASKAP SST Project Codes

AS101/AS201
EMU

AS102/AS202
WALLABY

AS103/AS203
POSSUM

AS104/AS204
DINGO

AS105/AS205
GASKAP-OH

AS107/AS207
VAST

AS108/AS208
GASKAP-HI

AS109/AS209
FLASH



Publishing and Acknowledgements

- CASDA (released) data is available to all astronomers.
- Please follow guidelines at:
<https://www.atnf.csiro.au/research/publications/Acknowledgements.html>
- Publications using data accessed through CASDA should include: “*This paper includes archived data obtained through the CSIRO ASKAP Science Data Archive, CASDA (<http://data.csiro.au>).*”
- Individual SSTs have their own data and publication policies.
- Good practice to cite the SST paper when using data from that project.
- Also please include CASDA DOIs to the dataset you use in your papers.
- If appropriate please also cite: “The CSIRO ASKAP Science Data Archive”, Huynh et al. 2020, ADASS XXVII, ASP Conference Series, Vol. 522



Thank you

CSIRO Astronomy and Space Science

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