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Rapid ASKAP Continuum Survey

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Introduction

RACS, the Rapid ASKAP Continuum Survey is a project to image the whole accessible sky quickly in 288-MHz continuum bands. RACS is distinguished from the Survey Science Projects (SSPs) by being initiated and led by CASS as an "Observatory Project". Its aims are to produce the Global Sky Model required for ASKAP calibration, to provide the ASKAP community with data to assist the planning of the SSP observations, and to provide the general astronomical community with a shallow all-sky radio survey.

Data access policy

RACS data is collected in support of ASKAP operation and for the benefit of the ASKAP user (SST) community, and ultimately the entire astronomical community. RACS data will be made public on CASDA as soon as their quality can be quantified and assured. Once loaded onto CASDA, the RACS products will be accessible to all. The Observatory expects the first release of data to be in Q3 or Q4 of 2019.

Access to RACS data prior to public release is at the discretion of the observatory and is granted with the express purpose of expediting quality control and subsequent public release. We understand that thorough quality control may lead to scientific discoveries and encourage any such results to be published, in accordance with the following.

1. Pre-release data may not be used arbitrarily for science. Established science teams are considered to have jurisdiction over research that falls primarily into their domain. Teams or individuals should confine the use of pre-release data to their own science domain and consult with the appropriate PIs on authorship when cross-over occurs. Disputes will be referred to a panel consisting of the ASKAP lead scientist, and the ATNF Assistant Directors for Telescope operations and ATNF Science, which will rule on authorship. Papers written using pre-release RACS data should adhere to the ASKAP Publication policy (section 3.4 *ASKAP Commissioning or Early Science Publications*.
2. Access to pre-release RACS data shall be negotiated between the relevant SST Principal Investigator and the Observatory.
3. Contributions to data quality assessment will be made in the form of software-encoded methods that can be incorporated into the Observatory's image processing system using interfaces in preparation. Details of these interfaces can be developed through discussion between the Observatory and the science team members.

Failure to follow these policies may result in access to pre-release data being withdrawn.

Image quality assessment

Assistance with data quality assessment will include the encoding of any procedures developed to allow their repeated application to successive epochs of RACS data (whether from fresh observations, or improved imaging of an older set). Such procedures will remain accessible to the Observatory for future use.

Data quality assessment areas will include the following:

1. image noise analysis;
2. astrometric accuracy;
3. radiometric accuracy (both flux-density and spectral index);
4. polarimetric characterisation, including the determination of corrections to the instrumental response.

RACS data

- **Visibilities**—A viable RACS dataset after observation comprises two MeasurementSets: a 36-beam observation of PKS B1934−638 (the calibration data) and an observation of a number of RACS fields (the science data). Typically, the science data files contain around 12 fields. A given calibration dataset may be used to calibrate a number of science data files. Usually PKS B1934−638 is observed once per day.
- **Primary image data**
  - the Stokes-I image[1];
  - the weights image;
  - the *rms* image.

  All are recorded in FITS files and will be loaded into CASDA as "level-6" data.
- **Secondary data products**—Once image quality is understood and assessed, higher level products will be derived from the primary image data and released in CASDA as level-7 data:
  1. Image mosaics over a number of tiles. These will be produced from the tile image and weights data, and will be constructed to have overlap with neighbouring mosaics. In this way the whole sky will be represented in at least one mosaic without suffering from the tile boundaries, which necessarily have reduced sensitivity.
  2. A source catalogue made from these mosaics, constructed so as to supress any catalogue software output from mosaic boundaries.

[1] These will be augmented with Stokes Q, U and V as soon as possible

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