ASKAP update for February 2024

This month we report on the status of CASDA, resumption of survey operations and plans for ongoing development.

CASDA status and data availability

CASDA users may have noticed that data access tasks were experiencing performance degradation and errors during late January and early February. This was due to an issue with the Pawsey S3 data storage system called Acacia, which CASDA uses to store all ASKAP deposits. On February 6th, Pawsey restricted access to the part of Acacia that holds ASKAP data so they could conduct system checks and work to address the issue. We switched CASDA over to a different part of Acacia which has allowed new deposits to continue, but data deposited before February 6th became unavailable at that time.

Remedial work on Acacia has since gone well, with no indication of data loss due to its high degree of internal redundancy. At 2 PM AEDT on the 16th of February, we switched CASDA back to its original storage area, restoring access to all data deposited before February 6th. Data deposited during the interim period February 6th to 15th is currently unavailable but will be migrated over to the main storage area in the background over the next two weeks and should be immediately available as soon as the migration jobs finish. We expect that there will be no further CASDA downtime related to this issue, and that Acacia performance has returned to normal. There will be a scheduled interruption to CASDA services on the 22nd of February between 10 AM and 4 PM AEDT while we deploy a new software release.

Survey science observations resume

The ASKAP Operations team has completed all backlog processing tasks from 2023. On the 16th of February we resumed Survey Science Project observations with a clean start that should give us the best chance of keeping up with incoming data throughout the rest of the year.

The starting pool of SSPs includes EMU, POSSUM, WALLABY, VAST, FLASH and CRAFT. We have also provided initial survey observations to GASKAP-OH, GASKAP-HI and DINGO for validation. When these are deemed ready for release, we will add the corresponding SSP to the active observing pool. We will also be completing the remaining Guest Science Project observations from the OCT2023 semester as soon as possible.

Changes to the observing parameters this year include a night-only constraint for WALLABY, which should prevent solar interference from contaminating the spectral line source finding output.

Last year we were unable to process any data for several accumulated months due to various issues with the newly installed Setonix supercomputer. The situation has improved over time as these issues are being addressed by the Pawsey Supercomputing Research Centre and the platform vendor. We hope to achieve significantly higher processing efficiency in 2024, which will lead to a higher overall observing efficiency given our limited capacity to store raw data. We will continue to automatically balance spectral line observing with continuum based on available disk space and will monitor any resulting impact on the spectral line projects.

The next RACS epoch

RACS-low3 is now fully complete (see Figure 1), including a small set of re-observations for fields that did not image well on the initial pass. 1493 unique fields were observed for a total integration time of 16.8 days spread over 53.9 calendar days. The first automated processing pass is also fully complete, with all fields having been imaged and deposited into CASDA. The RACS team are conducting basic quality checks to ensure that each field is suitable for science, and we expect to release the data for public access soon. Additional data products from combined survey fields will be created in future.

This iteration of RACS-low used a beam footprint the same as the EMU SSP and other RACS frequency bands.

Development priorities for 2024

During 2023 our highest priority was to deliver processing software features that would allow all SSPs to proceed with their observations. We delivered spectral line joint deconvolution capabilities for GASKAP-HI and improved velocity correction methods for GASKAP-OH, culminating in test observations that both teams are assessing.

Our priority this year will be to deliver features required to improve data quality and telescope reliability. In the context of Science Operations, one aspect of this will involve continuing work in the Collaborative Intelligence (CINTEL) space, with the production deployment of machine learning tools to improve visibility of possible issues in ASKAP monitoring and raw data alongside research into the optimisation of human-AI workflows. Development on SAURON will continue as required to meet the evolving needs of SSP, GSP and TOO observing, as well as other features to improve autonomous scheduling efficiency. We also have plans to improve the reliability of antenna drive systems, PAF control logic and metadata visibility, subject to available development effort.

Recent updates to the ASKAPsoft continuum imager allow simultaneous imaging in several directions. In future this could be used for direction-dependent calibration, but our first goal is to implement a system that can remove ("peel") bright sources from outside a field of interest to prevent their PSF from contaminating the main image. This will work alongside a first iteration of the RACS-based sky model, which the processing pipeline can access to determine the location of bright sources.

We are also discussing ways in which the ASKAPsoft tools could be optimised for improved compatibility with Setonix. One of the first goals is to reduce the number of small files we create by storing extracted source spectra in a single file. We plan to deploy this for use in validation workflows and possibly for science data products once compatibility with CASDA has been determined.

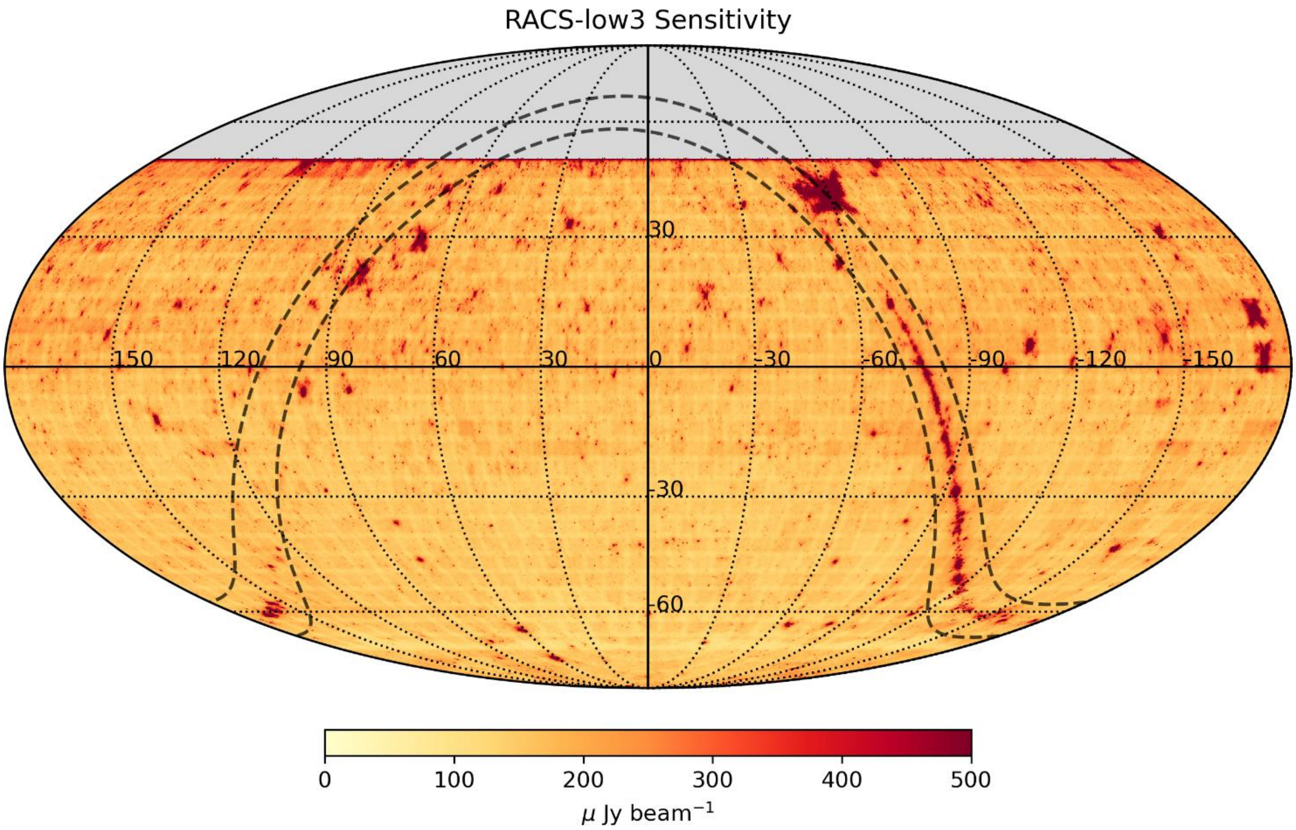

Figure 1: RACS-low3 noise map as of February 13th, 2024, with a median RMS of 168.9 µJy/beam for the region processed. For comparison, RACS-low2 has a median RMS of 183.8 µJy/beam and RACS-low1 has a median RMS of 229.7 µJy/beam. The large improvement between 1 and 2 was due to hour angle constraints made possible by autonomous scheduling with SAURON.

For further information

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