ASKAP update for June 2024

This month we report on key feedback from the Survey Science Project review workshop and completion of RACS-high processing.

Survey science progress update

We have been testing readiness to resume spectral line projects other than FLASH using a subset of GASKAP-OH data. Although recent changes to the quotas on /scratch may have had a positive impact, we are still seeing periods of reduced performance that impact operations.

We are currently testing ASKAPsoft 1.17.5 which includes parallel measurement set read/write capability for tasks previously done in serial mode such as calibration and flagging. When these changes are deployed, we should be able to complete spectral line jobs significantly faster.

SST	Deposited	Awaiting Validation	Released	Rejected
EMU	284	7	221	56
WALLABY	53	0	25	28
POSSUM	336	29	220	91
VAST	3447	49	3361	39
FLASH	149	0	88	61
GASKAP-HI	1	1	0	0
GASKAP-OH	1	1	0	0
DINGO	2	2	0	0

Table 1: Survey progress as of 14-06-2024

Feedback from the SSP review workshop

On the 21st of May we hosted a half-day workshop for Survey Science Project leaders and technical experts designed to reflect on progress during the first year of survey operations. We had a great discussion and would like to thank everyone for their contributions.

Each Survey Science Team had the opportunity to highlight their most significant challenges or high-priority feature requests. Ongoing data throughput issues remain a key concern, with impacts ranging from stalled spectral line survey projects to lack of timely feedback on data quality. Several teams expressed an interest in better understanding the limits of ASKAP's astrometry and flux scale accuracy. Solar interference is another common challenge, with impacts including imaging artifacts and associated continuum subtraction residuals or spurious rotation measure signatures.

EMU and POSSUM highlighted the importance of completing EMUCAT tiles. These are groupings of survey fields that are analysed together after the observatory has released the data. SAURON already prioritises these groupings, but we may be able to improve the field priority weighting. FLASH reported a lower data rejection rate after changes made to the automated tropospheric ducting detection logic designed to avoid scheduling in the affected band during periods of ducted RFI. However, some FLASH fields are still impacted by ducting, and we will continue to refine the algorithm.

GAKSAP-HI are investigating the best combination of imaging parameters to optimise ASKAP's sensitivity to large-scale structure and ensure adequate continuum subtraction, while GASKAP-OH are investigating ways to improve self-calibration and widefield doppler correction.

There was broad interest in developing closer links between the ASKAPsoft development team and the Survey Science Teams. This could begin with more involvement during testing of new features, and improved triage of feature requests based on experience with other software packages and recently published techniques. We are also considering whether a new technical update meeting series could improve communication of priorities and progress alongside the existing science working groups.

Given that ASKAP is somewhat less sensitive than its original design specification, many of the SSTs are interested in extending the survey programs beyond the initial allocation of time to ensure that their science goals are met. Long-term plans will be considered in conjunction with possible upgrades to ASKAP's hardware,

including the option of a new PAF that would significantly improve sensitivity.

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Radio astronomy stakeholders met with Pawsey Supercomputing Research Centre staff last week to discuss issues around communication and platform performance. To help prioritise issues impacting radio astronomy operations, Pawsey are planning to improve issue reporting channels and formalise regular technical meetings to improve accountability.

Ongoing issues with the performance of /scratch are being addressed at a platform level, with significant changes planned in August and September this year. In the meantime, we are working closely with Pawsey staff to find optimisations and improvements that can be implemented quickly in our own code and pipelines.

RACS-high processing complete

The Rapid ASKAP Continuum Survey team have recently completed re-processing the high-frequency 1656 MHz data observed across the end of 2021 and the start of 2022. RACS-high was not processed by the ASKAPsoft pipeline at the time of observation like RACS-low-3 and has been waiting in the queue behind RACS-mid which was recently released. Initial processing was done for a first assessment of data quality, but the results were not archived or released. The latest processing of RACS-high has benefited from experience gained with RACS-mid and the final run has proceeded quickly. All fields should be validated and released on CASDA for everyone to access by the time you read this!

RACS-high is the third and final frequency band covered by the survey. It has the best spatial resolution of all the RACS bands, with a PSF of just over 10” and a median RMS of 192.9 uJy/beam (see Figure 1).

With all three bands available in CASDA, the RACS team’s focus will shift to synthesising a global sky model from the full set of data. This will form the foundation for improved ASKAP calibration methods in future.

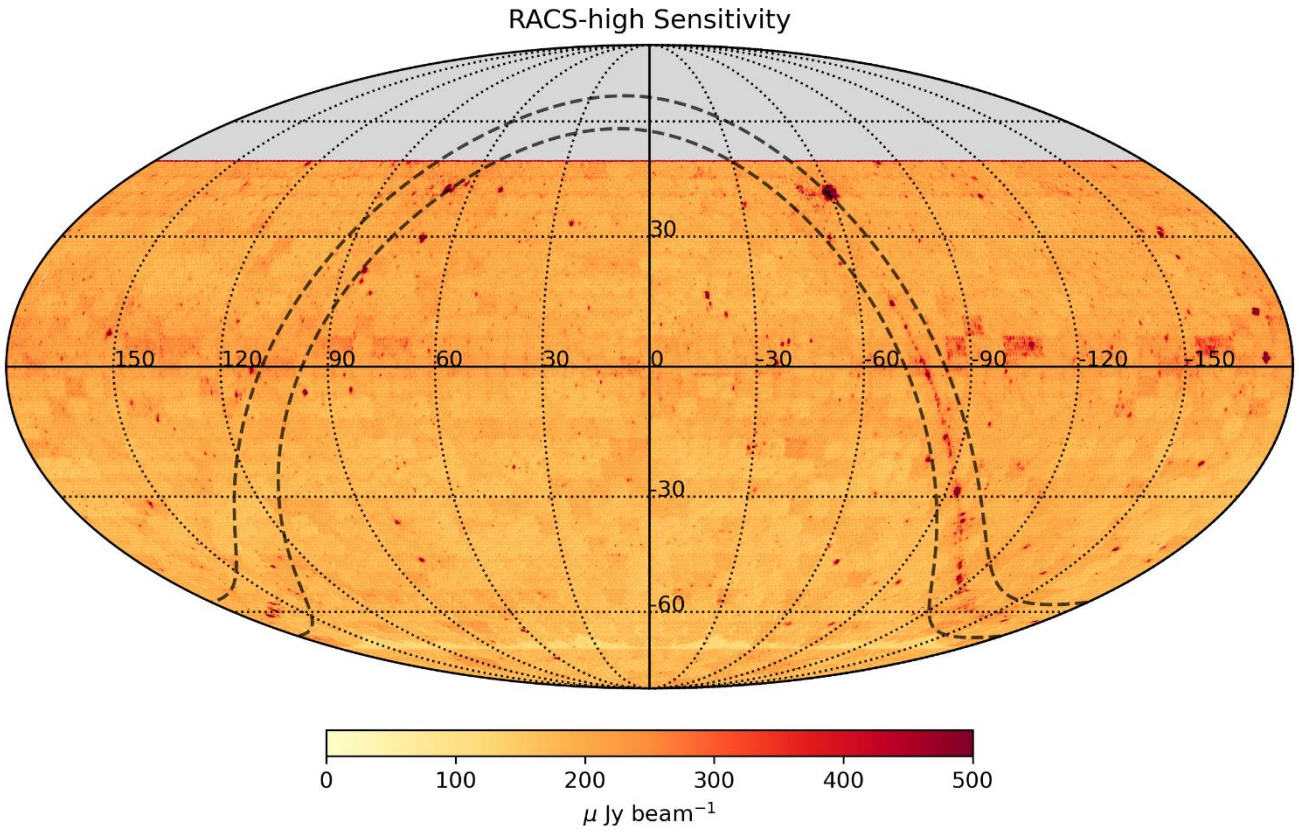

Figure 1: RACS-high sensitivity map. Image provided by Emil Lenc

For further information

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