



ASKAP update for May 2024

This month we report on plans to improve ASKAP’s processing efficiency and outline the goals of an upcoming Survey Science Project review workshop.

Survey science progress update

We have been limited to continuum observing modes for the past month while working through a backlog of FLASH processing. This backlog is now almost clear, so we have returned FLASH to the survey pool as it is a good test of the performance of Setonix and /scratch. We are not yet achieving the data throughput required for longer spectral line observations and are working on plans to address this (see later). However, progress on continuum projects has been good and we are approaching the ¼ point for completion of the EMU/POSSUM survey region.

SST	Deposited	Awaiting Validation	Released	Rejected
EMU	252	10	196	46
WALLABY	53	1	24	28
POSSUM	304	16	215	77
VAST	3360	102	3221	39
FLASH	128	18	63	47
GASKAP-HI	1	1	0	0
GASKAP-OH	1	1	0	0
DINGO	2	2	0	0

Table 1: Survey progress as of 17-05-2024

Survey science project timelines

ASKAP’s autonomous scheduler SAURON has been achieving well above the necessary observing efficiency to complete the Survey Science Projects on time. However, ongoing issues with the Setonix supercomputer, its filesystems, and the overall efficiency of data processing mean we have had to restrict spectral line observing modes significantly and at the current rate of deposits into CASDA, we will not finish spectral line projects on time. Resolving this situation is our top priority and we are considering possible contingency plans while working closely with Pawsey staff.

There are also some outstanding software development tasks required to improve data quality and deliver the last remaining features required to meet SSP goals. These include removing artifacts caused by bright sources and implementing VAST’s commensal fast imaging pipeline.

We have not had sufficient resources to complete these tasks as part of ongoing operations, so we are now preparing a project plan to address key issues as an additional body of work. This project plan will be submitted to the ATNF Project Review Board no later than their next scheduled session in October 2024. We are currently identifying specific tasks that fall under the banner of this project and estimating the additional resources required.

The project is likely to include a mix of feature delivery and optimisation work designed to improve observing and processing efficiency. The primary goal is to ensure we can deliver existing commitments on time. We also keep track of ideas for enhanced features using the unique capabilities of ASKAP’s Phased Array Feeds or software infrastructure, but these advanced features must be balanced against our more immediate operational requirements.

Working with Setonix

Pawsey Supercomputing Research Centre staff are aware of the performance issues with Setonix, both in terms of platform configuration and the conflicting workflows of multiple different users. In the coming weeks we expect Pawsey to communicate their plan to resolve these fundamental problems in conjunction with the platform vendor. However, we have seen that changes to the configuration of Setonix do not always have the desired effect. It is therefore important that we identify contingency plans if further action is required. This could include reconfiguring Setonix hardware to prioritise astronomy workflows, upgrading dedicated storage space or switching to a different platform altogether. Unfortunately, these contingency plans would likely

require some additional funding. Switching to an alternative platform is a major change that could not be made lightly, and we have been exploring our options on a smaller scale to gain experience.

SPICE-RACS on Petrichor

Since Data Release 1 (DR1), the SPICE-RACS team have been working to scale up and improve their processing pipeline so it can work with larger data volumes. SPICE-RACS aims to determine the rotation measures of extragalactic sources detected in RACS by creating cutouts with full linear polarisation calibration. DR1 involved a test region of 30 RACS-low fields, covering about 1300 square degrees. DR2 will be based on the entire RACS-low3 catalogue, covering an area larger than POSSUM, but with less sensitivity.

To avoid conflicting with ASKAP's primary operational workflow, the team have been running the processing pipeline on CSIRO's Petrichor supercomputer. Although Petrichor is smaller than ASKAP's partition on Setonix, it has ample capacity to process ASKAP continuum data. This project also provided an opportunity to test a new workflow management system based on the Prefect library, using alternative imaging software WSCLEAN. Prefect offers several advantages including an additional layer of job management that lessens the load on the supercomputer's SLURM queue system, along with extensive in-built logging and monitoring tools that can be augmented with astronomy-specific diagnostic and quality control plots.

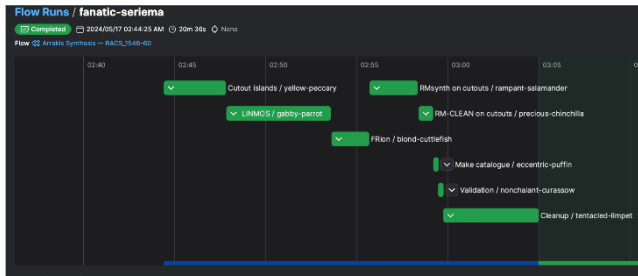


Figure 1: Prefect-based pipeline dashboard showing the task execution sequence for a single run. Image made by Tim Galvin.

WSCLEAN offers good flexibility in channelisation, which is useful when optimising for rotation measure synthesis.

Current estimates predict that SPICE-RACS DR2 will include over 200,000 RMs up to Dec +49.

We plan to test the compatibility of this pipeline with other science processing workflows and tools including ASKAPsoft in future.

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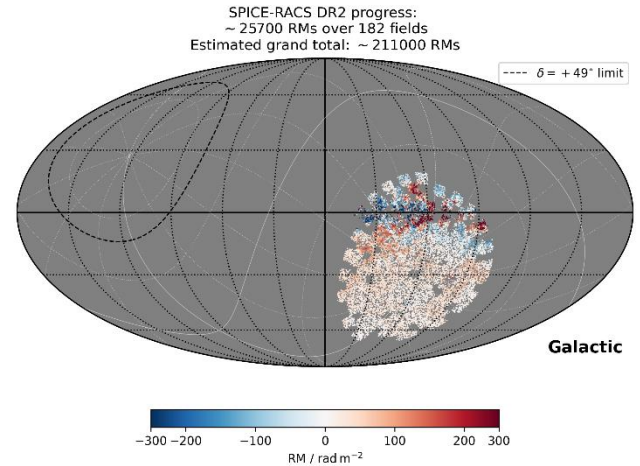


Figure 2: Current progress after 5 days of running the RACS-low3 data through the SPICE-RACS pipeline. Image made by Alec Thomson.

The SSP review workshop

On Tuesday the 21st of May, we will be hosting a half-day workshop aimed at sharing experiences from the first year of ASKAP survey operations. This workshop comes in advance of each SSP submitting a progress report to the ATNF Time Assignment Committee for review and provides a chance to identify common concerns and new opportunities. Each SSP has been asked to send up to three representatives to the workshop, which will be split almost evenly between talks and discussion.

While some projects have been impacted more than others by the ongoing issues with Setonix, there are also many success stories from the past year. These include uncovering two bugs in the application of holography beam models to polarisation images. Resolving these has improved the quality of ASKAP's wide-field polarisation leakage calibration to the point where we are now meeting the necessary science requirements on a routine basis. We will use the workshop discussion to refine priorities for the upgrade project mentioned earlier in this newsletter, as well as the priorities of development during ongoing operations. The workshop also includes a session on science highlights, and we are excited to see how the SSTs have been making use of their data.

Although this workshop has a limited participation quota, we are planning to host a larger online symposium this year, during the week of November 4th. Plans for this are still developing, but we will keep the community informed via this newsletter and the usual channels. If you know of any clashes with the proposed timing, please let us know.

For further information

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