



ASKAP update for September 2024

This month we report on survey progress, unexpected CASDA downtime and resumption of long-track spectral line observations.

Survey science progress update

This month we are making a concerted effort to progress the long-track spectral line projects, especially DINGO and WALLABY. Since both teams prefer night observations, we are experimenting with a relaxed constraint for WALLABY that allows daytime observations but avoids crossing sunrise or sunset, to keep the projected baselines in the direction of the Sun from becoming too extreme.

Processing of these large data sets is proceeding well, though it still takes significant time for the visibilities to be copied from the observing buffer to the processing buffer. Our goal is to process all observations promptly and we are starting to see the result of extensive efforts to improve ASKAP data throughput (see Figure 1).

SST	Deposited	Awaiting Validation	Released	Rejected
EMU	310	1	249	63
WALLABY	55	1	26	28
POSSUM	364	21	254	94
VAST	4189	67	4122	42
FLASH	253	0	136	117
GASKAP-HI	1	1	0	0
GASKAP-OH	1	1	0	0
DINGO	12	10	0	2

Table 1: Survey progress as of 12-09-2024

We are currently assessing the next round of Guest Science Proposals for technical feasibility and will use the Time Assignment Committee rankings to determine which will be scheduled during the October 2024 semester. ASKAP's GSP time allocation is over-subscribed this semester, so we will not be scheduling all proposals. PIs can expect to receive email notification about the status of their project by the end of September.

CASDA status

Maintenance work on the Nimbus cloud computing cluster and network infrastructure at the Pawsey Supercomputing Research Centre caused an unexpected outage of CASDA services. The maintenance window was scheduled for 2 hours on September 4th and the network changes were expected to have minimal impact. Unfortunately, the changes prevented external users from accessing services running on NIMBUS, including critical components of CASDA. Pawsey staff rectified this issue at 3 PM AWST on the 11th of September.

Not long ago we reported that the disk space allocated for CASDA was nearly full. At a recent meeting between members of the ASKAP Operations team and Pawsey staff, we discussed the plan to grow CASDA's storage resources faster than they are being filled. Up to 15 PB of space will be made available on the Acacia disk-based system, ramping up to the maximum amount by the end of 2025. This will be sufficient in the short term, but we expect to record around 35 PB of data throughout the 5-year full survey campaign at current rates. The remaining 20 PB shortfall is expected to be filled by tape-based storage which we will endeavour to provision over the next 5 years. The CASDA development team is currently working to support a hot/cold storage model where frequently accessed files remain staged on disk and less-requested files are kept on tape. All files will remain accessible through the same CASDA user interface, and we don't expect much overflow to tape until 2026 and beyond. These changes will be tested well before we reach a point where tapes are needed and should be ready for a smooth transition to the hot/cold model.

Spectral line project update

Due to data throughput issues, and the development time needed to implement and thoroughly test imaging software modes for spectral line teams, we have fallen well behind the expected survey timeline for WALLABY,

DINGO, GASKAP-HI and GASKAP-OH. Throughout September we will attempt to catch up and ensure that all these teams have a significant amount of data to continue working with, while verifying that we can now keep up with the most intensive data rates.

DINGO have completed their own arrangements to store visibility data for deep stacking experiments and we have identified that spectral discontinuities reported by DINGO can be eliminated using an older version of the beamformer firmware prior to a series of stability improvements. While the firmware team investigate the issue, we have deployed a slightly updated version of the older firmware that supports CRACO and does not show discontinuities but still has the occasional narrow dropouts that were fixed by the recent changes. DINGO observations are underway, and the first processed fields are currently being assessed for data quality.

WALLABY is also back in the observing pool, with an experimental daytime constraint that we will use to test thresholds of solar activity to see whether there is a level below which the Sun doesn't impact data quality.

GASKAP-HI have concluded the process of tuning ASKAPsoft's joint deconvolution mode and have reported

that the resulting image cubes look better than comparison data products produced by other software. The GASKAP-HI team has also made their own arrangements to store visibilities for deep stacking. The first two GASKAP-HI deep fields will be in the observing pool by the time this newsletter goes to press.

GASKAP-OH are investigating the optimal primary beam cutoff to use in the highest ASKAP frequency band, and optimising imaging parameters for bright, extended emission in the Galactic plane. Once the final processing parameters have been selected, we will be ready to start. Having these four teams active in the observing pool will bring us much closer to completing the ASKAP milestone clock, which requires all SSTs to have validated and released data for their full survey.

ASKAP Cutting Edge Science Symposium

Due to delays in approval processes and a high density of meetings throughout November, we have decided to delay the ASKAP symposium until 2025. We are currently aiming for timing around April/May, which also means more of the Survey Science Teams should have access to full survey data and time to conduct preliminary analysis.

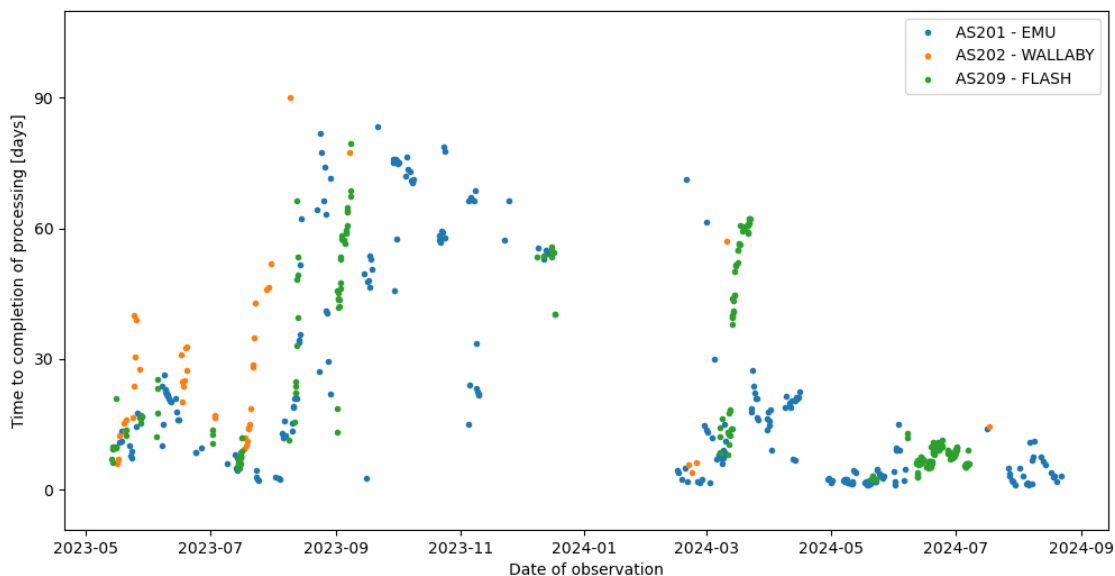


Figure 1: Historical analysis of processing backlogs represented as the time in days between observation and CASDA deposit, for selected Survey Science Project observations. The impact of various throughput issues has manifested across continuum and spectral line projects, but there is a noticeable lack of spectral line data during the worst periods due to our limited raw data storage capacity. ASKAPsoft optimisation and Setonix platform improvements have resulted in significantly decreased processing times over the last few months and further improvements are in progress. Figure made by Matthew Whiting.

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