ASKAP update for February 2022

In this issue we describe the timeline for migration of CASDA to new hardware and announce the return of an upgraded Observation Management Portal. We also report on RACS and Pilot Surveys Phase II progress.

CASDA hardware migration begins

As part of the Pawsey hardware refresh, ASKAP's science data archive CASDA will be moving to a new S3 storage system called Acacia. This will provide significant performance and capacity improvements.

The transition has been carefully planned to minimise downtime, with a subset of the full archive designated as "high priority" to be made available immediately when the switch-over occurs. This consists of catalogues, primary data cubes, spectra, value-added deposits, and auxiliary data products requested by the Survey Science Teams. The remaining auxiliary data will be transferred in the background after the switch-over and will become available again over the next few months.

There should only be a few minutes of complete downtime during the switch-over from one storage platform to the other. The copy of high-priority files will be done in advance.

The new storage system is currently being prepared and should be made available on or around the 15th of February. New deposits will go directly to Acacia from the 18th onwards. We expect the platform switch-over to occur on the 21st of February. Migration of all remaining data is expected to complete in May.

ASKAP observations and processing

With the remaining Pilot Survey Phase II science fields largely waiting on the results of quality gate analysis, we have made good progress on RACS high-band observations and associated holography. Analysis of the RACS flux scale is helping to quantify variations in beam properties from one beamforming solution to another, which will in turn help define operational procedures around the timing of holography observations during full-scale surveys.

Overall, ASKAP's flux scale routinely matches expectations to within a few percent across most of the field, where there is overlap between beams. We still see significant flux errors near the edges of the field, but experience with RACS shows that these can be mitigated by re-mosaicking using surrounding data when it becomes available. While we cannot do this as part of observatory processing (because not all neighbouring fields are observed in quick succession), it will be an important step in post-processing pipelines run by the SSTs.

RACS high-band progress report

Since the last newsletter, we have completed all observations for RACS-high at 1656 MHz. Processing is also going well, with roughly half the survey fields imaged.

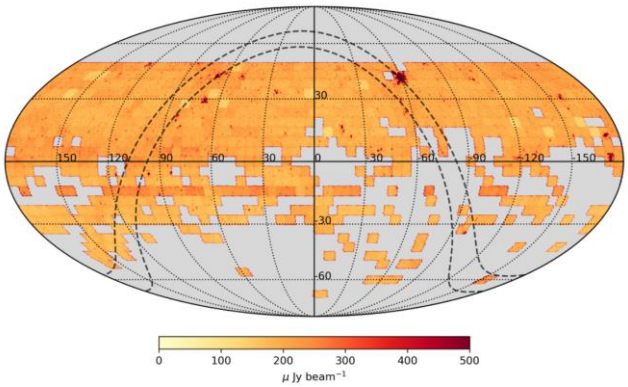

Figure 1: Noise map for RACS-high fields that have been processed so far. RACS-high uses the same tiling and footprint as RACS-mid. Image made by Emil Lenc.

Ongoing analysis of the RACS-mid and -high flux scales will determine the next steps, with some reprocessing likely required once the optimal primary beam correction is determined. Just like RACS-low, the best approach may involve a combination of holography and source flux comparisons.

Pilot Surveys Phase II

Four more EMU fields were released to the public on February 7th, these being the first EMU science fields to complete the full validation and release process. Two EMU quality gate fields were released in late 2021.

Processing of FLASH science fields has revealed a significant number were impacted by ducted RFI in one of the bandpass calibration observations. FLASH observes in ASKAP's low frequency band (700 – 1000 MHz), where ducting is a seasonal phenomenon that impacts about a quarter of the observing time (more in summer and less in winter). We have a real-time measure of ducted RFI power from the observatory RFI monitoring system, which will be integrated into the SAURON scheduler. This should allow the scheduling algorithm to avoid low-band observations when ducting is present in future.

Proximity to the Sun also degraded the quality of a few FLASH and RACS-high observations, which may prompt a change in the minimum Solar separation angle constraint. Since we are progressing towards Solar maximum during ASKAP's first planned full-scale survey campaign, it will also be important to monitor the impact of radio emission from Solar flares, particularly during beamforming.

MRO maintenance shutdown

For one week starting February 7th, central power systems at the observatory were shut down to allow inspection of high voltage cables and remedial work associated with a plumbing failure that occurred over the end of year break. Essential computing services continued running on backup power, so there should have been no impact on data processing activities.

The return of the OMP

Due to a potential security vulnerability in its underlying database, ASKAP's Observation Management Portal (OMP) was temporarily shut down late last year. Since many of the Survey Science Team members rely on the OMP for up-to-date information on ASKAP activities, we wanted to make sure that the OMP could be restored with full functionality as an externally available service. This required a significant rewrite and update of core components, resulting in an extended outage.

We are pleased to report that the updated OMP returned to service on the 8th of February. It remains a great way to see what ASKAP is currently doing and search the scheduling block database history to see when specific fields were observed and what telescope parameters were used at the time.

In future, we hope to integrate additional information on data processing activities into the OMP. This will enable SST members to view the full data life cycle and have a better idea of when their latest observations will be deposited into CASDA for validation.

ASKAP update 50th issue

This issue marks a milestone for the newsletter itself! We have now published 50 issues in the current format, since the first in July 2017. This publication started out as the ASKAP commissioning update. As we progressed through the final array release and into pilot surveys, we dropped "commissioning" from the title. Over the last few years, we have reported on historic events such as the first fringes from all 36 antennas, through to ASKAP's first all-sky survey release.

Although we are nearing the final hour on ASKAP's full survey countdown clock, significant development work remains. This year, a major task is the transition to Pawsey's new supercomputing platform, Setonix. With the expected improvement by a factor of at least two in overall processing speed that this brings, we should be able to keep up with incoming survey data. Creation of a global sky model from RACS and integration into the calibration and model generation stages of the ASKAPsoft pipeline has the potential to improve ASKAP's data quality significantly. Ongoing investigations into beam stability and holography accuracy will continue improving ASKAP's flux scale, especially at the edges of our wide field of view. Automated process control across the full data life cycle will improve our operational efficiency and better tracking of processing tasks will provide greater external visibility of ASKAP's survey progress. We also need to improve the overall stability of the telescope, addressing issues with correlator drop-outs and updating services like the weights archive to reflect experience with pilot surveys.

We hope you find this publication informative and look forward to many more issues as we continue preparations for full-scale surveys and enhance ASKAP's capabilities.

Contact us

1300 363 400
+61 3 9545 2176
csiroenquiries@csiro.au
csiro.au

For further information

Space & Astronomy
Aidan Hotan
+61 8 8643 8543
aidan.hotan@csiro.au
https://www.csiro.au/en/research/technology-space/astronomy-space