ASKAP update for January 2022

In this issue we describe plans for the ASKAP Science Forum in 2022, the status of Pilot Surveys Phase II, commencement of RACS high-band observations and plans for the Review of ASKAP Survey Science Projects.

RASSP timeline and process

In November 2021, the ASKAP Survey Science Teams submitted revised proposals for a 5-year survey plan. These proposals were designed to reflect the current performance of the telescope and changes in the scientific landscape over the last decade. We appreciate the effort that went into preparing these comprehensive proposals. Experience with Pilot Surveys has demonstrated that ASKAP's full survey program remains highly impactful, although time pressure has increased significantly.

The RASSP documents will be submitted to an international external review panel, which is scheduled to meet on the 24th and 26th of January. The goal of the panel will be to assess the proposals according to the terms of reference that were circulated last year, and ultimately recommend time assignment priorities.

The panel's recommendations will be assessed by the ATNF director and converted into an observing program by the ASKAP Operations team. The final combined survey strategy will then be circulated to the Survey Science Teams for comment as soon as possible.

ASKAP Operations update

Most of the Survey Science Teams are hard at work investigating their Phase II quality gate observations. As these are validated and released, we will continue observing the associated science fields during the first few months of 2022.

Over the end of year transition, we observed several FLASH and POSSUM science fields and embarked on the high-band component of the Rapid ASKAP Continuum Survey, which is now over 60% observed.

RACS high-band observations underway

RACS-high consists of 1493 fields, which are the same footprint and positions observed in the mid-band. This is roughly 50% more than the number of fields observed in RACS-low. Using the same integration time as both other bands (15 minutes per field), observations need about three weeks of continuous observing.

Processing of RACS-mid is still underway, but a few select fields from RACS-high have also been imaged to check data quality. The results are very encouraging and demonstrate the improved resolution available in ASKAP's highest frequency band (See Figure 1).

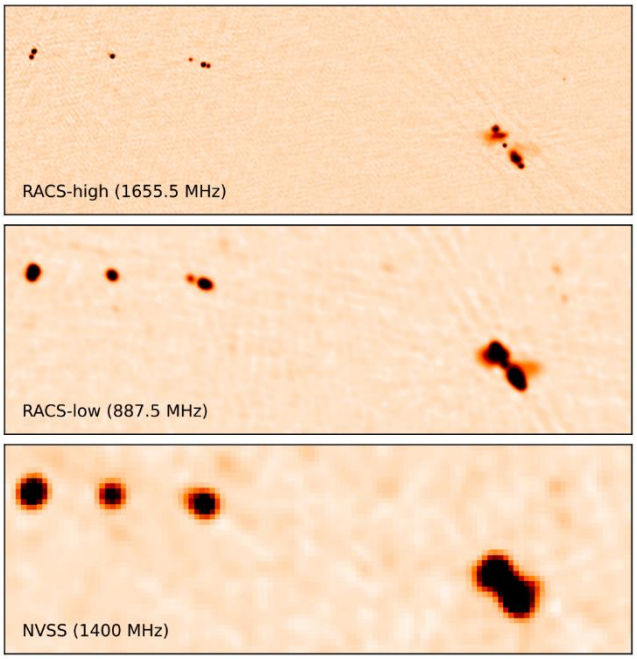

Figure 1: Comparison of a small region observed in two RACS bands and NVSS, showing the improvement in resolution with RACS. Image made by Emil Lenc.

Sky model calibration

With all three RACS bands soon to be available, we have identified sky-model calibration as the next major feature to be developed for ASKAP's image processing pipeline. Using RACS as an input model, we hope to improve the current self-calibration and imaging process on any ASKAP science field. A better starting model may speed up imaging and improve calibration solutions, possibly reducing the need for frequent bandpass observations.

As part of YandaSoft development efforts, we are also collaborating with GASKAP-HI to ensure that ASKAPsoft will be ready to support joint deconvolution on the new Setonix supercomputer.

SPICE-RACS preparing for first data release

The first value-added project derived from RACS is nearing completion. SPICE-RACS will be a polarisation catalogue covering the Spica Nebula HII region. Polarisation spectra cut-outs and rotation measure synthesis were used to form an RM grid over 30 RACS-low fields, for a total area of about 1300 square degrees. The RM grid has roughly 5 sources per square degree.

SPICE-RACS provides a glimpse of the science that should be possible with the full POSSUM survey.

Consolidation efforts prior to full surveys

When Pilot Survey Phase II observations conclude, we will enter a consolidation period designed to further improve the telescope systems in advance of full surveys. Items of significance include improving the unified antenna drive control software for improved robustness and flexibility, consolidation of beam-forming code to support all required modes in the weights archive, event-based triggering of key processing tasks, and the migration of ASKAP's processing pipeline to the new Pawsey Setonix platform.

We expect that some of this work (on the control system side) will be possible with no impact on the start time of the full surveys, since there will be a gap during which we must clear the processing backlog from all previous observations, including Pilot Surveys Phase II.

If the transition to Setonix is delayed, we can continue processing on Galaxy for up to 6 months. Even so, the impending decommissioning of Galaxy makes it prohibitive to embark on full surveys until Setonix is ready. This is a significant scheduling factor outside of our control, which makes it difficult to give a timeline for the start of full survey operations.

SWAG-X data release

On the 12th of January, we released the first dual-band spectral line data from the Survey With ASKAP of GAMA-09+X-ray (SWAG-X). The first data release represents half the total integration time over 6 ASKAP fields in two observing bands and should provide a valuable multi-wavelength resource to complement X-ray observations. Data can be found in CASDA by searching for the project code AS112.

The ASKAP science forum in 2022

Towards the end of 2021 we circulated a feedback form to assist in planning the future of the ASKAP science forum. Many thanks to all who responded! Analysis of the results shows that the most appreciated aspect of the forum is live discussion between the Survey Science Teams and the ASKAP Operations team. Since there was very little interest in the science-related aspects of the forum, we will rename it the ASKAP Operations Forum in 2022.

The forum will still occur on the 3rd Tuesday of each month, but we will change the time to better accommodate our international community. Since there is no single time that is convenient for everyone, we will be alternating the time of the forum each month, with odd months starting at 08:00 AWST and even months starting at 18:00 AEDT/AEST. This means that odd months will always be at 00:00 UT and even months will be at 07:00 or 08:00 UT depending on the daylight savings time observed by NSW. We appreciate that this stretches business hours in both locations, but it should make attendance much easier for other parts of the world, at least half the time.

Another popular request was to circulate an operations update in advance of the forum itself, so that questions could be prepared in advance. We plan to experiment with this using the telescope operations component of the regular agenda and see whether it leads to more time for interactive discussion. We will also cancel the science focus sessions and replace these with extended time for discussion (or a break between meetings!).

To accommodate sharing of science results from ASKAP surveys, we will consider an alternative format on a longer timescale, possibly a yearly conference or workshop.

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