ASKAP update for August 2024

This month we report on survey progress, supercomputer maintenance, a new project aimed at improving ASKAP's development capacity and ASKAP's impact at the IAU General Assembly.

Survey science progress update

This month we are commencing observations for DINGO and have returned WALLABY to the survey pool alongside continuum projects. This will test our data throughput for long-integration spectral line modes after having cleared all previous processing backlogs. DINGO's region of interest is observable at night from now through to October, so it is important to obtain data while the window of opportunity is open. The impact of solar interference and associated observing constraints may create time pressure during the night hours. We will assess any impact on our combined survey efficiency over the next few months.

FLASH have validated a large collection of scheduling blocks with mixed results. Many were still impacted by RFI from tropospheric ducting, and we are working to make the ducting avoidance system more robust in future. More recent observations had a higher success rate due to changes that have already been made.

SST	Deposited	Awaiting Validation	Released	Rejected
EMU	300	11	234	58
WALLABY	54	1	25	28
POSSUM	353	17	249	92
VAST	3840	9	3792	40
FLASH	253	0	136	117
GASKAP-HI	1	1	0	0
GASKAP-OH	1	1	0	0
DINGO	2	0	0	2

Table 1: Survey progress as of 16-08-2024

The Pawsey supercomputing research centre recently completed a major maintenance session that lays the foundations for further improvements later this year. The work is part of an ongoing effort to increase the overall stability and performance of Setonix and its storage systems. We resumed data processing jobs on the 15th of August after some initial issues with /askapbuffer post-maintenance which were quickly rectified by Pawsey staff.

ASKAP key capability project

Efforts to improve all aspects of ASKAP continue in parallel with survey operations. The recent Survey Science Project review workshop helped confirm existing development priorities and highlight a few additional issues in need of attention. Many of the issues identified as high priority are already the subject of ongoing investigation, such as ASKAP's astrometry performance (see Figure 1).

The ASKAP Operations team is aware that completing all Survey Science Projects within the expected 5-year timeline will be challenging, and we have been discussing ways to improve our development capacity while working with Pawsey to increase data throughput.

These discussions have converged on the need for a new ATNF project aimed at accelerating progress on key features such as bright source subtraction. The project will also aim to improve our observing efficiency and reduce overheads by improving key parts of the control and monitoring system and processing pipeline. Specific goals include improving automated beam weight updates and implementing new astronomical calibration methods using a RACS-based sky model.

This project will ensure visibility of effort already expended on ASKAP within ATNF and provide resources to bring on a few new staff members. We are currently preparing a detailed resourcing plan that will be presented to the ATNF Project Review Board.

Formalising this project provides an opportunity to focus effort and revisit some of the items highlighted in the post-pilot consolidation plan alongside lessons learned from our first year of survey operations.

ASKAP in the community

The 32nd General Assembly of the International Astronomical Union was recently held in Cape Town, South Africa. Data from ASKAP's pilot surveys featured prominently in several of the symposia, especially around the themes of all-inclusive AGN and studies of neutral hydrogen in and around galaxies. The key role played by all the SKA precursors was evident throughout the conference as these new facilities provide greatly enhanced observational capabilities and pioneer new ways of solving the data challenges that come with those new capabilities. This includes use of citizen science, AI/ML and remote processing/visualisation services based on cloud technology. The need for collaboration across all wavelengths was another strong theme, with many presenters highlighting the need to combine data from different facilities to gain better understanding of the astrophysical processes at work.

A session on radio astronomy in an increasingly crowded spectrum highlighted that we are likely to face increasing pressure from RFI, with some telecommunications service providers looking to introduce direct-to-service satellite capabilities in mobile bands. This may make advanced mitigation methods a high priority alongside advocacy for radio astronomy in spectrum management.

We also ran several tours of the ASKAP virtual exhibition space for IAU GA participants, highlighting ASKAP's capabilities and promoting the availability of released survey data including all three RACS frequency bands.

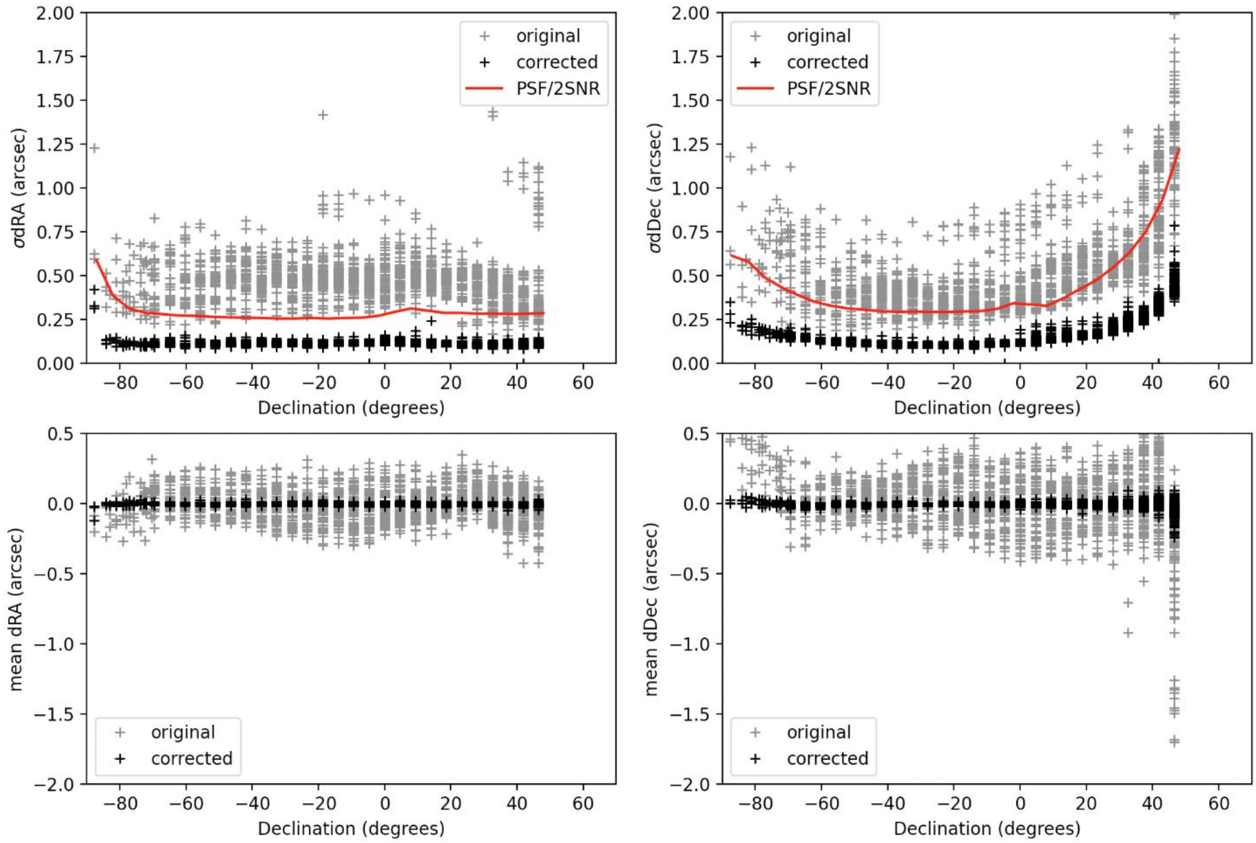

Figure 1: Analysis of ASKAP astrometry using a correction derived by comparing the position of the same sources across multiple beams in the ASKAP footprint to a beam identified as the reference. The correction significantly improves the consistency of source positions across an ASKAP field, but we are still investigating how the result compares to catalogues derived from other telescopes. Although the correction is self-consistent within the field, it may leave a bulk shift of all sources across the entire field due to the uncertain absolute calibration of the reference beam. The fact that it is possible to derive a high-quality astrometry correction suggests there is a good chance of being able to eliminate the calibration errors at their source or at least apply routine corrections in post-processing. Figure made by Emil Lenc.

For further information

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