ASKAP update for November 2021

In this issue we describe preparations for 2022, Pilot Survey Phase II progress, plans for holiday observatory operations, and a bug found in the ASKAP processing pipeline.

Towards full-scale surveys in 2022

We are rapidly closing in on the end of the year and this will be the last newsletter for 2021. ASKAP embarked on a new phase of its Pilot Survey plan this year, advancing another step on the countdown to commencing full-scale surveys. CASDA now hosts over one petabyte of ASKAP data that has been released to the world, including the Rapid ASKAP Continuum Survey low-band observations and curated source catalogue, which is also available to astronomers through widely used platforms such as Aladin sky viewer.

As usual, the Geraldton-based Murchison Support Facility staff will wind down routine operations during the holiday period, with a caretaker on site and key personnel on call in the event of serious equipment failure.

ASKAP operations will continue across the new year transition using the autonomous SAURON scheduler to continue Pilot Survey Phase II observations.

Preparing for the Setonix supercomputer

ASKAP developers already have access to a small test platform that is being used to prepare software packages and benchmark the new Setonix supercomputer architecture. We will retain access to the current Galaxy supercomputer for 6 months, running parallel with operational tests on Setonix Phase I.

The overlap with commencement of full survey operations will be challenging, but we look forward to getting practical experience with the new supercomputer.

Achieving performance improvements will depend on fine-tuning parallel job distribution and workflows on the new platform and this is critical to reaching ASKAP's target operational efficiency of 70%.

Planning a 5-year survey program

All updated proposals for input to the Review of ASKAP Survey Science Projects were submitted by the 11th of November deadline. These revised proposals reflect changes in the scientific landscape over the past decade and experience from ASKAP's Pilot Surveys.

The review will help decide how we can best support multiple survey science projects. Commensality can decrease our need for observing time, but it doesn't equally scale down the amount of data processing required. We therefore need to consider the overall operational efficiency and science impact when determining the best joint survey strategy.

The commensality workshop held in 2020 demonstrated that our initial 5-year survey plan is unlikely to deliver all the data products required. Nonetheless, planning for an initial 5-year survey duration will help to prioritise the science that can be done promptly. Outcomes from the first surveys will help shape plans for future extensions, hopefully in conjunction with upgrades to the telescope.

The RASSP panel will meet early next year and provide a report that will help determine our full survey observing strategy, in consultation with the Survey Science Teams.

Pilot Survey Phase II progress report

Pawsey conducted an extended maintenance period during the first week of November. This prevented observations requiring visibility data, and halted processing of the Pilot Survey Phase II backlog. Monitoring data from the observatory was interrupted for about a

day while key network hardware was powered down. Work performed during this outage was essential for future installation of the Setonix supercomputer.

During this pause in activities, the Murchison team arranged power works at the observatory site that would otherwise have been disruptive, including RCD testing in the correlator room. All work has been completed, and normal ASKAP operations have now resumed.

Commensal processing parameters

Detailed analysis of Pilot Survey Phase II quality gates has prompted further investigation into processing parameter optimisation. WALLABY, EMU, and POSSUM are jointly investigating parameters optimised for fields with bright sources (see Figure 1). Analysis of spectral characteristics in conjunction with continuum image quality has been a key aspect of Pilot Surveys Phase II, in the search for a viable commensal processing strategy.

New holography beam maps available

Holography observations described in the previous issue of this newsletter have been processed and the resulting maps are now available for use. Aside from one set of observations in which there was an issue with the reference antenna (these are currently being re-observed), all maps are of high quality and show good consistency in measured beam shapes.

Pipeline convolution bug discovered

Re-processing of a combined VAST/CRAFT observation recently revealed a bug in version 2.0 of the CONVOLVE module, used alongside version 1.5 of the pipeline. Comparison of continuum images showed that the requested convolution to a common resolution was scaling the image without changing the resolution.

The problem was traced to a library linking issue, which impacted the 2D convolution function (but not the version used for spectral cubes). Data processed since the 21st of September will have been impacted if convolution to a common resolution was requested.

The problem was quickly patched, with CONVOLVE 2.0.1 available for use (as the default version) with the current pipeline scripts. The operations team are re-processing all continuum images impacted by the bug and will deposit the corrected versions into CASDA where necessary.

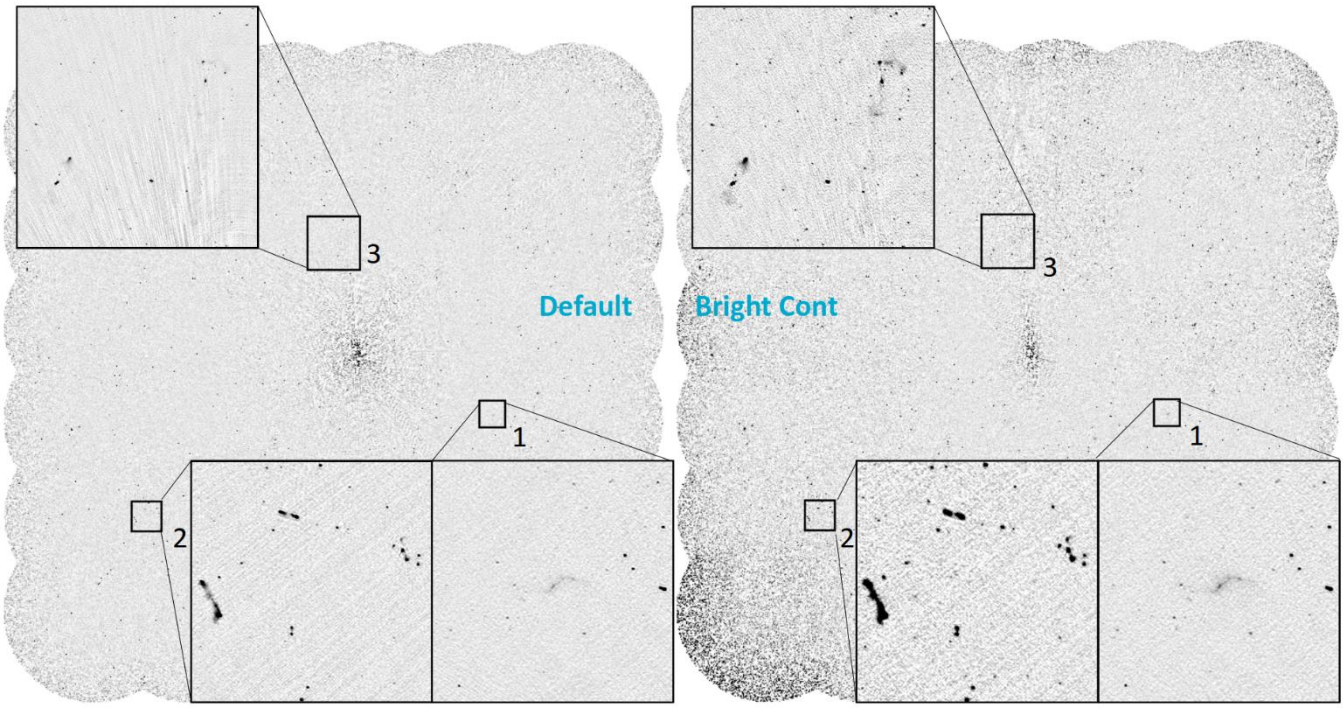

Figure 1: Comparison of two different continuum processing strategies, ASKAPsoft's default parameters on the left and a set that conducts additional self-calibration loops and deeper cleaning, designed for fields containing bright sources on the right. Identical linear intensity scaling was used for all panels. Images made by Ivy Wong.

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