



ASKAP update for November 2022

In this issue we discuss the impending start of ASKAP's first full survey trial.

Ramping up survey operations

After conducting an Early Science program and two sets of Pilot Surveys over the last few years, ASKAP is now taking its first steps towards beginning full survey operations.

From the 16th of November 2022, we will be attempting to operate with maximum possible efficiency on a continuous basis, observing the pool of survey fields corresponding to the 5-year RASSP time allocation.

We will be using an automated workflow that extends from observing to archiving. Because several things have changed and new features have been developed since Pilot Surveys, the first month of full survey operations will be considered a trial run. If this trial goes well, we will continue to the best of our abilities with the goal of observing, processing, archiving, and releasing all survey data within 5 years as planned.

Testing a new supercomputer

To keep up with ASKAP's high output data rate, we need the improved processing power of Pawsey's new supercomputer, Setonix. Much like commissioning the rest of the telescope, preparing Setonix for ASKAP operations is a complicated process that includes building, deploying, testing, and benchmarking our extensive software suite. Setonix uses a new hardware architecture compared to the previous supercomputer, Galaxy, and many parts of the software stack have changed.

Our first tests on Setonix Phase 1 revealed issues that have been partially addressed with a major software upgrade conducted by Pawsey in conjunction with the platform vendor and we have been attempting to run new tests on the improved system since November 9th. An issue with the installation of a software container service

called Singularity has slowed progress, but on the 11th of November we were able to run the full pipeline on the upgraded Setonix. We are currently testing several science modes and unless new issues arise, we will conduct the full survey trial on the new supercomputer as planned.

Goals of the first month

The full survey trial month is our first opportunity to test a few key aspects of sustained survey operations. We will be testing our new automated end-to-end workflow, using an event-driven system to manage disk usage, processing jobs, calibrator, and holography selection. In conjunction with the SAURON autonomous scheduler, this should mean that most observations proceed from scheduling to archiving with no human intervention. Perfecting this workflow will be one of the key tasks for the first week.

The full survey trial is also our first opportunity to test SAURON with a large multi-survey observing pool. Simulations have helped refine SAURON's scheduling algorithms, but real telescope configuration changes and disk usage governed by processing throughput will impact our achievable observing efficiency. We will ensure that the active Survey Science Teams are receiving the expected share of telescope time and that the telescope is being utilised as efficiently as possible.

Once data are flowing through the entire system, we will pay close attention to any issues that arise. While we expect most scheduling blocks to proceed without error, there will undoubtedly be a few failures. Understanding and addressing the cause of these will help maximise our observing efficiency. We will also assess the processing duration and the amount of disk usage in each observing mode. This will let us know whether processing is likely to

keep up with observations over an extended period. If necessary, we will tune the pipeline jobs and other constraints to achieve sustainable throughput.

Finally, we will ensure that science processing strategies developed and refined throughout pilot surveys are correctly implemented for the full surveys. The validation process for the first few scheduling blocks will be key, so it is important that the Survey Science Teams inspect data deposited into CASDA promptly and thoroughly. ASKAP's high data rate means that reprocessing observations will not be possible as part of the operational workflow, so it is important that all necessary data and metadata are available in the initial deposit.

Several file naming conventions will also be changing (including the option to use a more descriptive extension for the ".alt" images, and an additional ".raw" extension for images and cubes that have not been convolved to a common resolution) so we need to ensure that names are being correctly assigned to data products.

Since several of the full survey projects are commensal, we also need to check that project codes are correctly assigned to individual data files within a deposit. This is important both for distribution of the validation responsibilities, and future discovery of the data via project code searches.

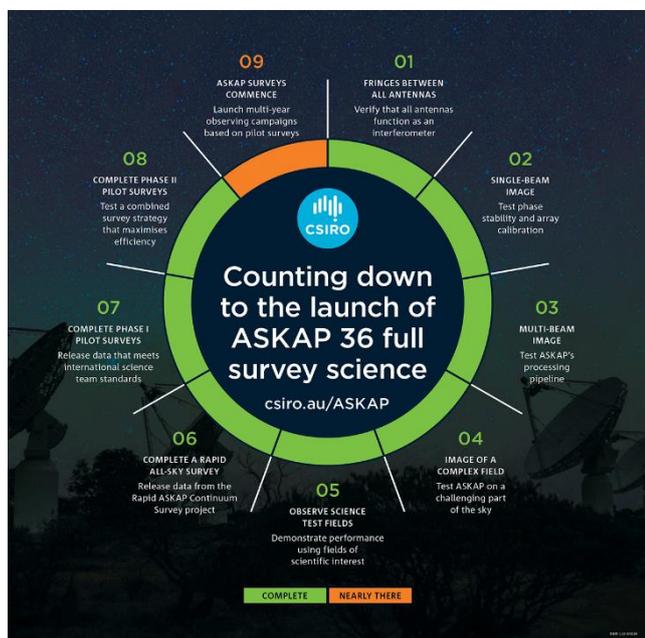


Figure 1: The ASKAP survey countdown infographic, showing all stages between the end of construction and the start of the full survey program.

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Pilot Surveys Phase II concluding

The Pilot Survey program has been instrumental in preparing for full surveys, and although we have not met its goals for all SSTs, we must begin to wrap up activity so that the operations team can switch focus. Most Pilot Survey observations have now been validated and released, and the few fields that need action will be processed on Galaxy before it is decommissioned.

We recognise that GASKAP-OH has not received viable Pilot Survey data for various technical reasons, most recently an issue with velocity correction. Once solutions have been identified we will determine a suitable verification and testing process in consultation with the PIs. The Pilot Survey time allocation will then be scheduled alongside GASKAP-OH's full survey allocation by adding these fields to the main pool.

GASKAP-HI used a Pilot workflow that relied on external resources and transport of spectral line visibilities to other supercomputing facilities. This will not be viable for the full survey, so we are working with the team to test joint deconvolution in ASKAPsoft and compare output to the WSCLEAN pipeline used during Pilot Surveys.

DINGO are also working with us to determine a better solution for compressed (u,v) grid storage, since the current method requires inflating data back to its original size before it can be processed.

Early in the new year we will review progress on all Pilot Surveys in consultation with the SSTs to make sure that expectations have been met or we have identified a development path to resolve outstanding issues.

CASDA status

The Online Proposal Applications & Links (OPAL) system should be back in service by the 15th of November. Users external to CSIRO can create an OPAL account to authenticate with CASDA if they need to download large data files. Survey Science Teams are also advised that disk space for staging large file transfers from CASDA is available via the "ja3" ASKAP post-processing project. Please contact the ASKAP operations team if you would like to make use of this resource.

An update released on the 10th of November has improved CASDA's performance when validating and releasing deposits with many files. This will help validation proceed promptly during the full survey trial.