Welcome to the second edition of the ASKAP Commissioning Update. This is a regular e-mail reporting the progress of ASKAP commissioning, new results and challenges, bugs in the system, releases of new software and availability of test data files. It will not replace any of the formal communications about ASKAP or SKA, but aims to disseminate more technical information of potential interest to astronomers.

As the ASKAP SSTs are open collaborations, we do not attempt to maintain a current list of your team members. For this reason we ask the PIs of the survey science teams to forward this to your SST distribution list. If this edition has been forwarded to you, please sign up to the exploder by sending an e-mail to 'askap-commissioning-request@atnf.csiro.au' with the subject text: 'anything' and the message text: 'subscribe'. We hope you enjoy receiving this regular update on the progress of ASKAP commissioning. Do not hesitate to contact us if you have any questions about the project.

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First ASKAP multi-beam continuum image

April brought a satisfying milestone with the demonstration of the first multi-beam image with three PAFs.

The image (Figure 1) was created with three ASKAP antennas, each fitted with an ASKAP Mk I phased array feed. Three separate beams were created for each PAF and lined up to track an elongated patch of sky over a single 12-hour observation.

This field was chosen as it contains a trio of strong and well-known extragalactic sources, with suitable angular separations, including the three brightest points in the image (from top left) PKS 1610-771, PKS 1606-772, PKS 1549-790 and PKS 1547-795.

These sources are too far apart to be observed simultaneously using a single pixel feed on a 12-m dish. This is a striking demonstration of the power of imaging with ASKAP PAFs, particularly given the very limited u-v coverage that three antennas can achieve.

The observations used a software correlator and 16 x 1 MHz bands were processed. Data captured for the three beams were correlated simultaneously. Image processing was performed in ASKAPsoft.

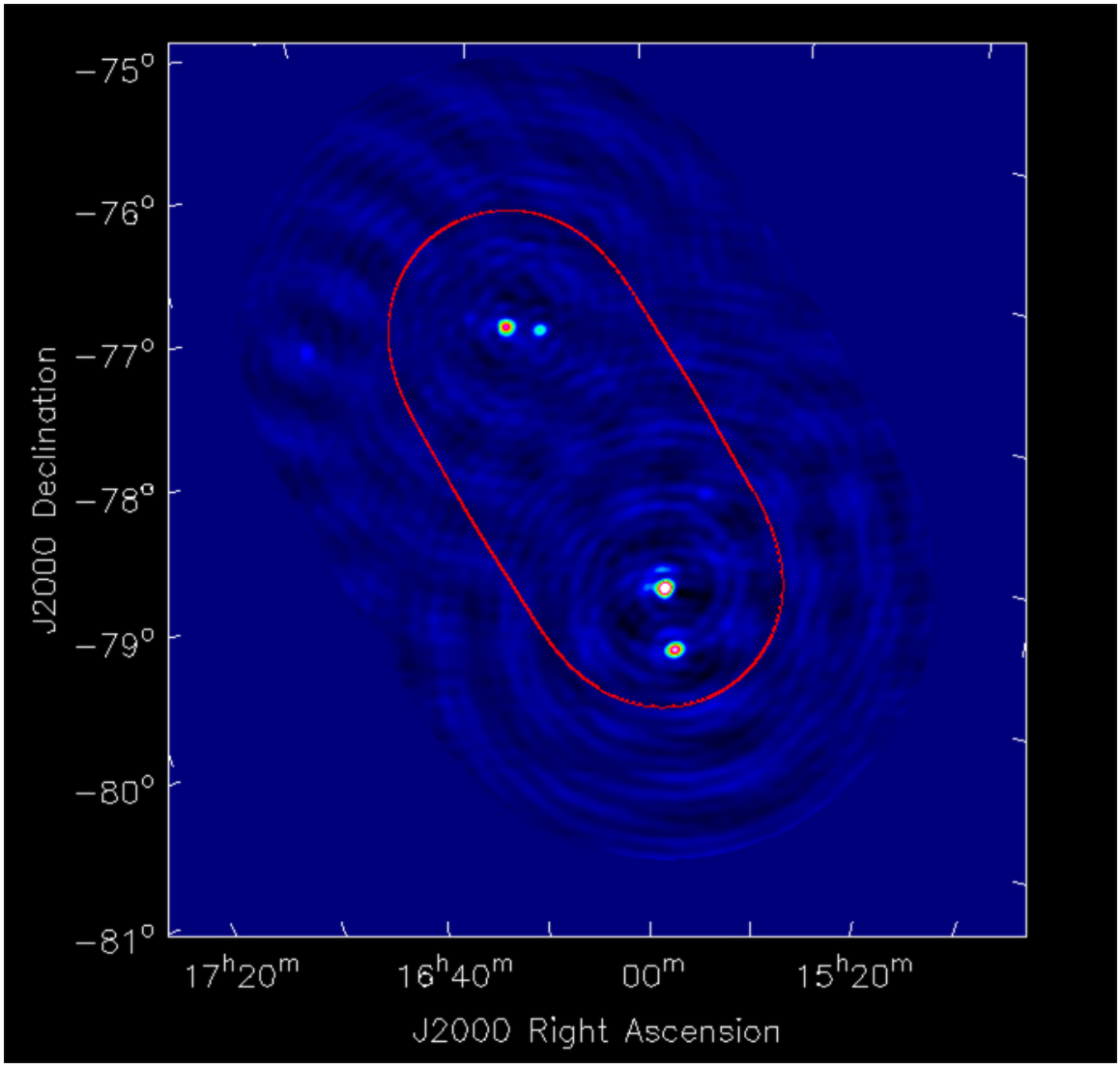

Figure 1: First three-beam image taken with 3 antennas equipped with ASKAP's Mk I phased array feeds. The red line is the boundary of 50% sensitivity.

Comparisons with SUMSS images of the same field have confirmed that the positions and flux densities agree very well with the ASKAP images.

Investigation of Beam Shapes

The SCOM team has continued work on characterising the shapes of the formed beams from ASKAP phased array feeds. This will be important in learning how to optimise beamforming techniques for ASKAP science surveys.

Figure 2 shows some preliminary results of the measurement of beam shapes on ASKAP dishes at 928 MHz. Four beams were mapped simultaneously. To measure the patterns the team pointed the reference antenna at 0407-658 (a calibrator source) and performed a raster scan with the other antenna around the same source, covering an area sufficiently large that 0407-658 went through all of the offset beams.

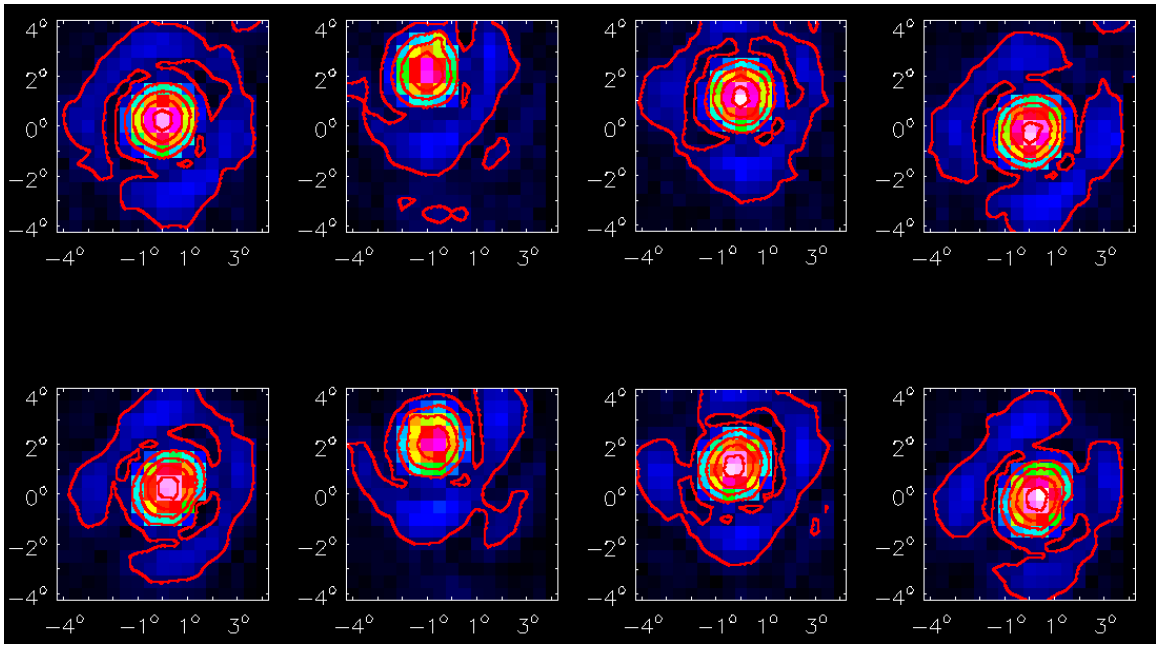

Figure 2. Left to right: Beam patterns for the boresight beam and three offset beams. Bottom row: Top row = antenna 3, bottom row= antenna 6.

Hardware Correlator Testing

The hardware correlator is progressing well, with coding and development testing complete and no major issues identified. Now begins the integration and functional testing. This is done in the lab, with a test signal provided to 3 beamformers, which provide beam data to the hardware correlator under the control of the telescope operating system. The team will be testing both the real-time engineering display console and the output of the ASKAP ingest pipeline, which should produce measurement sets (albeit with very little meta-data).

The correlated signals are transferred to a computer, where the phase closure will be carried out. The first version of the hardware correlator for BETA has 9 dual-polarization beams, 152 MHz of bandwidth and a fine filterbank generating 18.5 kHz channel resolution.

What's next for commissioning?

Commissioning activities over the coming month will continue as follows:

- RFI shielding of BETA PAFs will be enhanced (now achieving an additional 20 dB), avoiding cross-talk issues that were previously identified
- The team will demonstrate phase closure using test input signals into the correlator in the laboratory in Marsfield, followed by remote phase closure tests using an astronomical source as the input.
- BETA PAFs will then be installed on the remaining 3 BETA antennas
- Equipment required for all 6 BETA antennas will be shipped to site. This comprises three sets of pedestal racks, 3 beamformers, 3 PAFs and the additional correlator boards.
- Installation of BETA is likely to occupy the month of July, followed by integration and testing in August.

ASKAP Early Science

An ASKAP survey science team co-ordination and management meeting was held on May 9th in Marsfield. The group discussed a plan for 'Early Science' with ASKAP, that is the commencement of a co-ordinated program of science with between 12 and 18 ASKAP antennas equipped with Mk II receivers.

We are holding an all-day workshop to discuss the best way to approach early science on Monday 5th August 2013 at Marsfield. All ASKAP Survey Science Team members are invited to participate and PIs are strongly encouraged to attend.

Videoconference links are available for all ASKAP meetings.

In the meantime, please contact the ASKAP Project Scientists (atnf-askap-ps@csiro.au) at any time to discuss early science or any aspect of the project.

CSIRO acknowledges the Wajarri Yamatji people as the traditional owners of the land on which the observatory lies.