



ASKAP Update: ATUC open session

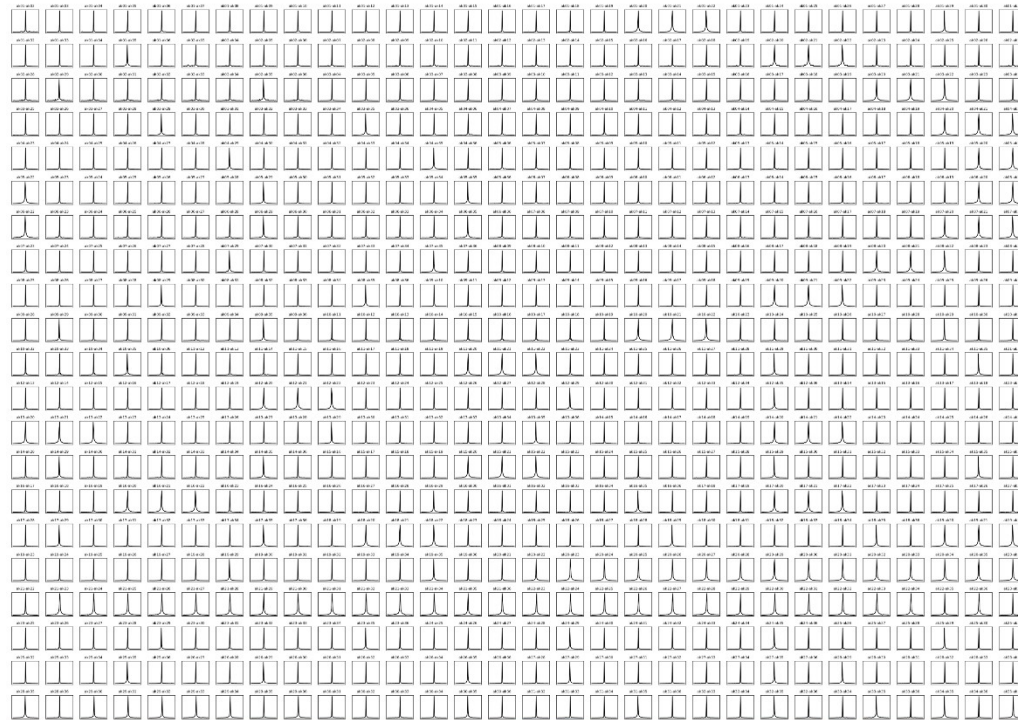
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CSIRO ASTRONOMY AND SPACE SCIENCE
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First fringes between all 36 ASKAP antennas

February 22nd, 2019: Correlated signal from PKS B1934-638 detected on 630 baselines



360-degree panoramic photograph showing all visible antennas tracking the radio galaxy PKS B1934-638 during the first calibration observations made with the full array



Counting down to the launch of ASKAP 36 full survey science

csiro.au/ASKAP

01

FRINGES BETWEEN ALL ANTENNAS
Verify that all antennas function as an interferometer

02

SINGLE-BEAM IMAGE
Test phase stability and array calibration

03

MULTI-BEAM IMAGE
Test ASKAP's processing pipeline

04

IMAGE OF A COMPLEX FIELD
Test ASKAP on a challenging part of the sky

05

OBSERVE SCIENCE TEST FIELDS
Demonstrate performance using fields of scientific interest

06

BEGIN THE RAPID ASKAP CONTINUUM SURVEY
Create an improved sky model and ASKAP's first large-scale catalogue

07

BEGIN PILOT SURVEYS FOR MULTI-YEAR PROJECTS
Test international science team survey plans

08

REVIEW PILOT SURVEY DATA
Publish and analyse pilot survey results

09

ASKAP SURVEYS COMMENCE
Launch multi-year observing campaigns based on pilot surveys





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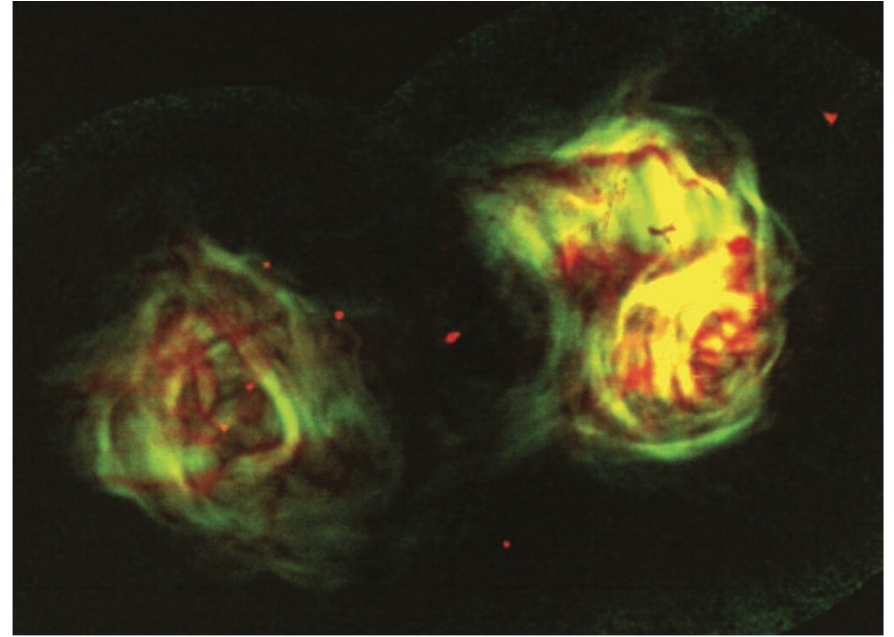
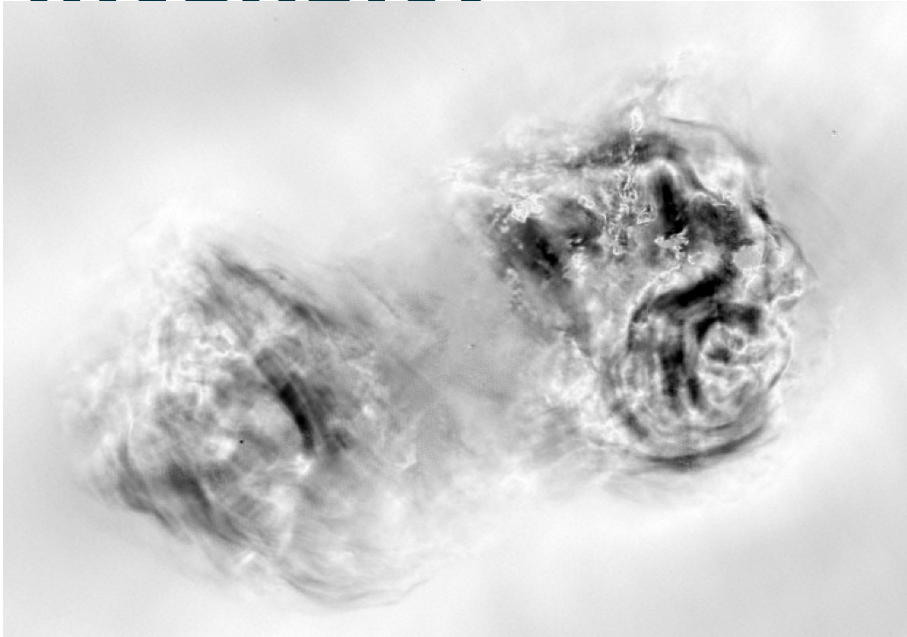
Test international science team survey plans

08

REVIEW PILOT SURVEY DATA

Publish and analyse pilot survey results

Fornax A linearly polarised intensity



ASKAP image courtesy of Craig Anderson VLA image courtesy of NRAO/AUI

3rd Step: Multi-beam field -

GAMA23

- First science package from ASKAP 36
 - 2-tile continuum image, 744-1032 MHz
 - Upload of images & catalogues to CASDA
- The ultimate continuum data challenge
 - Pipeline needed tuning for 36 antennas
 - Resulting strategy still quite simple
 - 1934 bandpass and phase-only self-cal
 - CLEAN parameters now differ per loop
 - Should™ work on any similar field

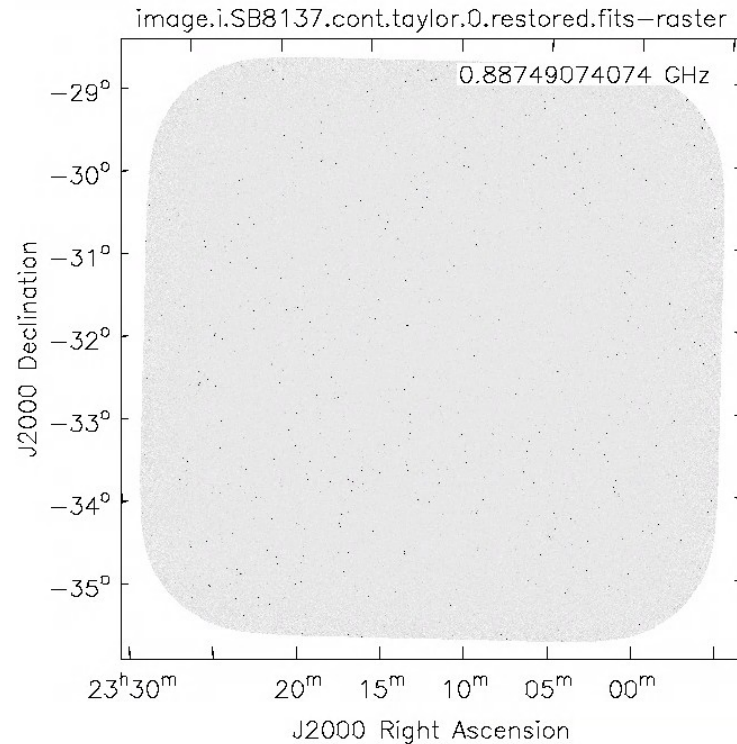
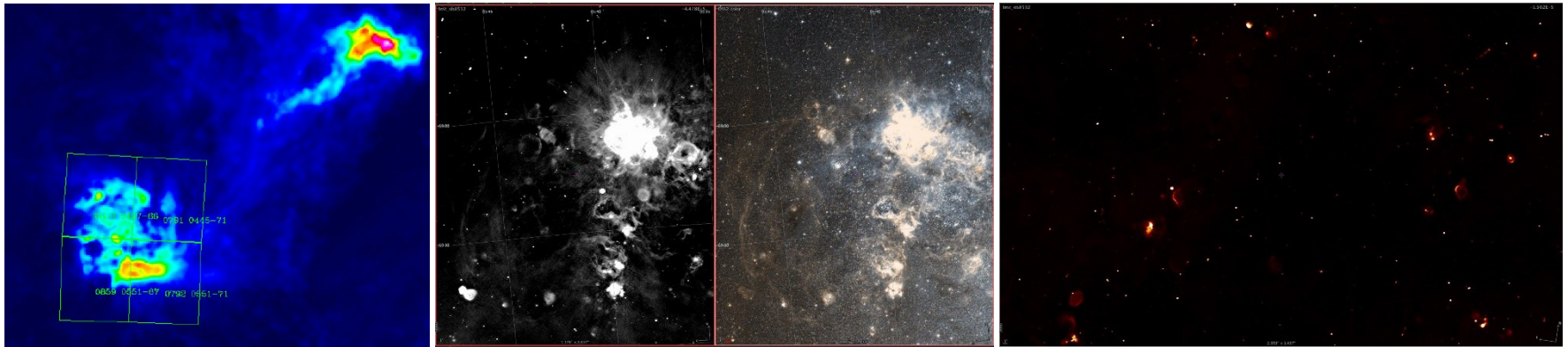


Image by Andrew
O'Brien

4th Step: LMC in HI and continuum

4th field observed in both modes

- 4x zoom mode spectral line processing underway
 - Collaboration between ANU and CASS SDP team
- Continuum to be run through the standard pipeline



Images from Emil Lenc and David McConnell

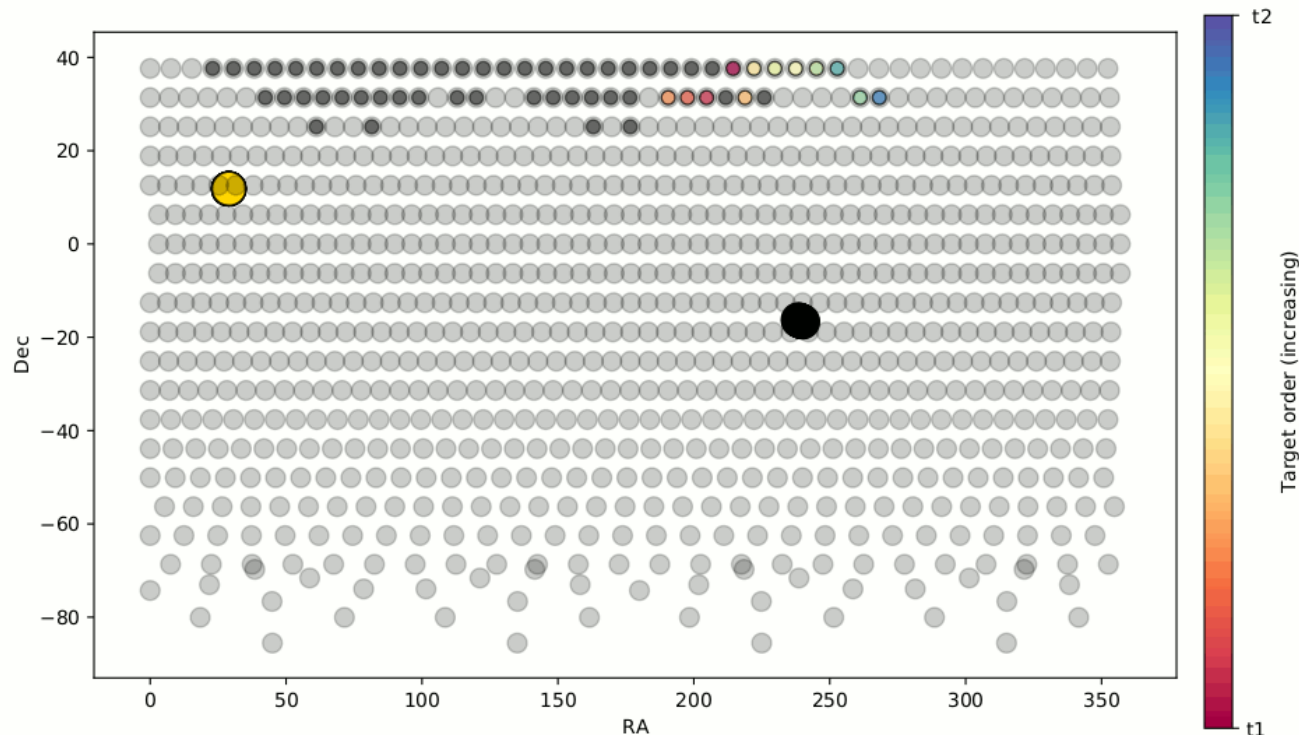
5th Step: Eridanus field - Spectral line processing

- Major advances in pipeline support
 - Split-by-time method for pre-processing stages
 - Factor of ~ 10 speed-up compared to serial
 - Continuum subtraction finishes within job time limits
 - Quality of result also greatly improved
 - Using multiple file writers to speed up imaging
- Not real-time, but within a factor of ~ 3
 - Likely the best we can do on Galaxy

6th Step: Rapid ASKAP

Continuum

- First attempt underway
 - Mostly a learning exercise
 - Should highlight problems we need to solve for large scale survey operations
 - Test case for automated flagging of bad data
- 744 – 1032 MHz
- Square_6x6, pitch 1.05
- 15-min integration time
- ODC-updated beams



Science test observations for SSTs

- Many science test fields have been observed with the full array
 - These are being processed by an ACES/OPS collaboration
 - About 60% of fields respond well to new default pipeline parameters
 - Analysis of image artifacts and performance ongoing
 - Data will begin to appear on CASDA soon™
 - See <https://confluence.csiro.au/display/askapsst/Test+Observations>
- ASKAPsoft and pipeline v0.24 released
 - Updated default parameters for 36-antenna array
 - Fix for spectral line outputs missing PSF information
 - NGC7232 processing to resume this week
 - Installation on OzStar machine at Swinburne underway

Science outside the countdown

- CRAFT transient localisation and commensality testing
 - Extensive improvements to software and firmware to improve reliability
 - Hoping to see the first commensal FRB any day now!
- UV Ceti transient case study for VAST
- Cosmology early science survey release on CASDA
- Steady stream of early science papers

- Come to the ASKAP science forum for more information!

System testing and known issues

- Zoom mode imaging tests ongoing
 - LMC in 4x, maser field in 16x
 - Planning to try a field with less continuum in 16x
- Spectral ripple understood and reduced significantly
- PAF domino drop-outs still occur, investigation ongoing
- Multiple RF link issues requiring maintenance on site
- Correlator alignment drop-outs still occur, investigation ongoing
- Occasional packet storms from CRAFT data capture

7th Step: Pilot surveys

- Science observation guide released to help with planning
- Designed to test readiness for full surveys
 - The telescope is not perfect – what impact do known problems have?
 - Are there any new issues arising at survey scales?
- Pawsey disk upgrade (3 TB for ingest & processing) in June
 - This will be required before we can begin spectral line work
 - Continuum pilot surveys could potentially begin in May
- Awaiting analysis of test observations to inform planning

Thank you

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