ASKAP Commissioning Update Dec 2013

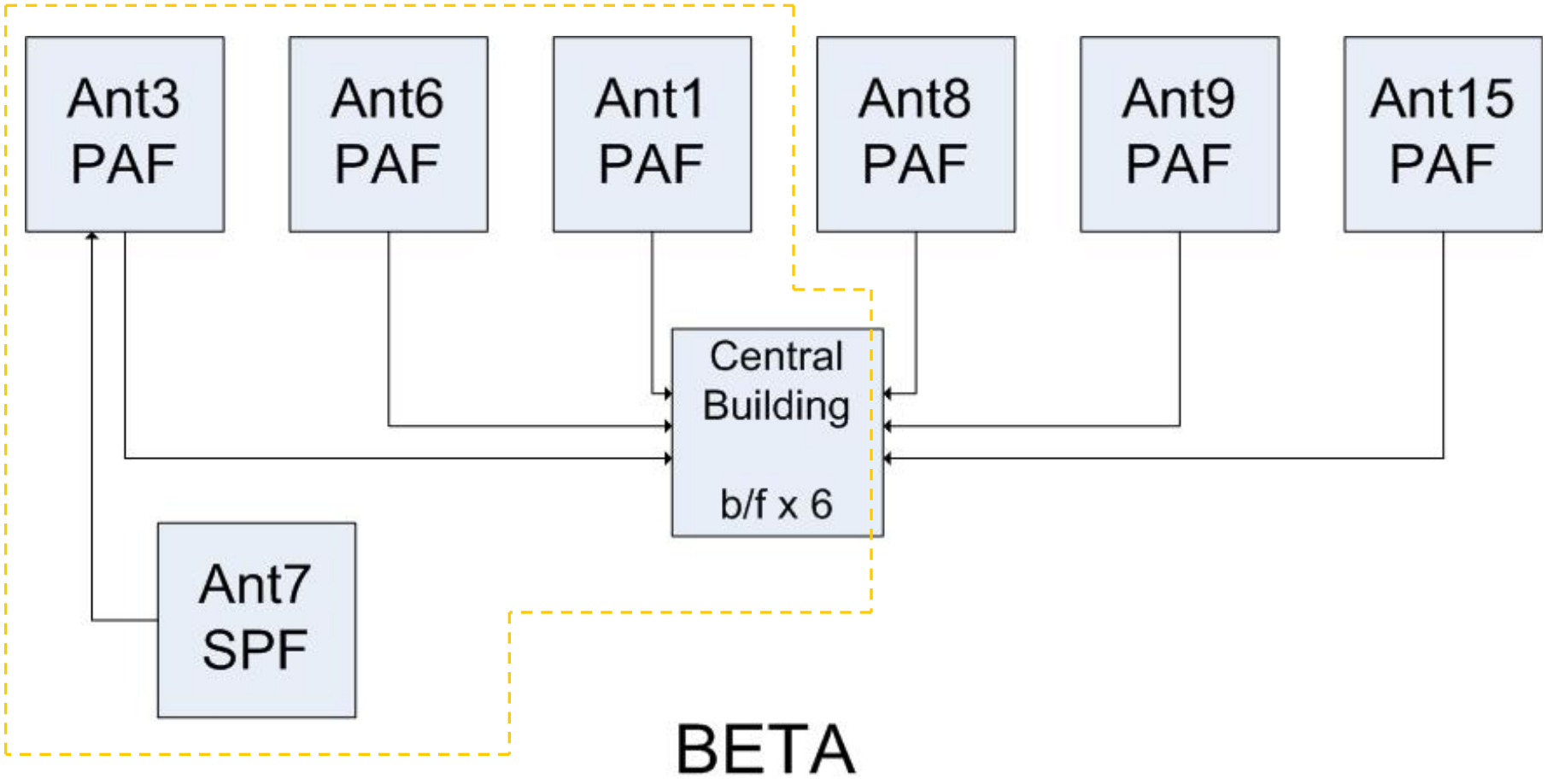
Commissioning Overview

- BETA – current status
- Recent results
- ADE / MkII commissioning
- ACES – "ASKAP Commissioning and Early Science"

BETA status

- All six BETA antennas now operational (as of Sep 2013)
- Three newer antennas still being bedded-in
- Correlator currently in 3+3 configuration
- Data successfully taken with each 3-antenna subset
- Initial imaging tests gave poor results owing to h/w correlator artifacts and instability
- Firmware developers currently have priority access to rectify these faults

BETA 1.5 → Full BETA



First image with h/w correlator

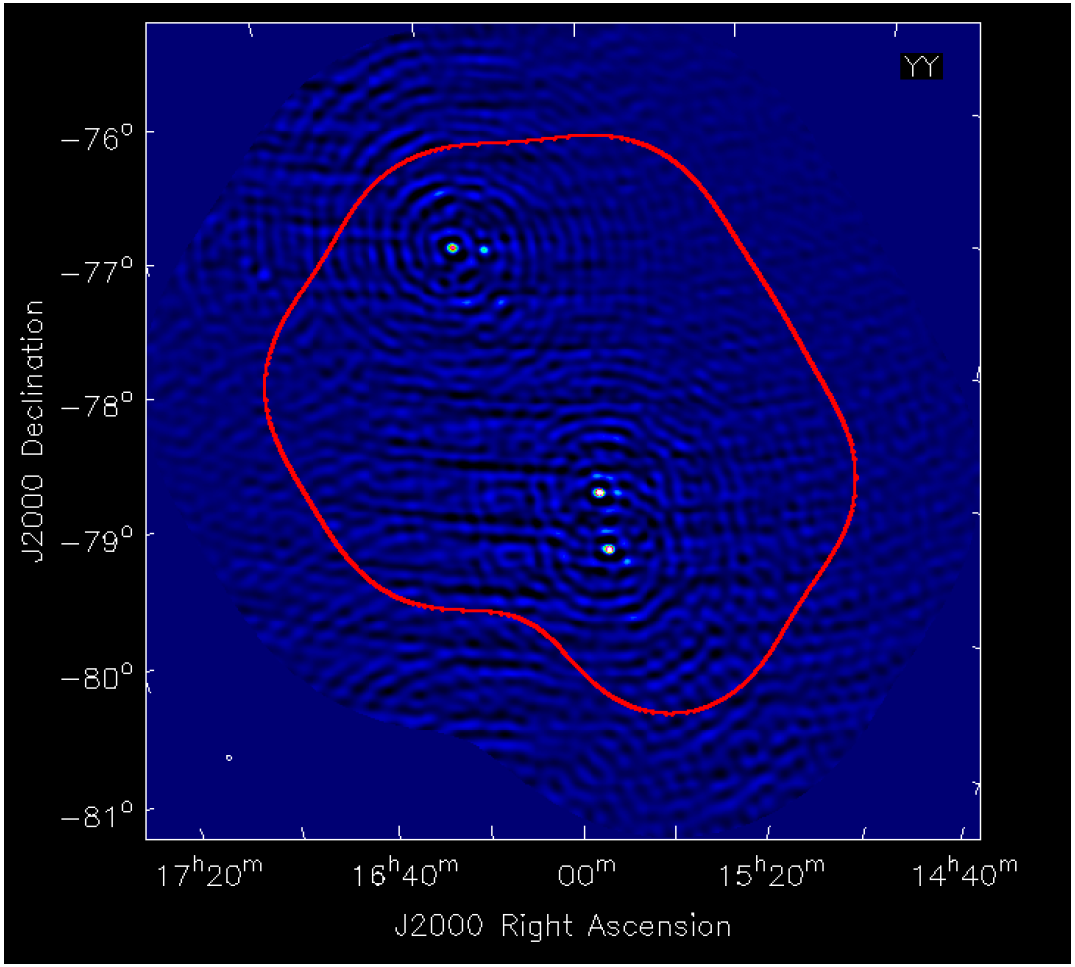
Nov 2013

Standard test-field

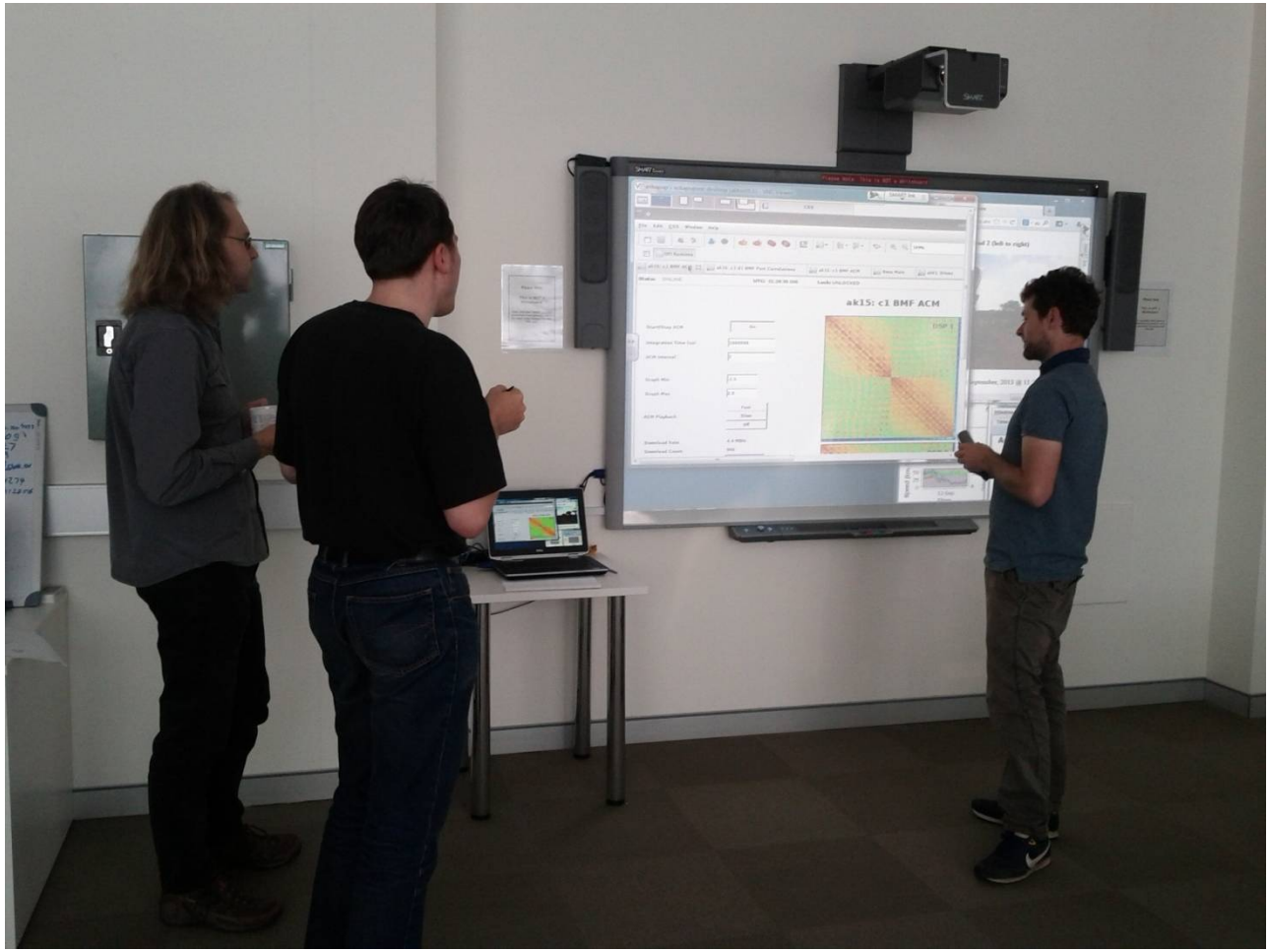
h/w correlator with ants
1 + 3 + 6

9 overlapping beams
(c.f. red contour)

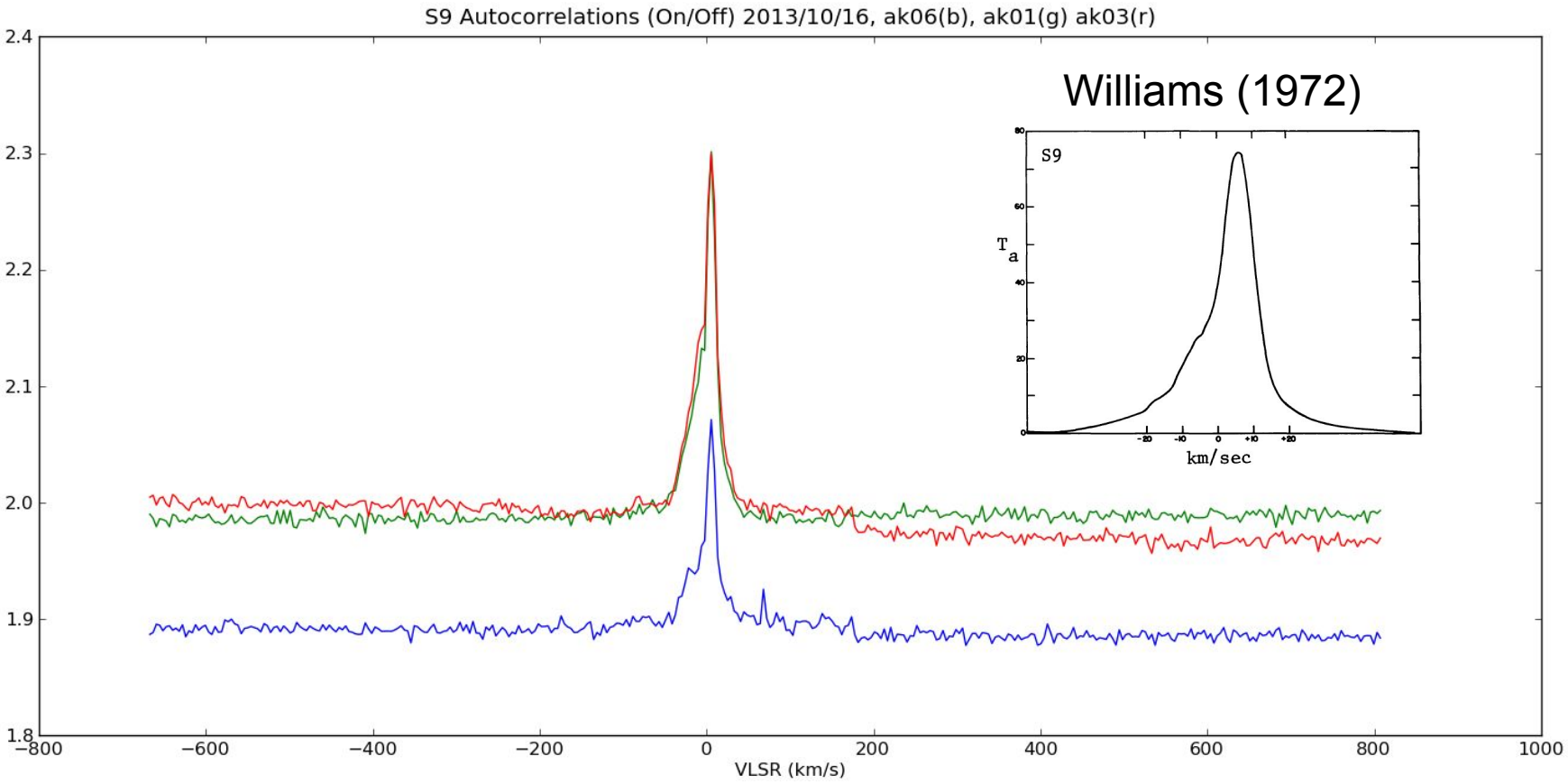
F = 1GHz, 32MH b/w



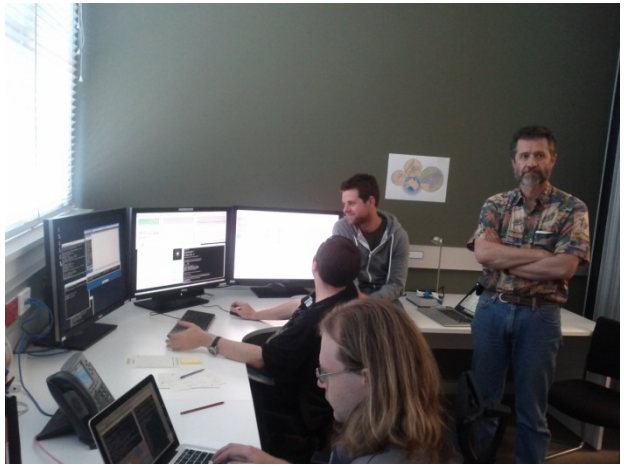
Remote observing begins at the SOC



First HI detection with BETA (autocorrs)



One day in the SOC

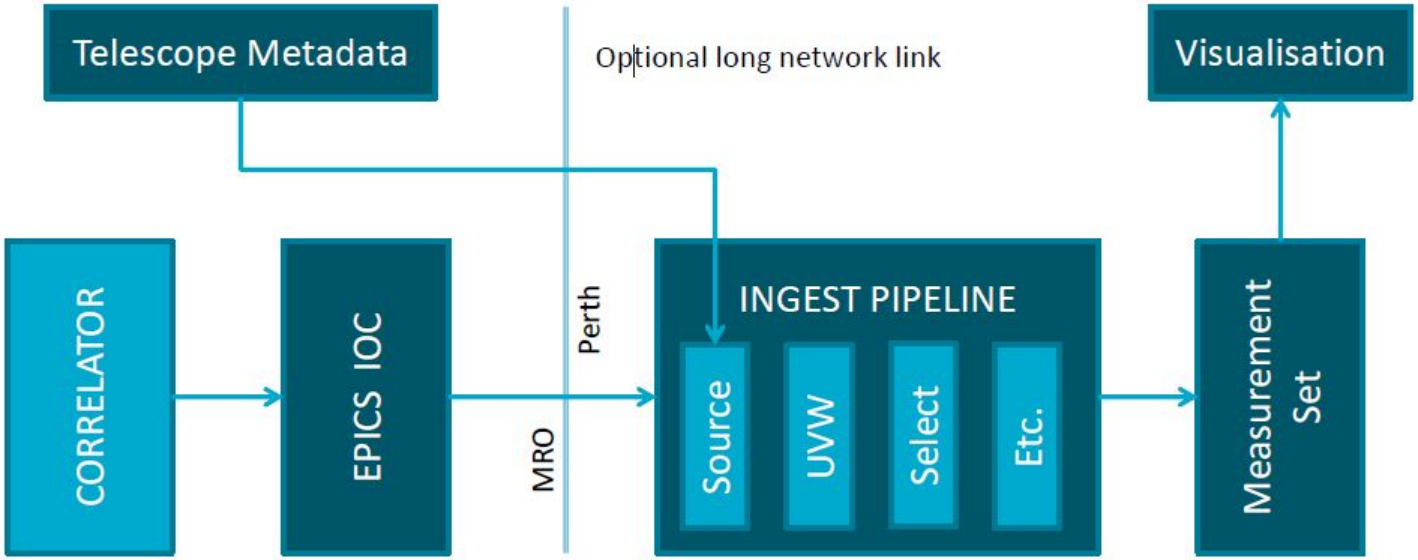


Current activities

- Fixing minor hardware problem as they arise
- Learning to drive the hardware correlator
  - Debugging firmware using on-sky data and injected signals
  - Stress-testing the correlator software drivers
  - Testing delay tracking and fringe-rotator
  - Testing the "ingest pipeline" that records data to disk
  - Coming to grips with calibration
- Expanding knowledge and operator base of BETA
  - Enlarge commissioning group through "ACES"
  - Extensive discussion between commissioning and computing groups

Data pipeline

- Still some way from full ASKAP data pipeline
- Additional s/w tools developed for commissioning

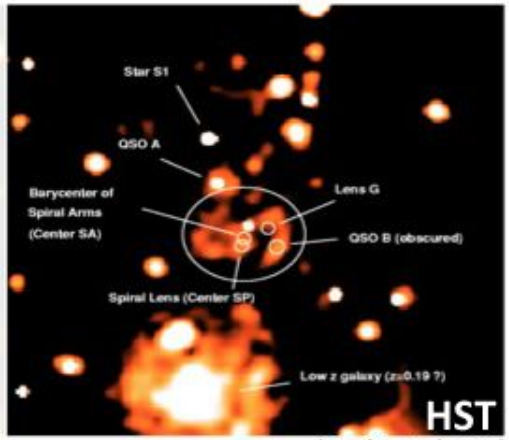


New result: HI in absorption at z=0.89

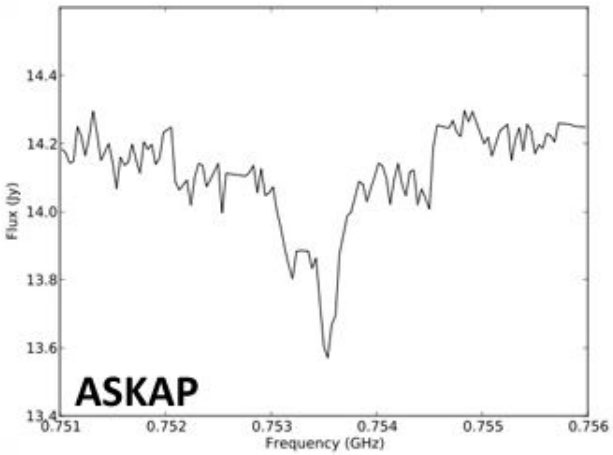
PKS 1830-210 aka
PKS 1830-211

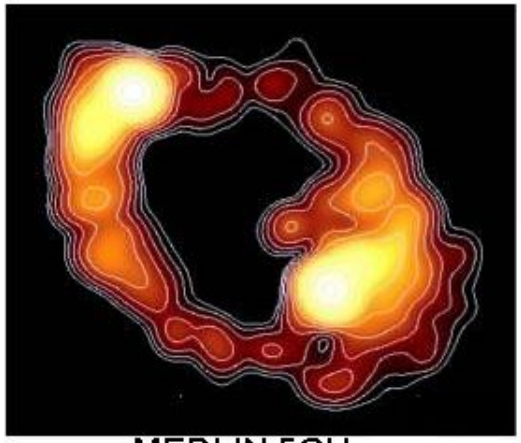
The strongest radio gravlens

Multiple absorption systems,
z=0.89, z=0.19

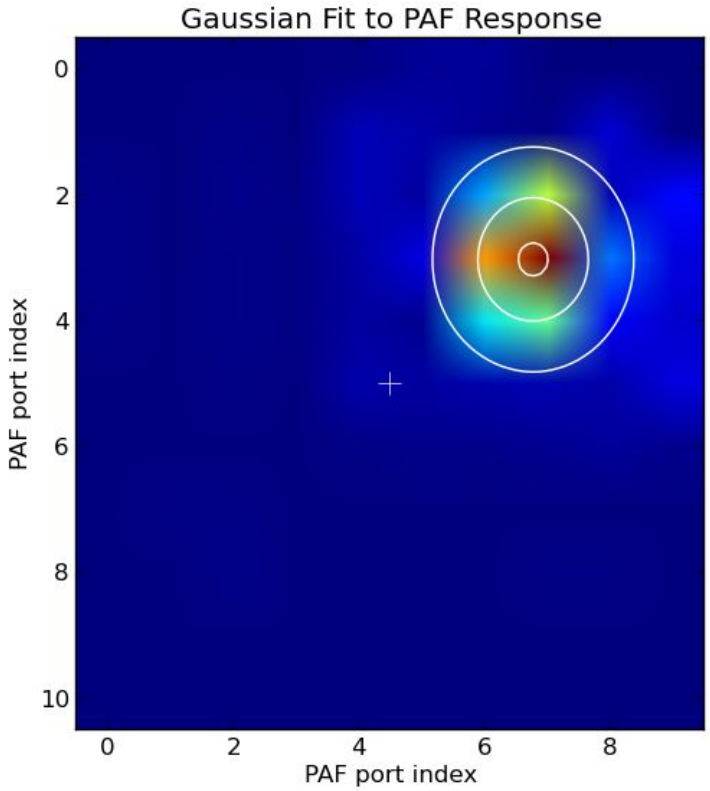


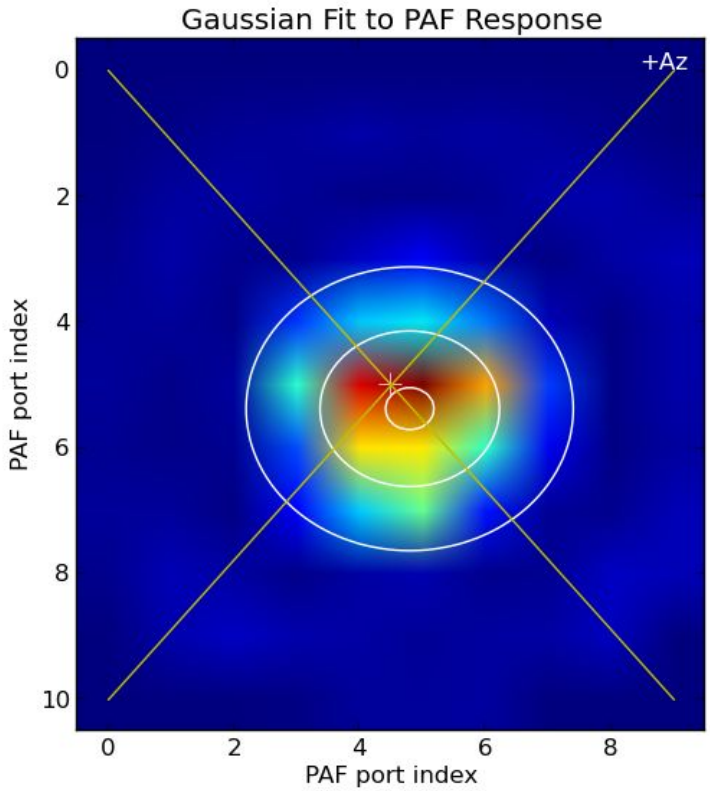
(Courbin et al. 2002)




MERLIN 5GHz

Using PAFs for pointing correction





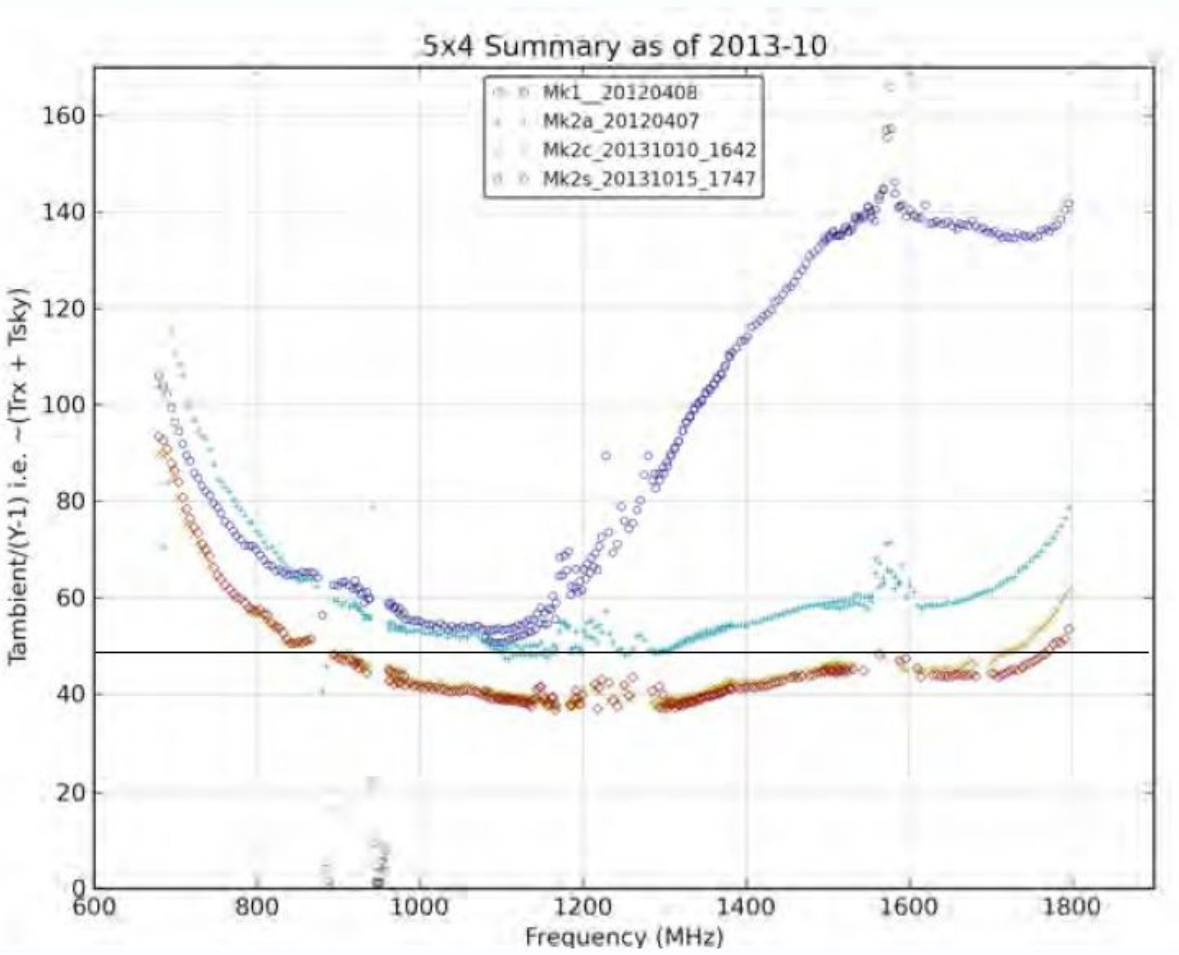
Before: *a priori* error = ~2.5d

One iteration: error = ~0.3d

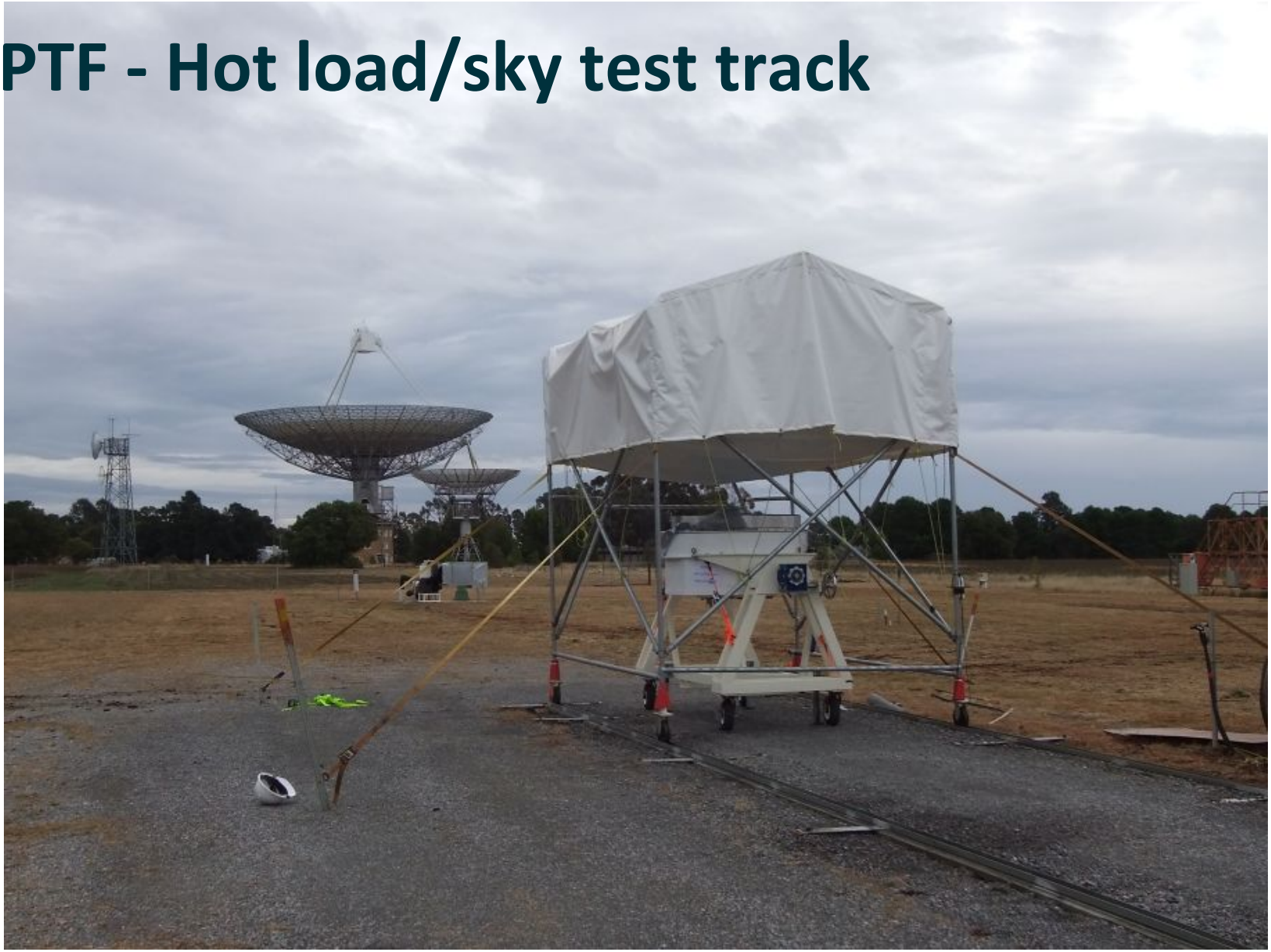
Upcoming priorities

- Repeat 3-antenna test image on BETA-2 (antennas 8,9,15)
- 6-antenna phase-closure and image on full BETA
- Early 2014: full BETA continuum image and simple spectral-line image released to SSTs.
- BETA remains engineering test-bed through to Q3 2014.
- ~March 2014 first field-tests of MkII PAF at MRO
- mid 2014: ADE-6 deployment commences
- 2nd half 2014: full ADE-6 continuum image and simple released to SSTs
- Early science program commences with ADE-12

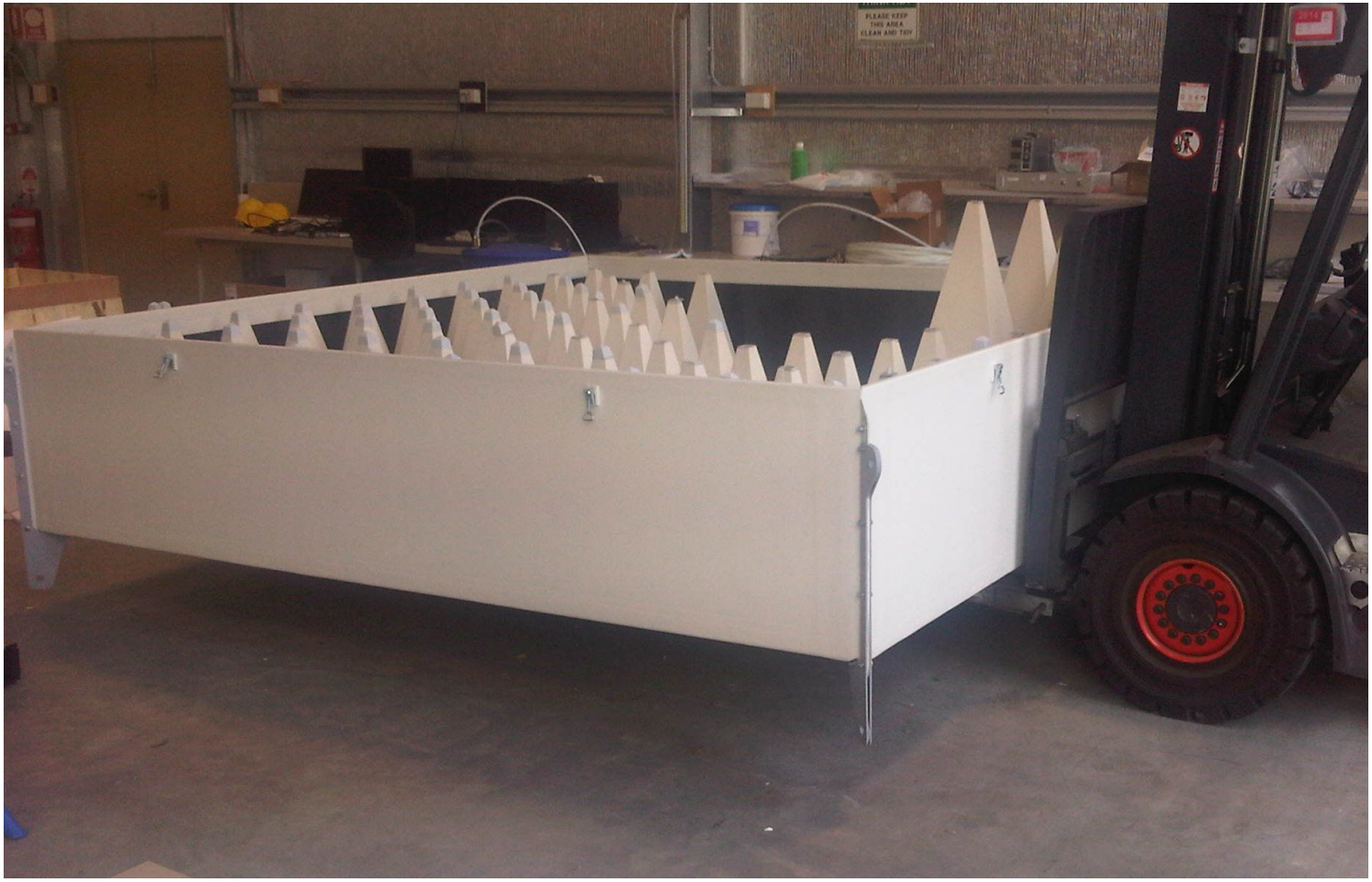
ADE / MkII PAF status: 5x4 test results



PTF - Hot load/sky test track



Full ADE test at MRO – early 2014



Hot load for ADE PAF ground tests *en route* to MRO

ASKAP - schedule

- ***Mk I***
  - *6 BETA PAFs at MRO*
  - *H/W correlator testing*
  - *3+3 configuration →*
  - *6 antenna config ~Feb 2014*

- ***Mk II***
  - *Prototype assembly: June – December 2013*
  - *Field tests at MRO in Q1 2014*
  - *First 6 production PAFs – Q2 2014*
  - *2nd 6 – Q4 2014*
  - *Subsequent deliveries:*
    - *Optimum batch size being determined*

Parkes Test-Bed

- Successful results from ADE 5x4 test programme at Parkes – new ADE design now matches best achieved with earlier designs
- Continuing active programme of PAF observing and calibration using 64m-12m interferometer for calculating, manipulating and applying beam-former weights
- Brian Jeffs (Distinguished Visitor BYU) and CASS staff using PTB to develop active RFI weights for adaptive RFI mitigation
- PAF “bake-off” in 2014 between different types of PAF

ACES –
ASKAP COMMISSIONING AND EARLY SCIENCE

-Informal structure to assist in resourcing and planning of commissioning and early science

-Manager is Dave McConnell

-Aims to identify in-house and external resources to facilitate commissioning and early science programme

-Call for EOI to participate in secondments to ACES

We acknowledge the Wajarri Yamatji people as the traditional owners of the Observatory site.

Thank you