



ASKAP commissioning

presentation to ATUC

Dave McConnell
2 June 2016

www.csiro.au

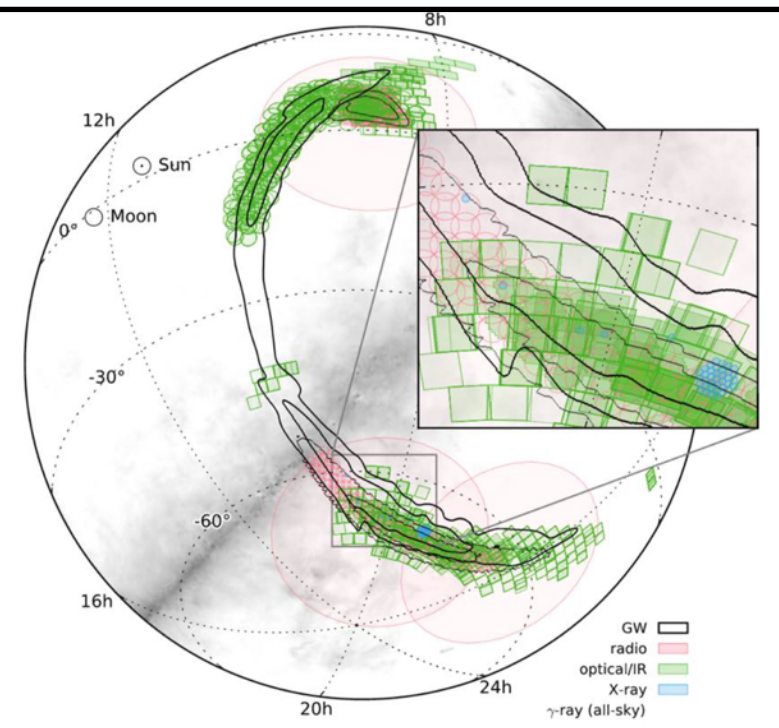


BETA

- Ceased operation from 16 Feb 2016
- Huge benefits: learning how to use PAFs
- BETA data continues to be used for ASKAPsoft testing
- BETA performance is summarised in a paper recently submitted to PASA
- Science papers from BETA:
 - ASKAP Hi imaging of the galaxy group IC 1459, Serra et al., MNRAS, 452, 2690, 2015
 - Discovery of H I gas in a young radio galaxy at $z = 0.44$ using the ASKAP, Allison et al. MNRAS, 453, 1249, 2015
 - A pilot ASKAP survey of radio transient events in the region around the intermittent pulsar PSR J1107–5907. Hobbs et al., MNRAS, 456, 3948, 2016
 - Wide-field broad-band radio imaging with phased array feeds: a pilot multi-epoch continuum survey with ASKAP-BETA, Heywood et al., MNRAS, 457, 4160, 2016
 - High-velocity OH megamasers in IRAS 20100–4156: Evidence for a Supermassive Black Hole, Harvey-Smith et al., MNRAS, 2016
 - Localization and broadband follow-up of the gravitational-wave transient GW150914, Abbott et al. arXiv 1602.08492, submitted to ApJ
 - Illuminating the last 8 billion years of cold gas towards two gravitationally lensed radio quasars, Allison et al., in prep.

Follow-up for GW150914

Frequency: 711 - 1015 MHz
Surveyed area: 270 square deg
Observing time: 18h
Sensitivity: 1-5 mJy/beam



ASKAP

State

- 12 antennas fitted with PAFs : 2, 4, 5, 10, 12, 13, 14, 16, 24, 27, 28, 30
- Fringes acquired with all antennas (but not simultaneously)
- Simultaneous fringes on 11 antennas
- At present restricted to 48MHz band - 1 correlator block
- Data ingest to the Pawsey Supercomputing Centre successfully demonstrated

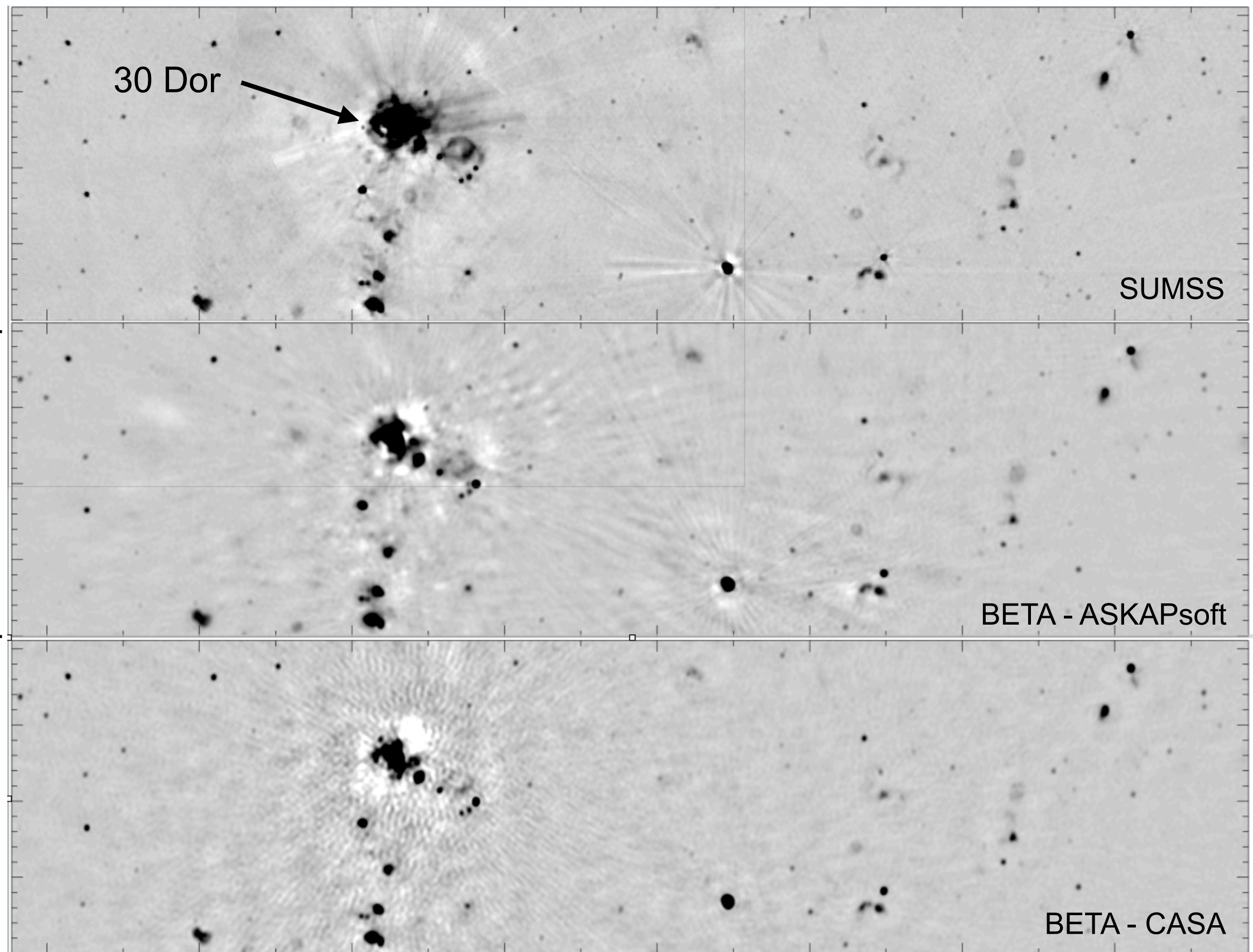
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ASKAPsoft

- Considerable progress over recent months
- Substantial increase in resources allocated to the project
- “Readiness” review held in March
 - panel chaired by Jeff Kern of NRAO
 - recommended improving access to package for external users, may include additional installations at institutions with the capabilities
- Wide range of advances in the package: both in applications and in the pipeline scripts

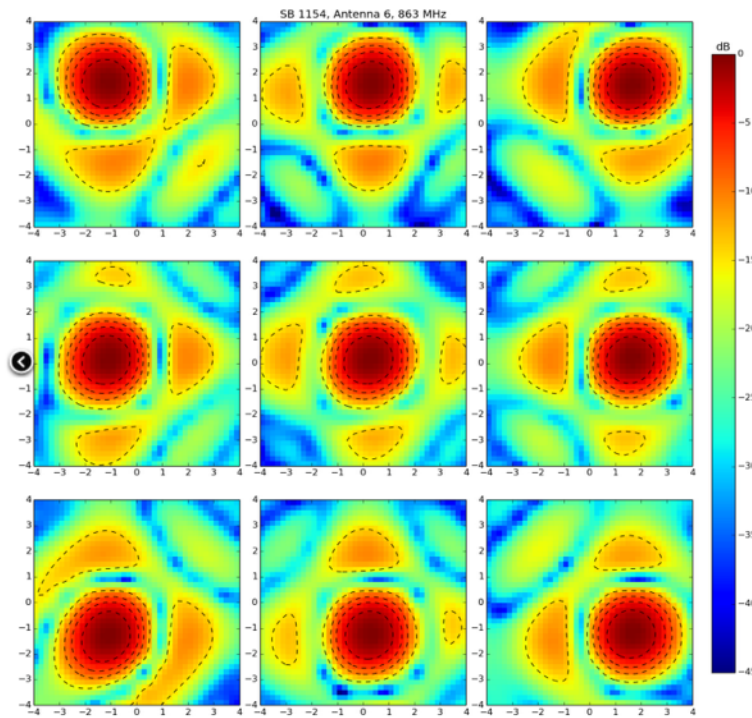
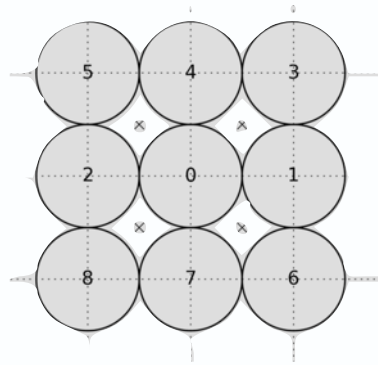


ASKAP

Beam forming

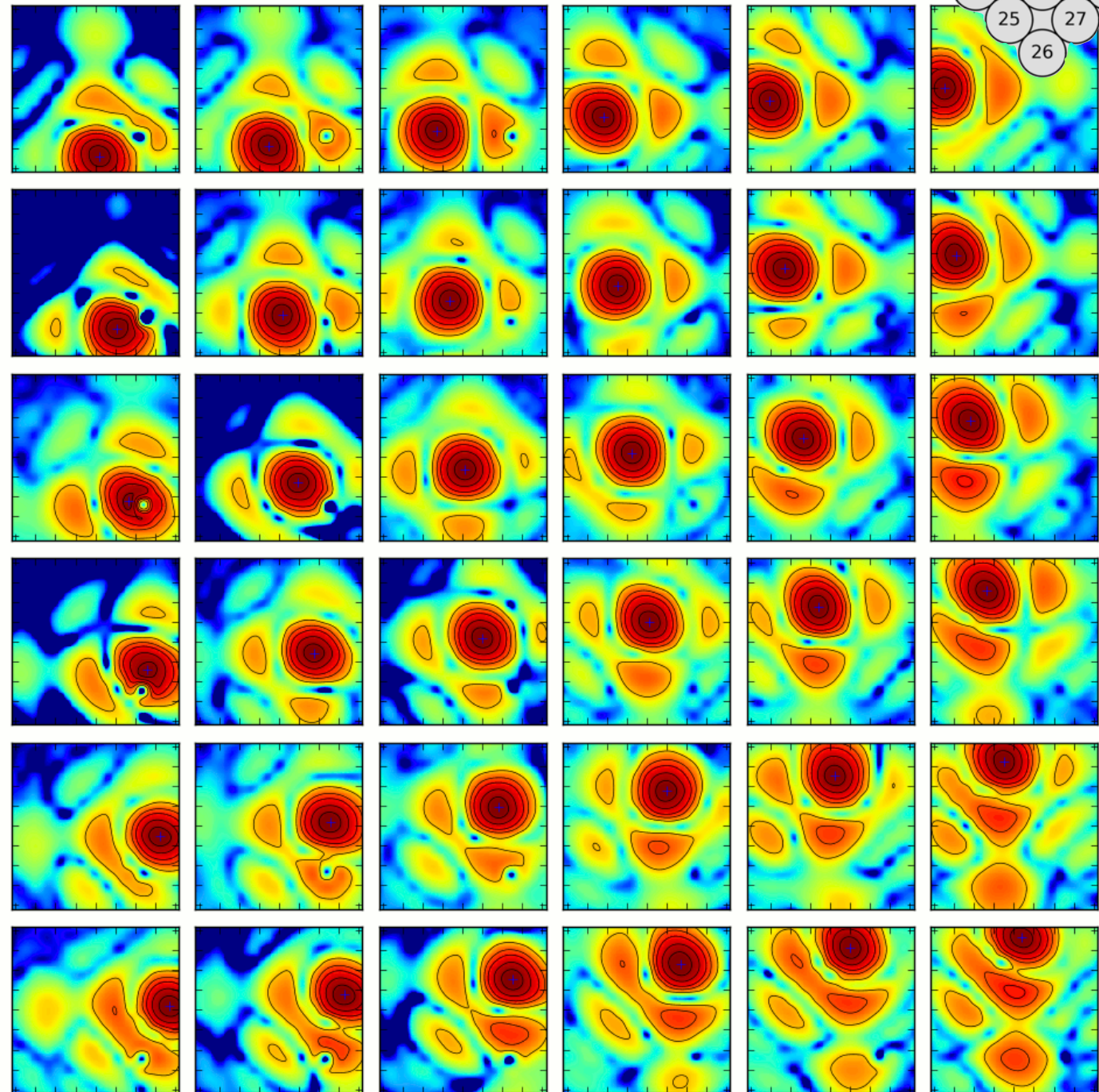
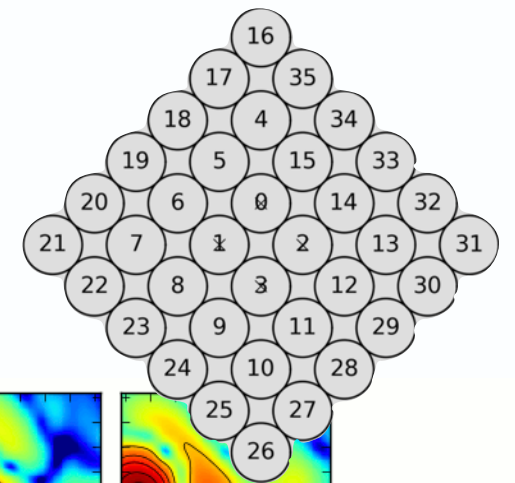
- 36 beams formed
- Use Sun as target for maxSNR beam weight determination
- Observations take ~2 hours

BETA



Credit Aidan Hotan

ASKAP



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Beam forming

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- Use Sun as target for maxSNR beam weight determination
- Observations take ~2 hours

Imaging

- Apus field 16:08:50, -78:12:00 - single pointing
- 9 Antennas, 36 beams
- 48 MHz BW centred at 939.5 MHz, 11 hours.
- No interleaving.
- 1934-638 was observed for calibration: ~9 hours! (15 minutes per beam)
- Theoretical image noise: expected ~150-200 $\mu\text{Jy}/\text{beam}$; actual ~ 300 $\mu\text{Jy}/\text{beam}$

ASKAPsoft Image of APUS (April 2016)

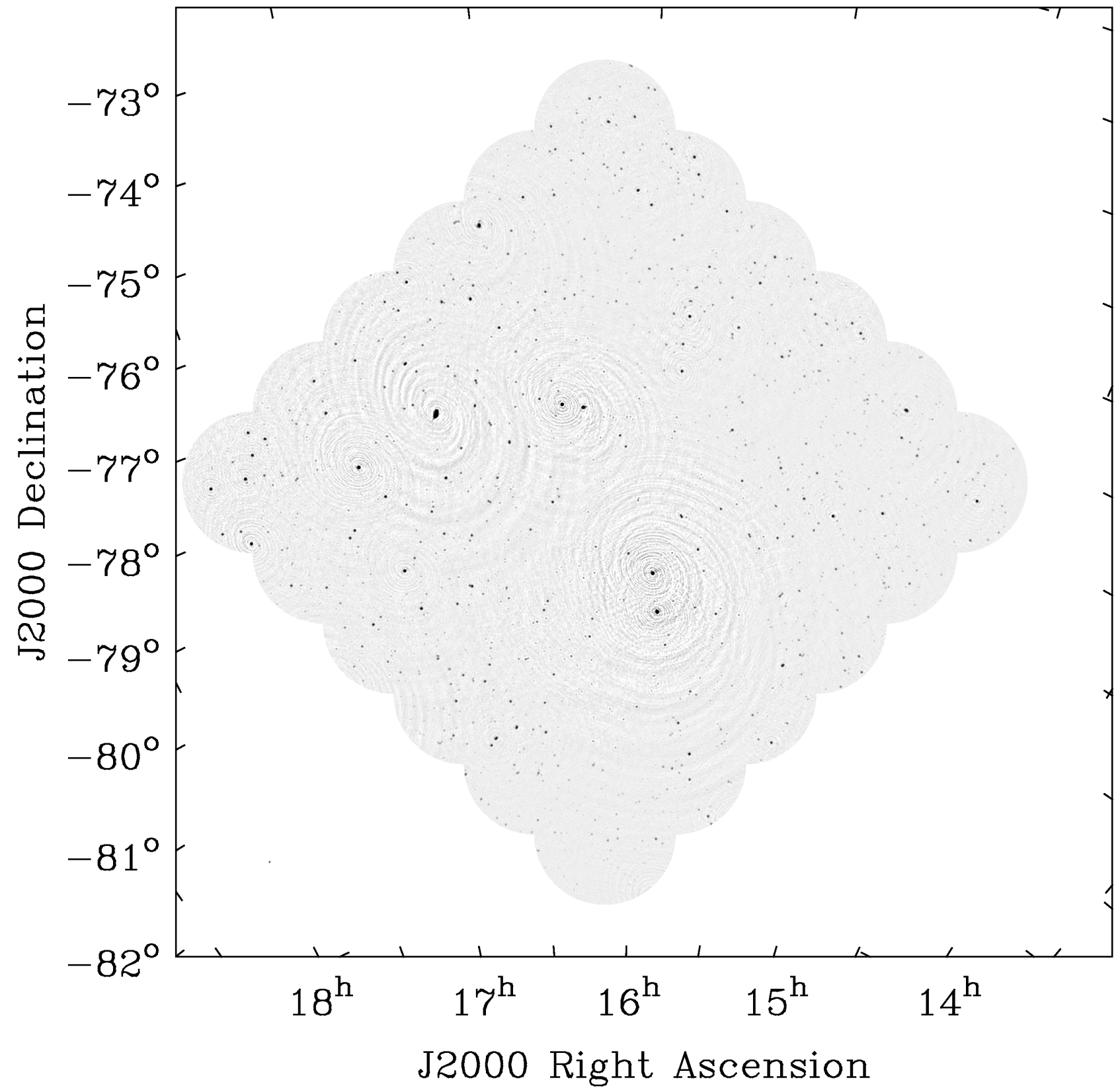
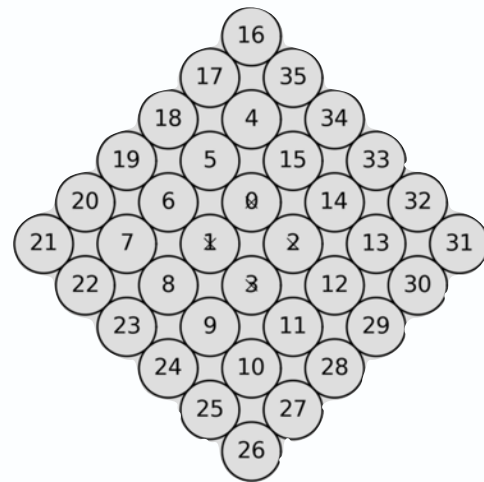


Image by Wasim Raja & ASKAPsoft

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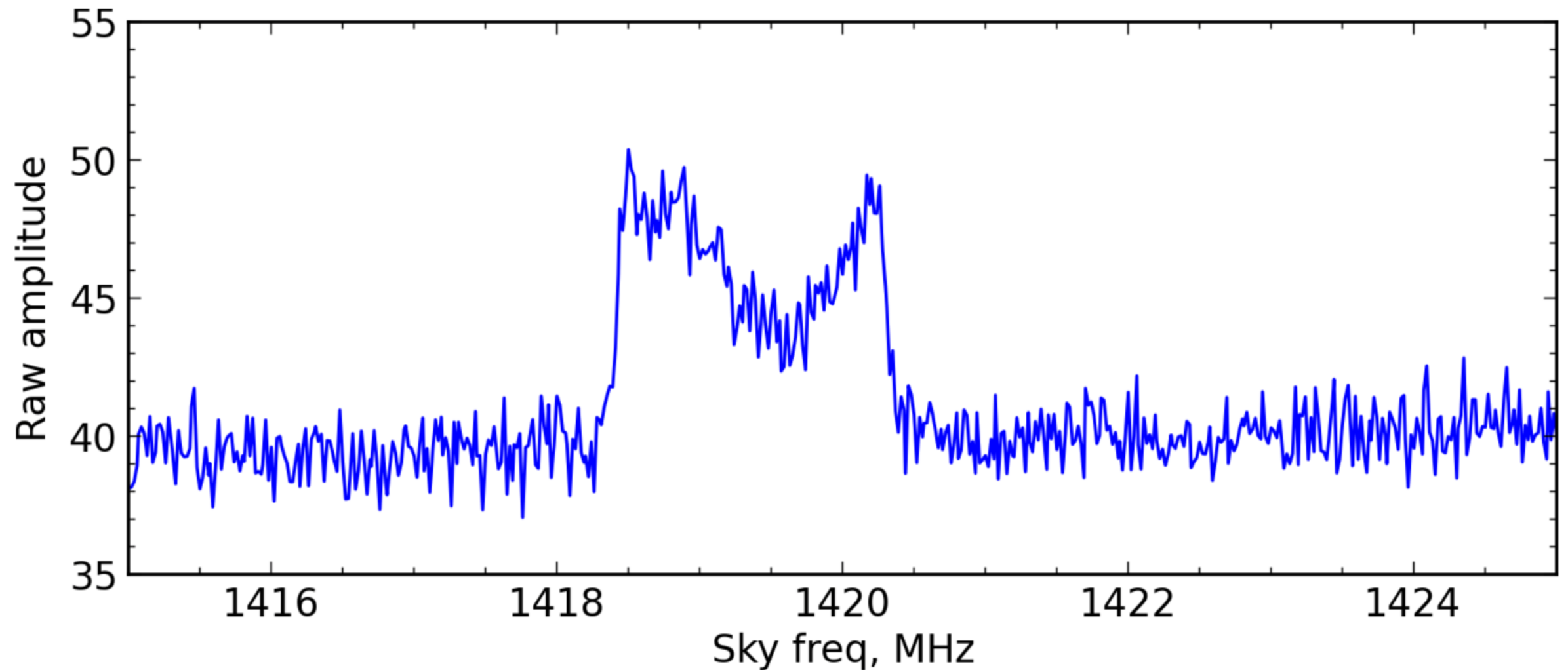
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Frequency tuning

- technically different from BETA
- recent progress: successful selection of different centre frequency: 1420 MHz.

ASKAP at 1.4 GHz



NGC253

Single baseline AK04-AK05

ASKAP work flow

SO Science Operations
HSO Head SO

	Commissioning	Pre-Early Science	Early Science	Survey Science	Guest Science	Data level
Proposal	Internal	Opportunistically	~Done	Done	to TAC	
Specify observation	ACES	SST/ACES	SST/ACES	SST	PI	
Prepare observation	ACES/SO	ACES/SO	SO/ACES	SO	SO	
Schedule telescope	SchedCom	SchedCom	SchedCom	HSO	HSO	
Instrumental setup, calibration	ACES/SO	ACES/SO	SO	SO	SO	
Observation: launch, monitor	ACES/SO	ACES/SO	SO	SO	SO	
Process data	ACES/SDP/SO	SST/SDP/ACES	SO,SDP \longleftrightarrow SST	SO	SO+	5
Data validation			SST	SST	PI	6
Process pipeline products			SST	SST	PI	7
Store/release data products	Comm. Archive	CASDA/?	CASDA	CASDA	CASDA	