

KAT-7 update

Anja Schröder (HartRAO, KAT)
and the SKA-SA/KAT team





KAT-7 Status

KAT-7 status



On site:

- 7 Antennas
- 4 warm receivers, full signal chain
- 4-bit correlator ("FringeFinder")

Site Complex



Array Site



Friday, 7 May 2010

Array Site



Friday, 7 May 2010

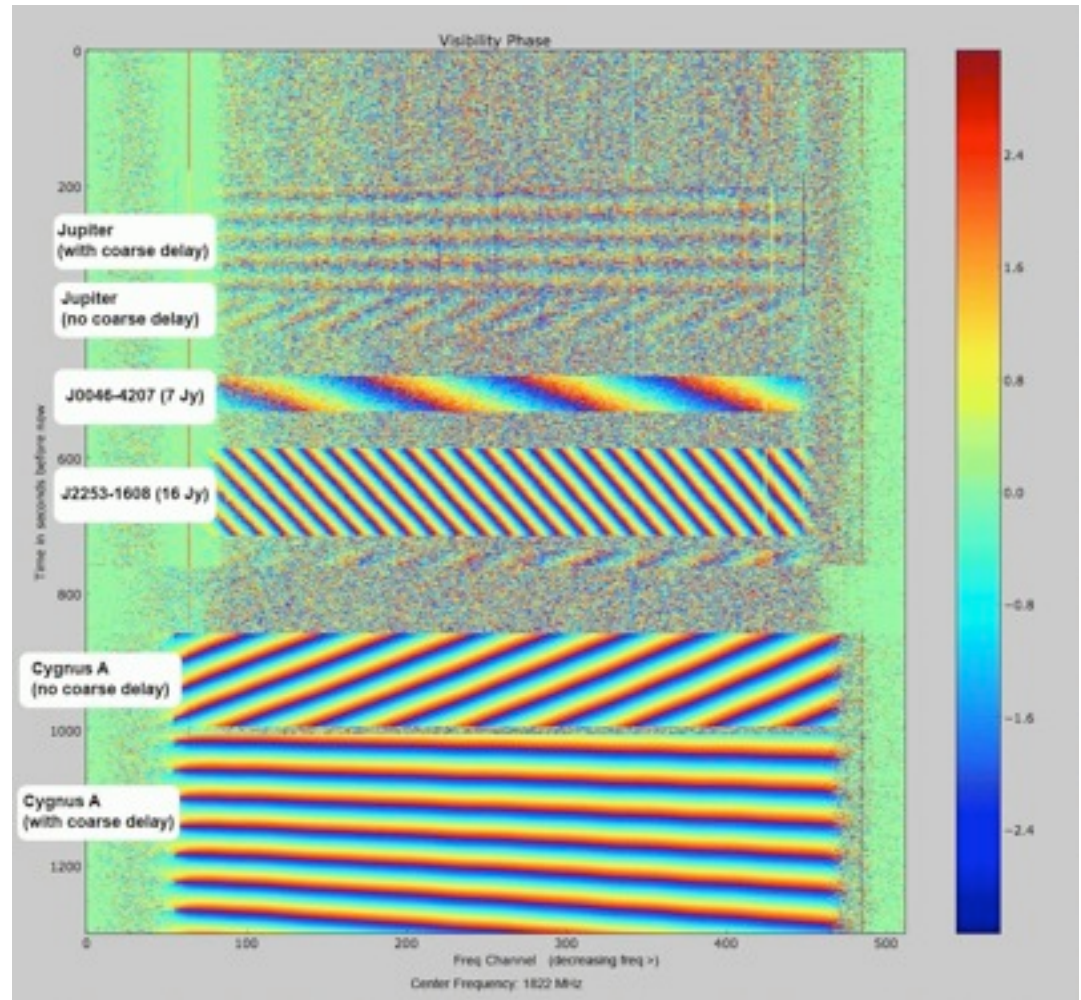
Toilet ...



December 2009



- First fringes:



February 2010



- Introduction week for commissioning



March 2010



Start commissioning Ants 1 & 2:

- one scientist on site per week (Mon up, Fri back)
- plus software support
- plus technical support

Continued engineering and software work

March 2010



March 2010



Friday, 7 May 2010

March 2010

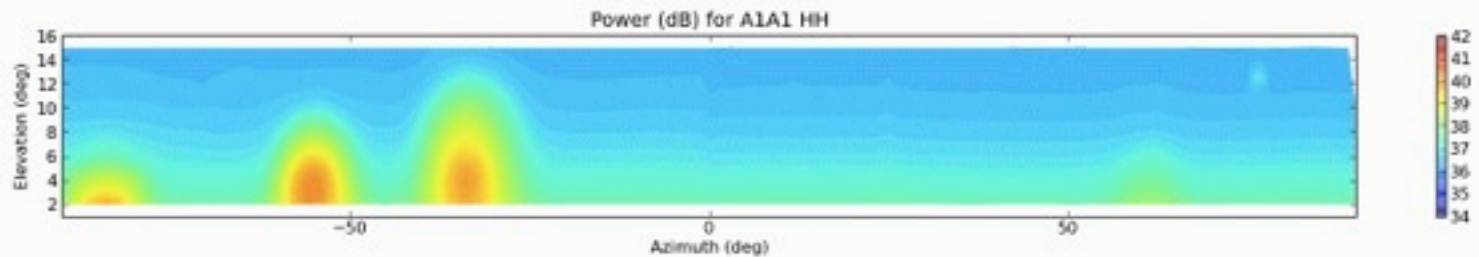
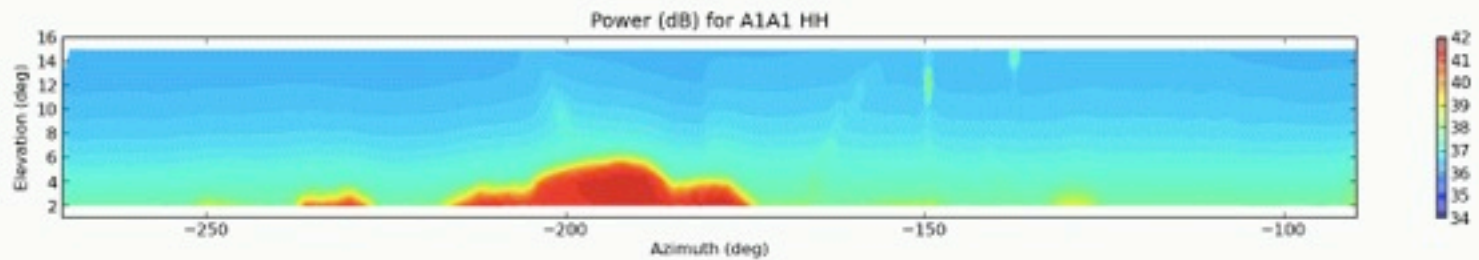


Friday, 7 May 2010

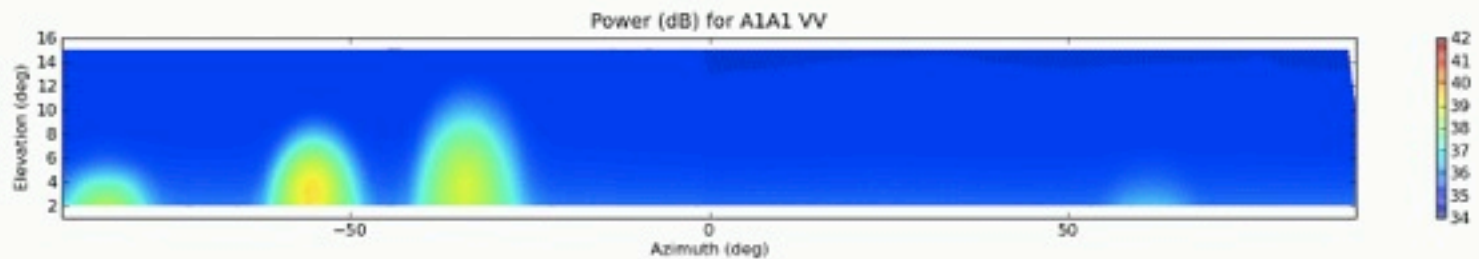
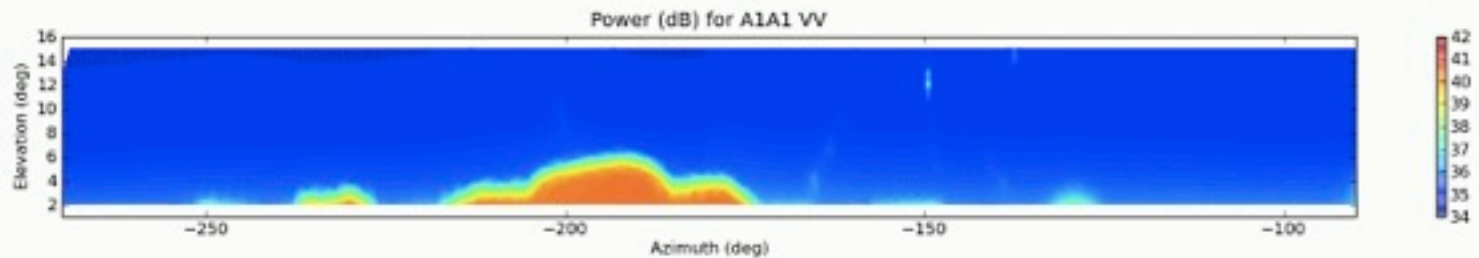
15 - 18 March: Horizon mask Ant 1



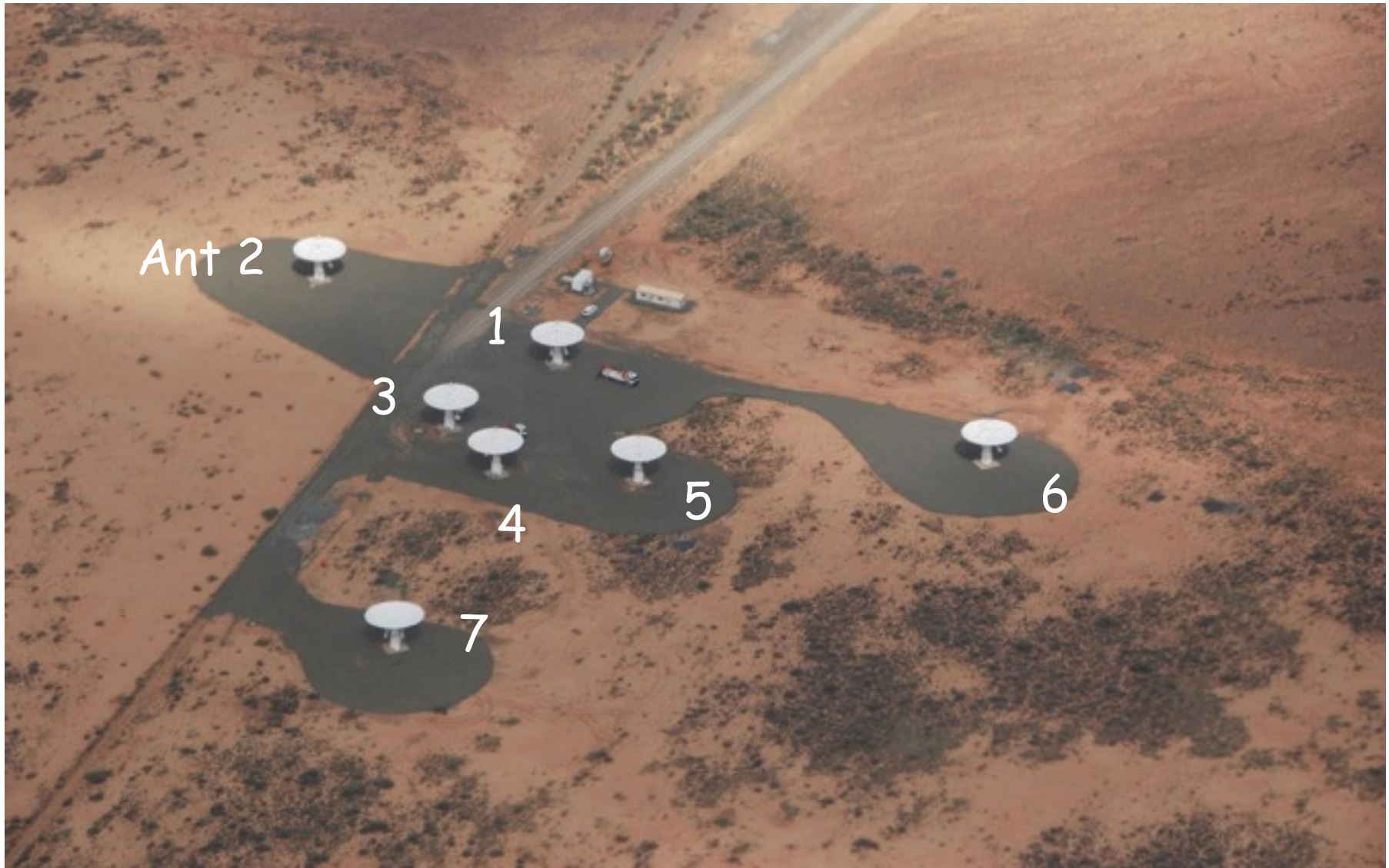
HH



VV



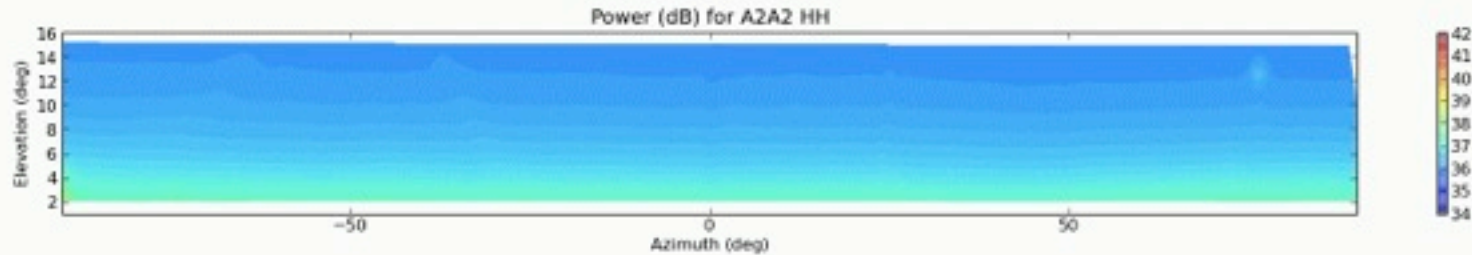
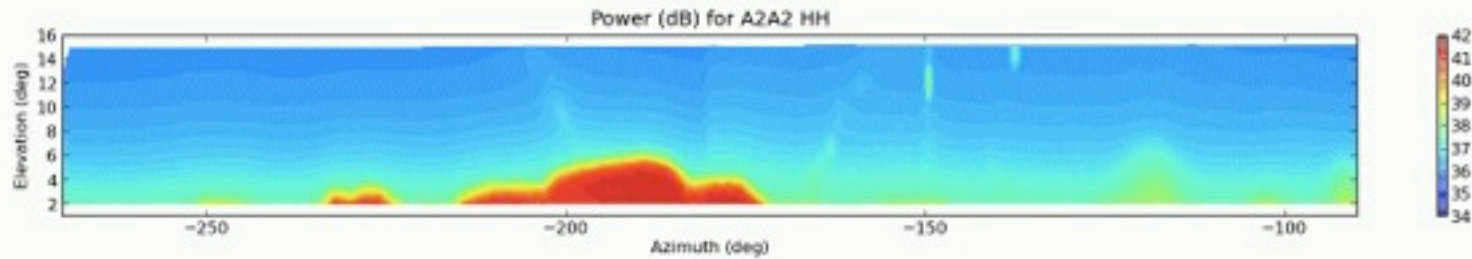
Array Site



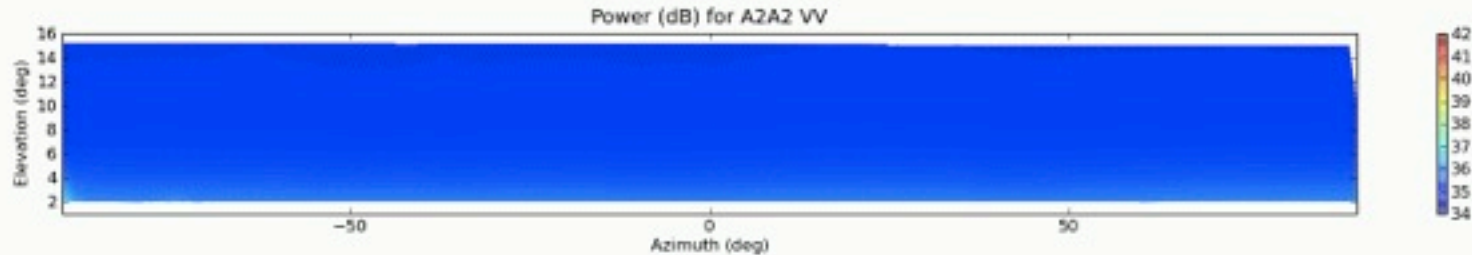
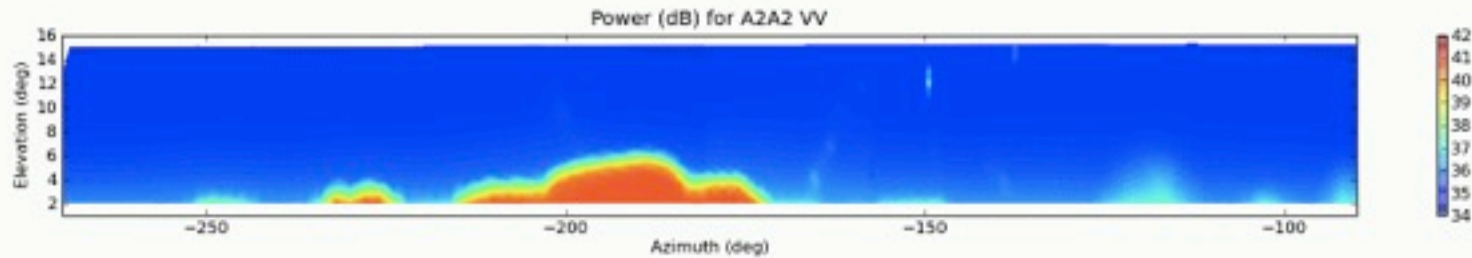
15 - 18 March: Horizon mask Ant 2



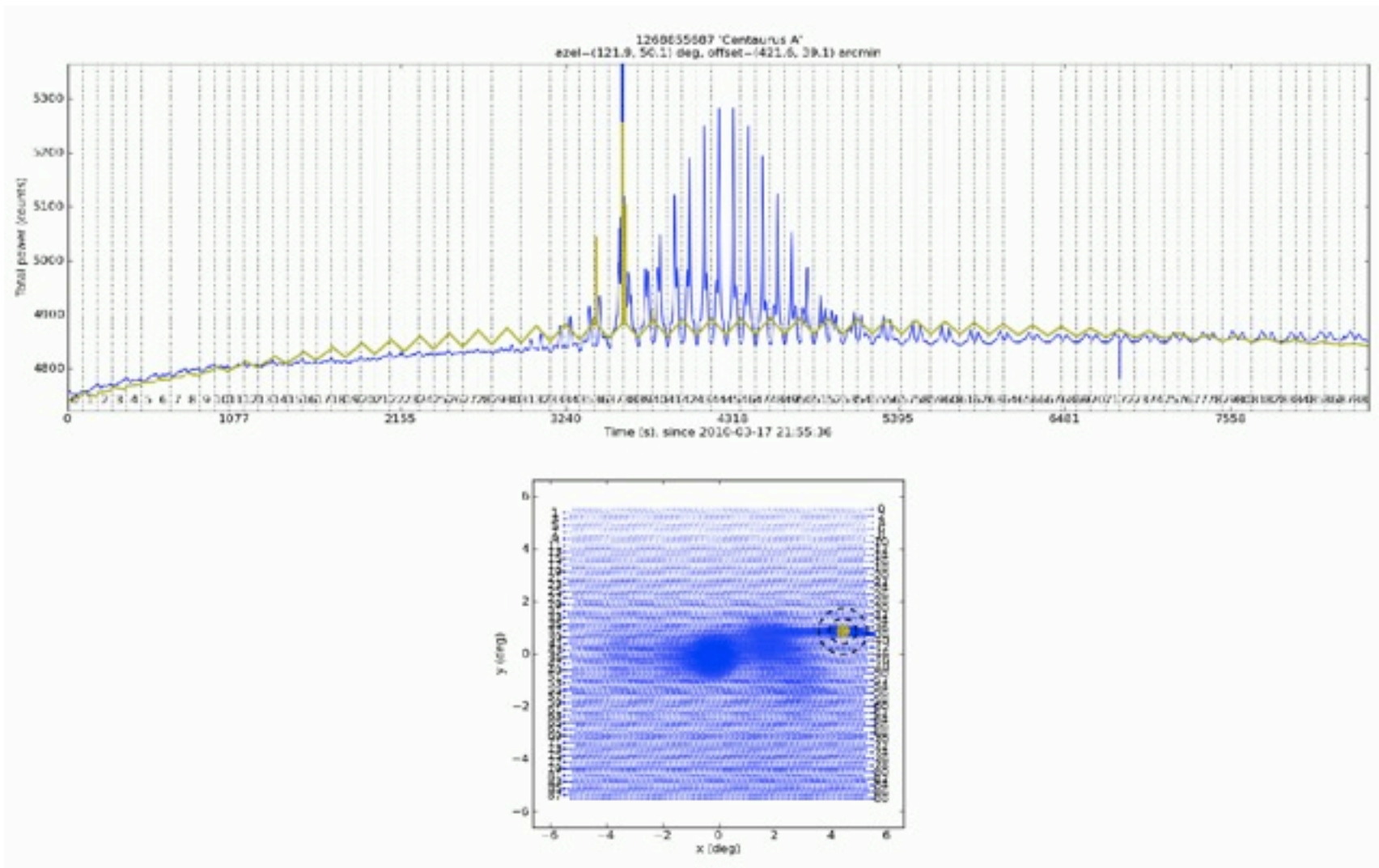
HH



VV



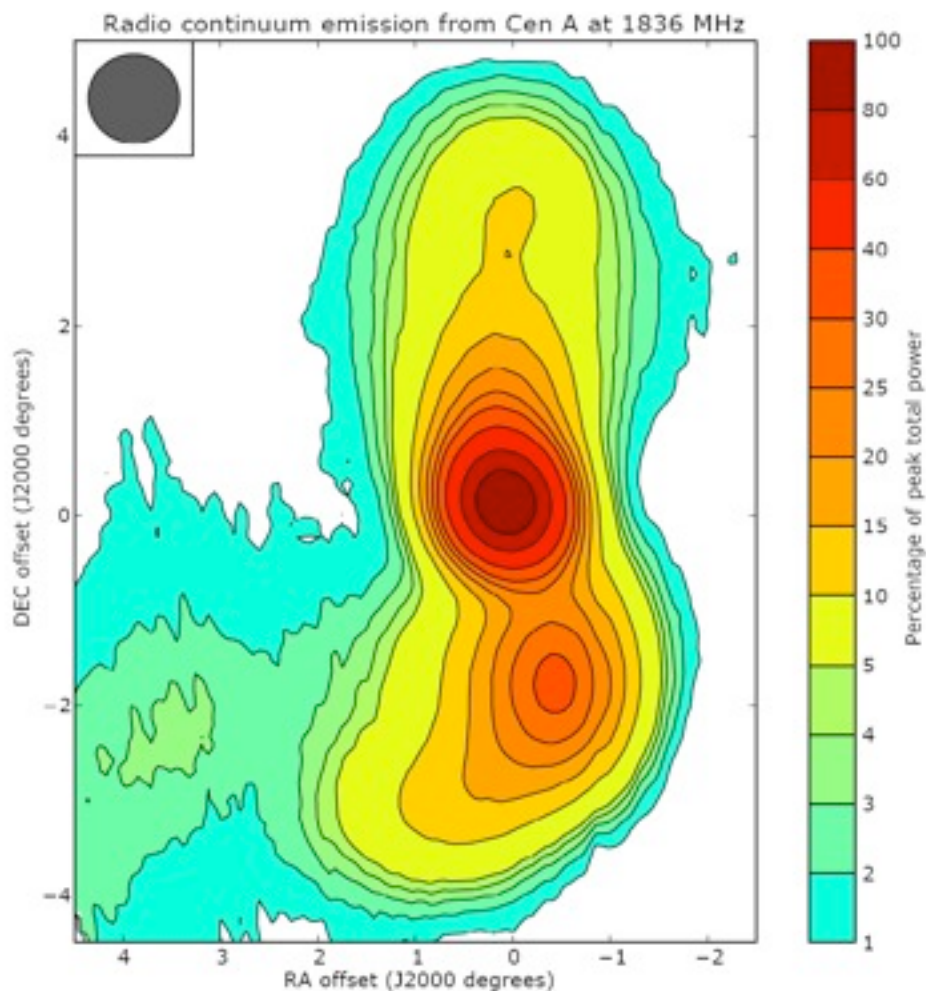
17 March: Map of Centaurus A



17 March: Map of Centaurus A



KAT-1 1836 MHz

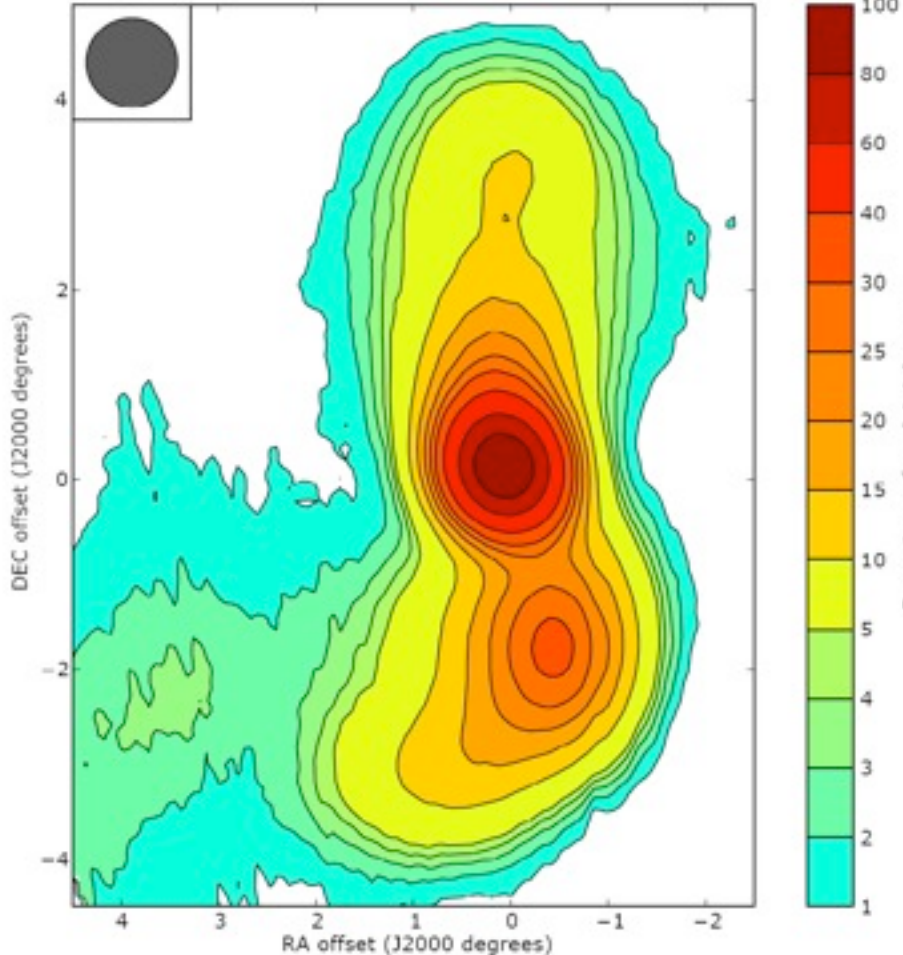


17 March: Map of Centaurus A



KAT-1 1836 MHz

Radio continuum emission from Cen A at 1836 MHz



Bolton & Clark 1960, PASP 72, 29

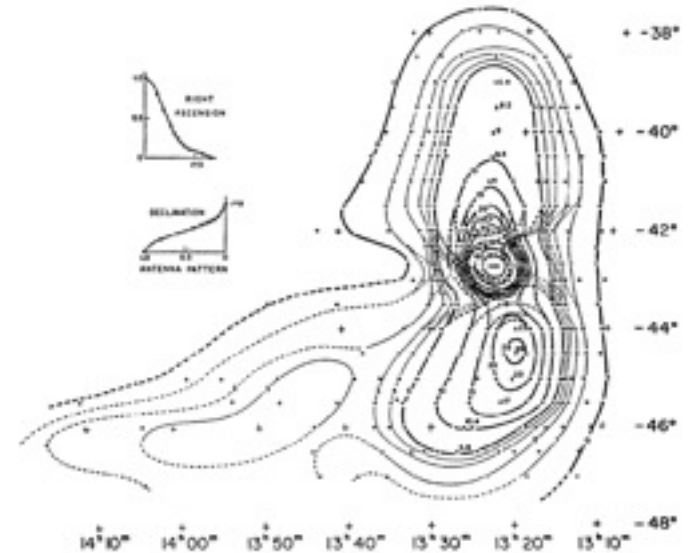
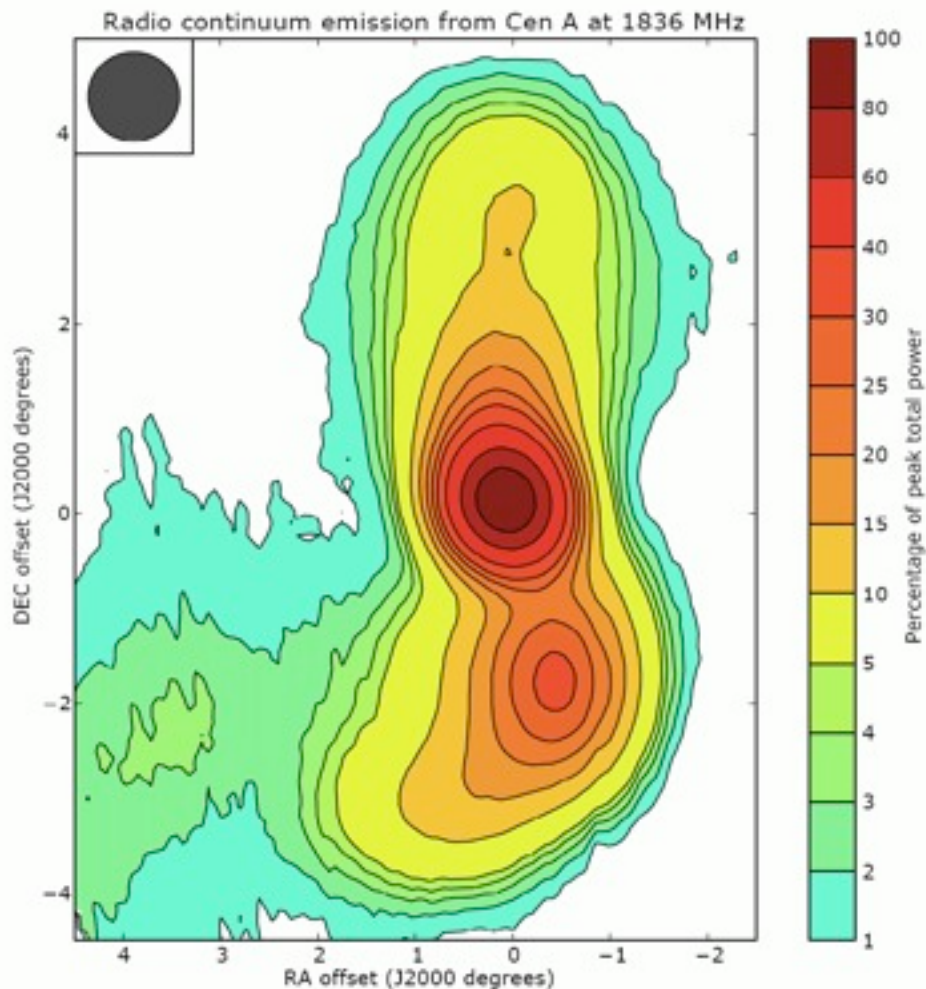


FIG. 1.—Observed brightness distribution of 960 Mc/s radiation from NGC 5128/Centaurus A on an equal-area chart. Contour lines are steered through observed points shown as dots. Contours are in units of approximately 0.5 K; antenna temperature intervals were chosen to avoid undue crowding. Dashed lines in the left hand part of the diagram are in regions where the observations are somewhat uncertain. Dashed lines in the central region are contours that result from the subtraction of a point source of 92 units. Crosses mark the highest points in the observed drift curves.

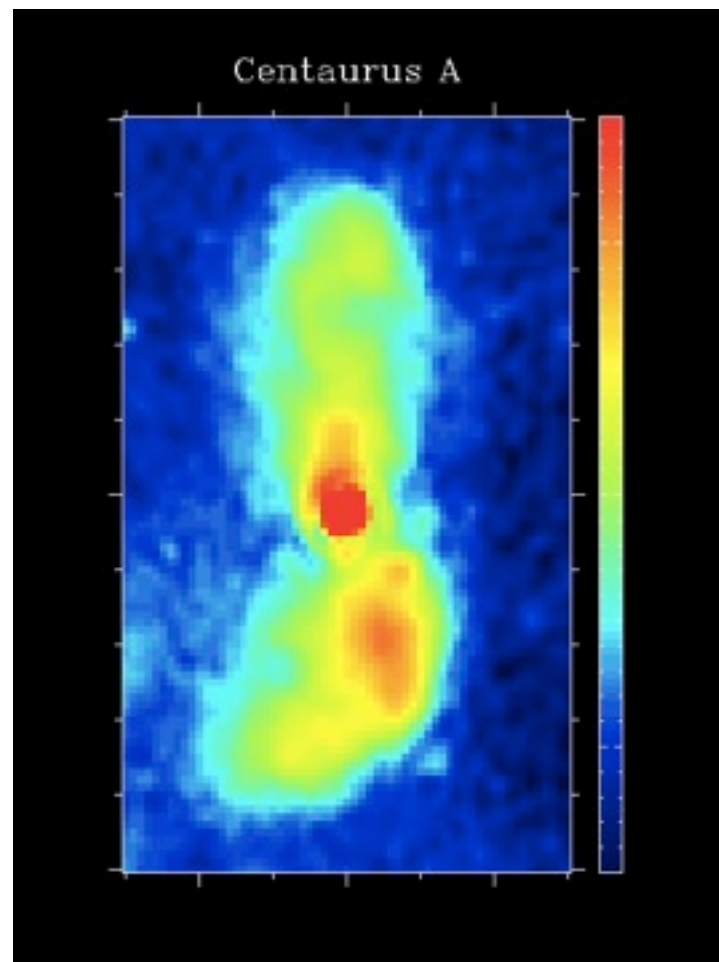
17 March: Map of Centaurus A



KAT-1 1836 MHz



Rhodes/HartRAO 2326 MHz survey

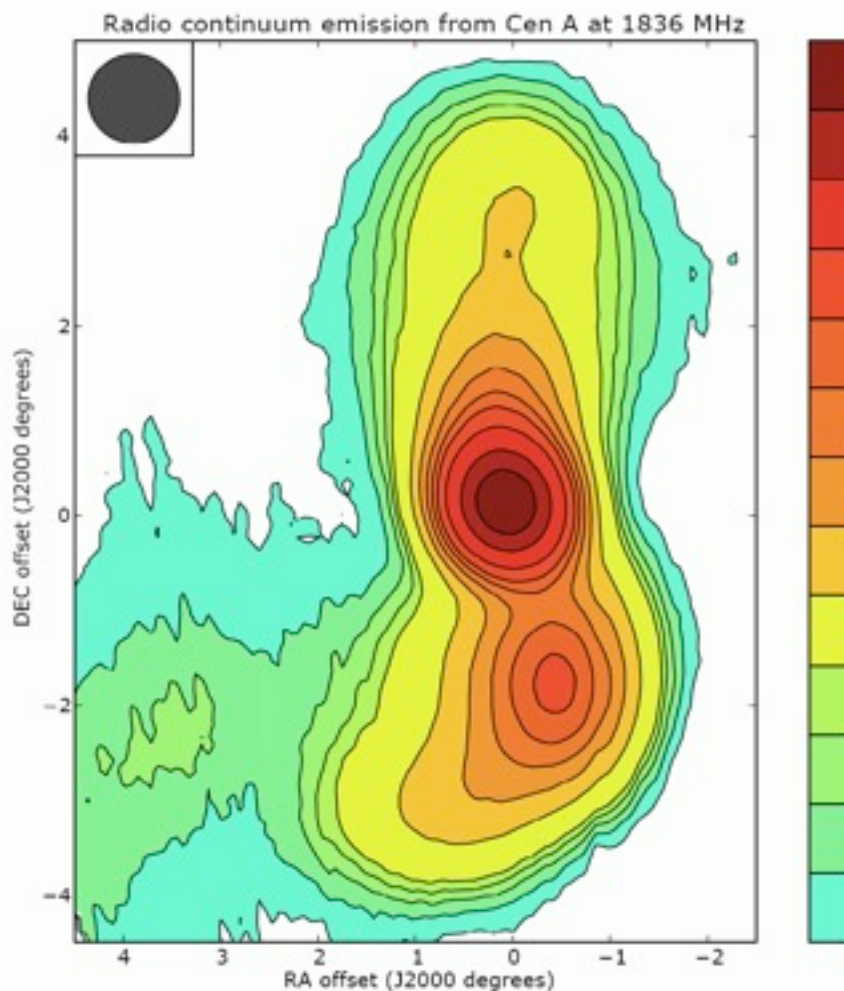


(Jonas, Baart, Nicolson 1998, MNRAS 297)

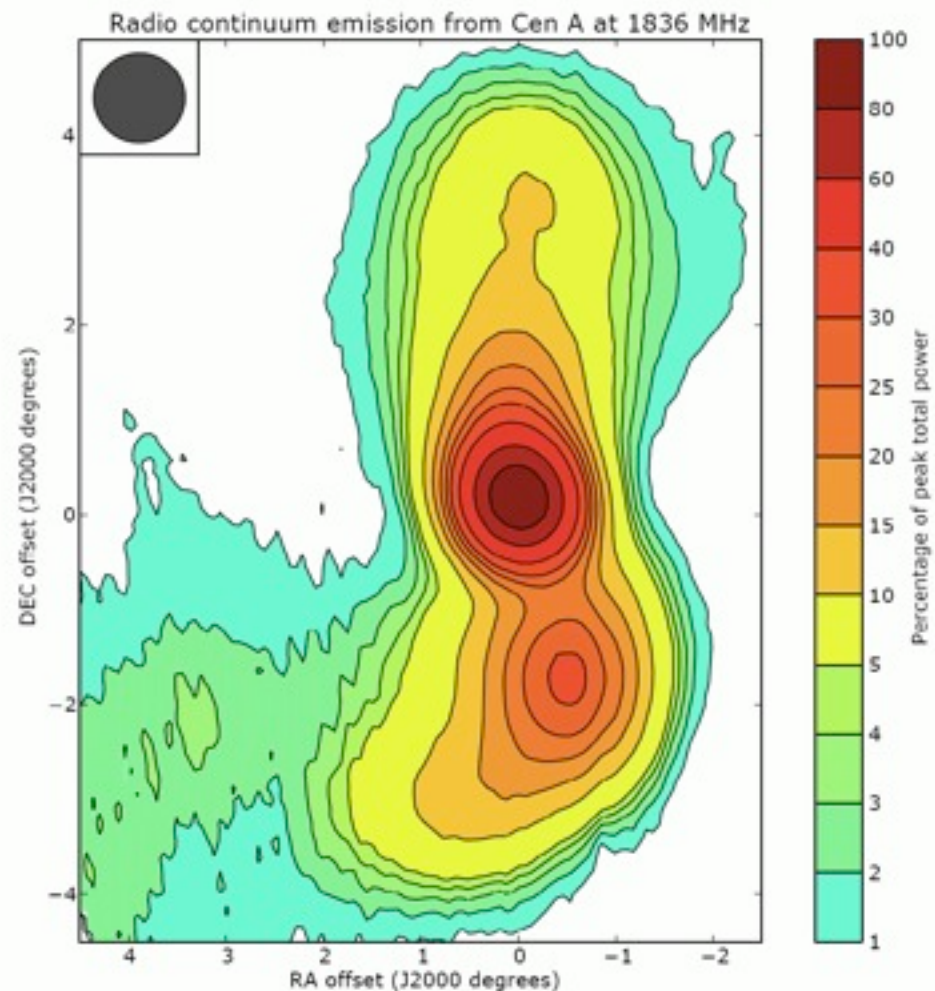
17 March: Map of Centaurus A



Ant 1



Ant 2



22 - 25 March



Antennas 3 & 4

- Engineering tested
- First pointing model
- First attempt on phase closure

30 March



Visit by the Minister of Science & Technology, Naledi Pandor



30 March



Friday, 7 May 2010

30 March

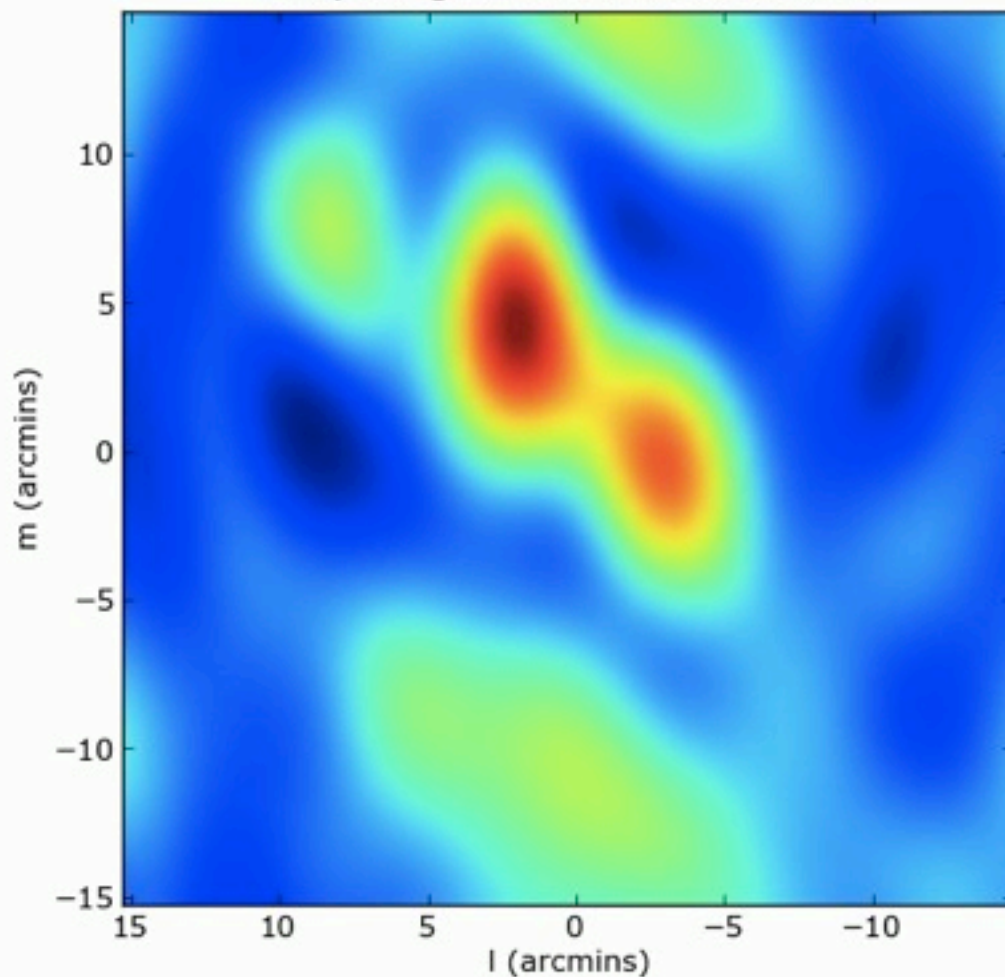


Friday, 7 May 2010

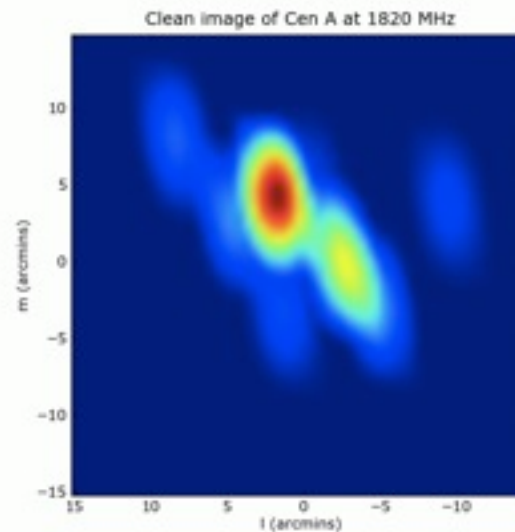
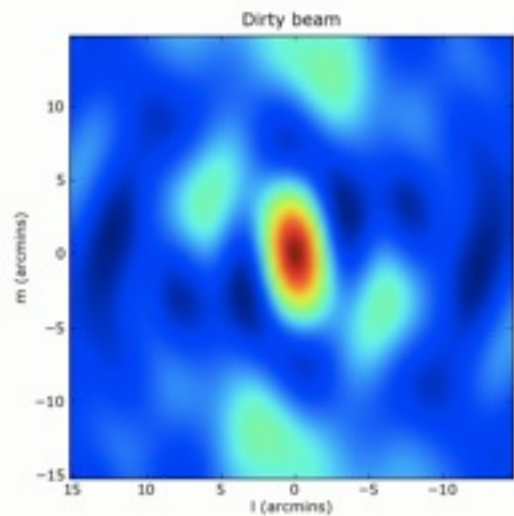
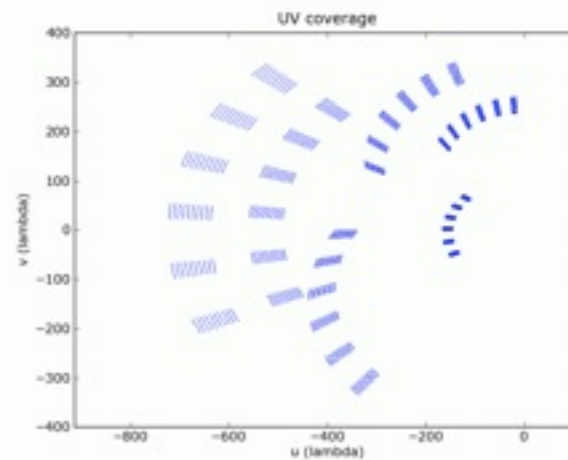
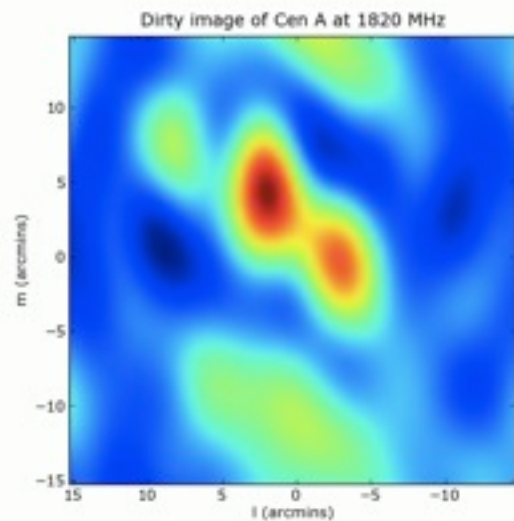
31 March: First Light Kat-4



Dirty image of Cen A at 1820 MHz



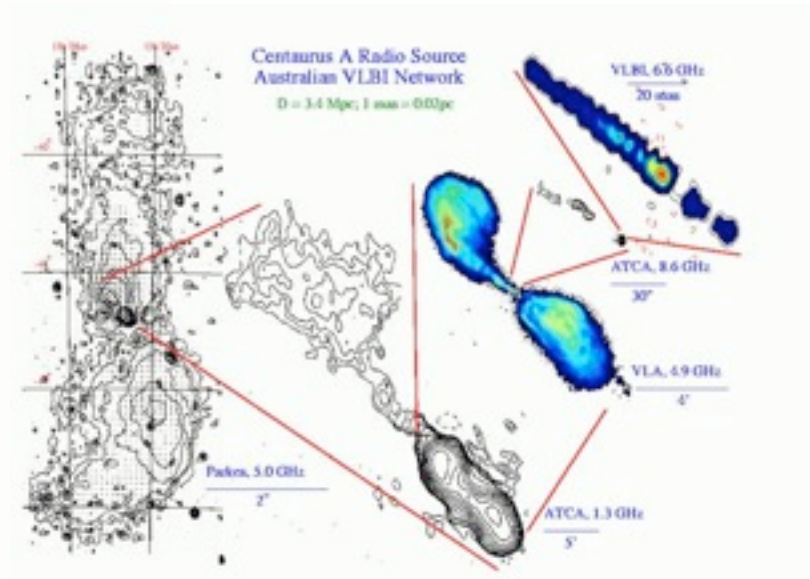
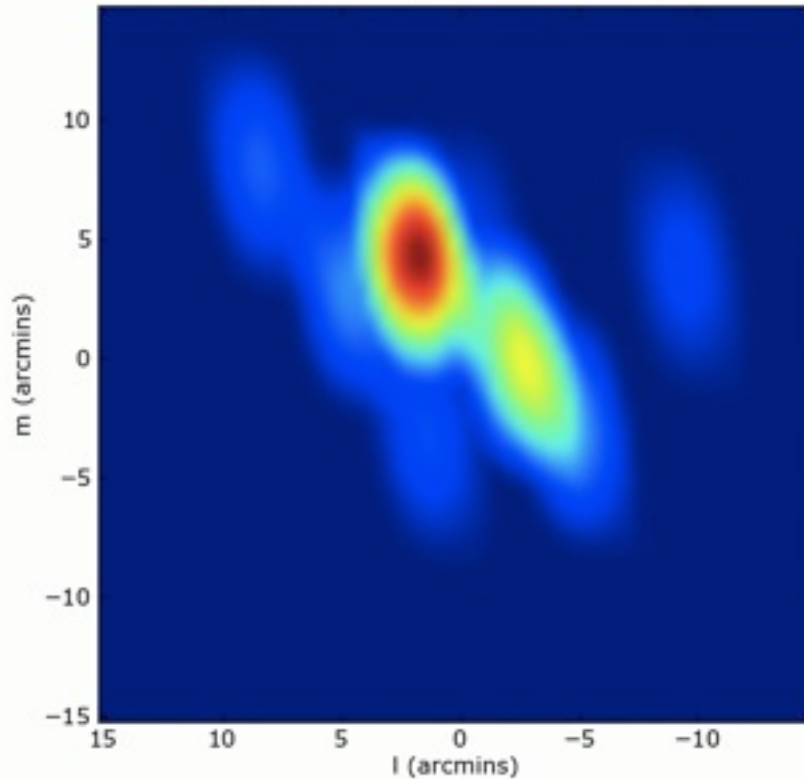
31 March: First Light Kat-4



31 March: First Light Kat-4



Clean image of Cen A at 1820 MHz



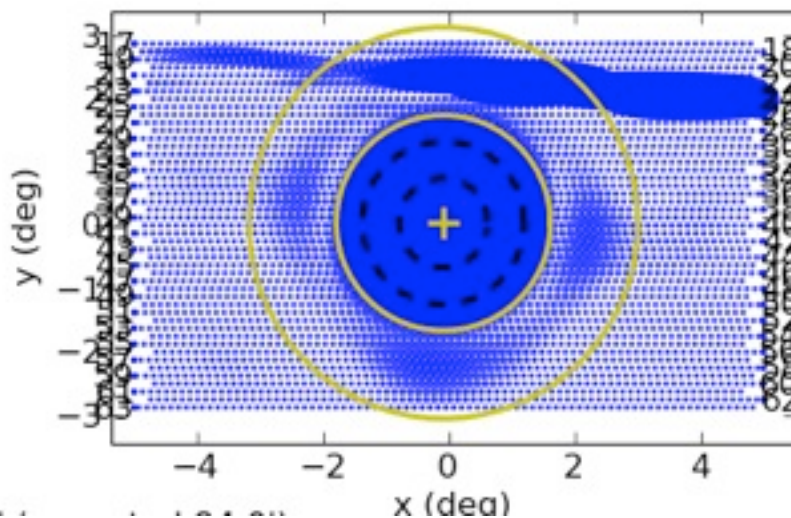
April 2010



- Continue commissioning Ants 1 & 2
 - Tipping curves
 - Pointing model
 - Beam map
 - Gain curve
 - Stability test
 - ...

12 - 15 April: Beam map

GLONASS satellite: COSMOS 2458 (734)



April 2010



- Continue commissioning Ants 1 & 2
 - Tipping curves
 - Pointing model
 - Beam map
 - Gain curve
 - Stability test
 - ...
- Commence commissioning Ants 3 & 4
 - Pointing model



KAT-7 outlook

May/June 2010



- **Antennas 5, 6, 7:**
 - Installing Antenna Control Units
 - Do optical pointings

May/June 2010



- **Antennas 5, 6, 7:**
 - Installing Antenna Control Units
 - Do optical pointings
- **Antennas 1 - 4:**
 - Testing cooling system,
 - Checking RFE chain,
 - Improving gain stability
 - Continue commissioning and iterating on stability issues

May/June 2010



- **Antennas 5, 6, 7:**
 - Installing Antenna Control Units
 - Do optical pointings
- **Antennas 1 - 4:**
 - Testing cooling system,
 - Checking RFE chain,
 - Improving gain stability
 - Continue commissioning and iterating on stability issues
- **Antenna 5: Holography**

June - September 2010



SKA RFI measurement campaign

- July/August
- ~60 hours available in 4-hour blocks

June - September 2010



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Optical Fibre connection

- Start May
- Expected end Aug/Sep

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Power supply

- In progress ...



Friday, 7 May 2010

June - September 2010



SKA RFI measurement campaign

- July/August
- ~60 hours available in 4-hour blocks

Optical Fibre connection

- Start May
- Expected end Aug/Sep

Power supply

- In progress ...
- Needs extensive testing
- Ready in September

August - October 2010



KAT-7 correlator (16-bit)

- Lab testing commence in August
- On-site in October

August - October 2010



KAT-7 correlator (16-bit)

- Lab testing commence in August
- On-site in October

Cold receivers

- September on Ant 5
- Evaluation for ~ 1 month
- Commence commissioning in October

Nov 2010 - Mid 2011



Cold receivers:

- On antennas 6 & 7 before replacing warm, receivers on Antennas 1 - 4: until early 2011

Nov 2010 - Mid 2011



Cold receivers:

- On antennas 6 & 7 before replacing warm, receivers on Antennas 1 - 4: until early 2011

Commissioning:

- Single dish with cold receivers
- Interferometry with KAT-7 correlator

Nov 2010 - Mid 2011



Cold receivers:

- On antennas 6 & 7 before replacing warm, receivers on Antennas 1 - 4: until early 2011

Commissioning:

- Single dish with cold receivers
- Interferometry with KAT-7 correlator

Correlator modes:

- Limited sub-arraying (same frequency band)
- Spectral line: end of this year
- Phased array: early 2011



Friday, 7 May 2010