

A report on KAT-7 and MeerKAT status and plans

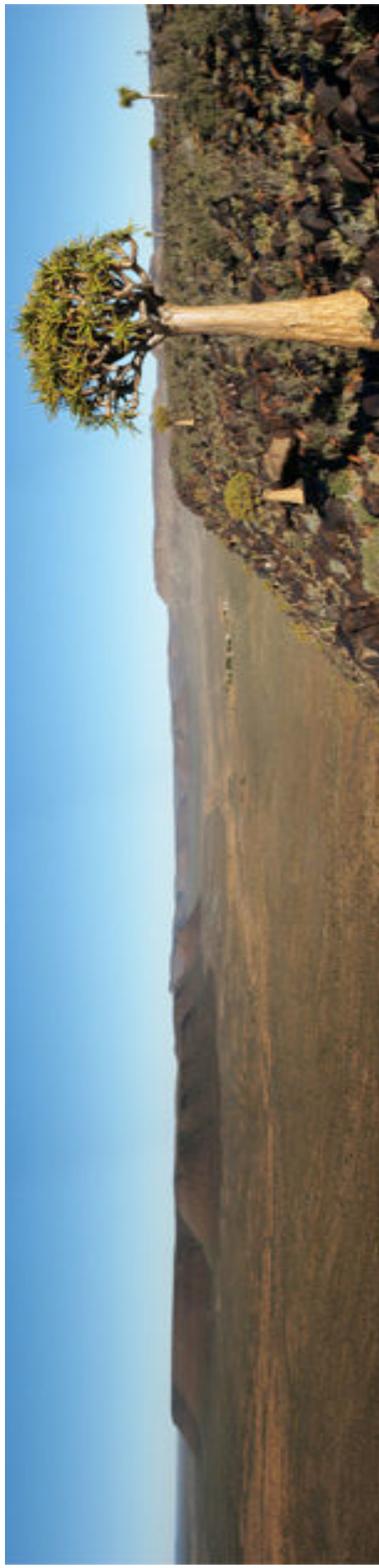
Tony Foley

tony@hartrao.ac.za



science and technology

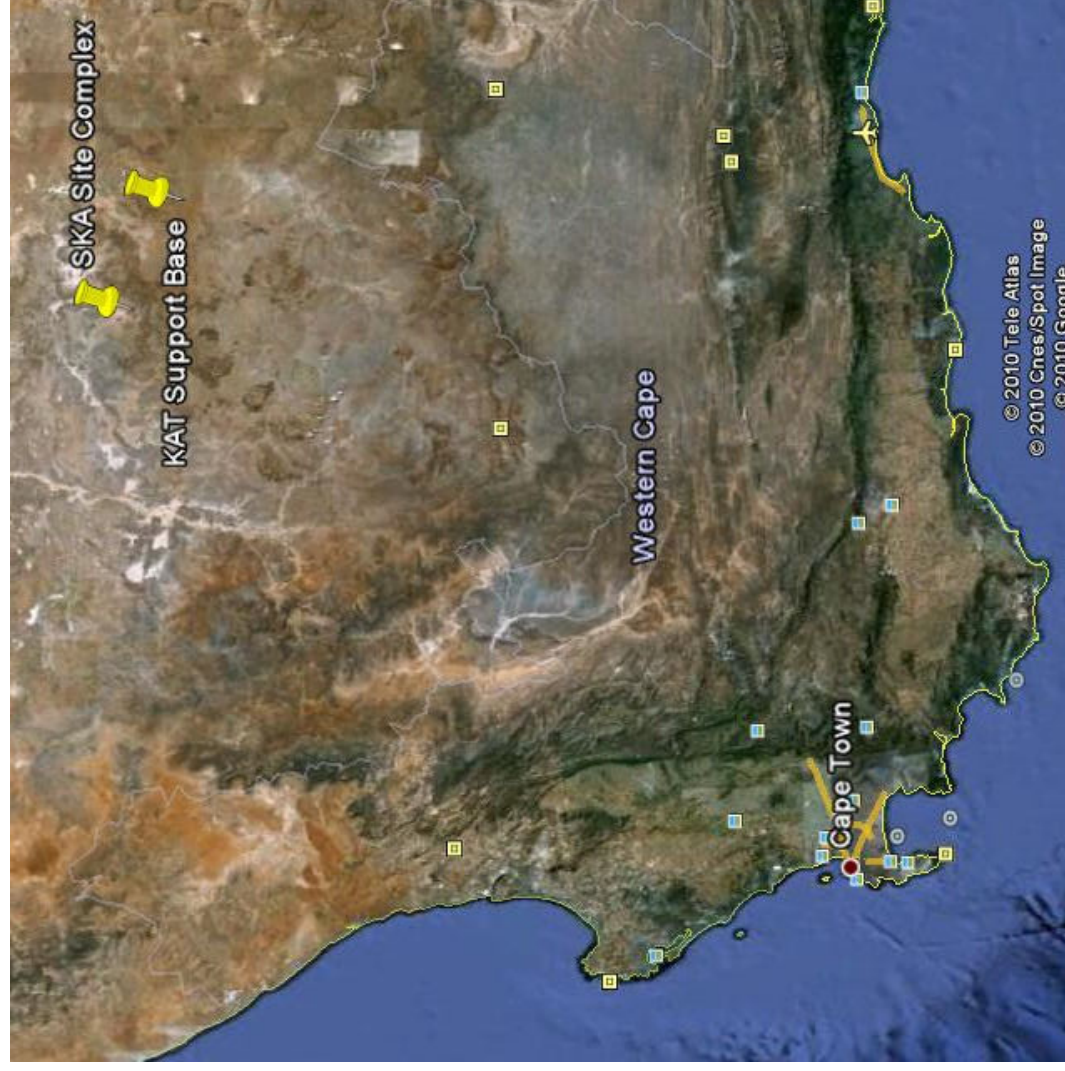
Department
Science and Technology
REPUBLIC OF SOUTH AFRICA



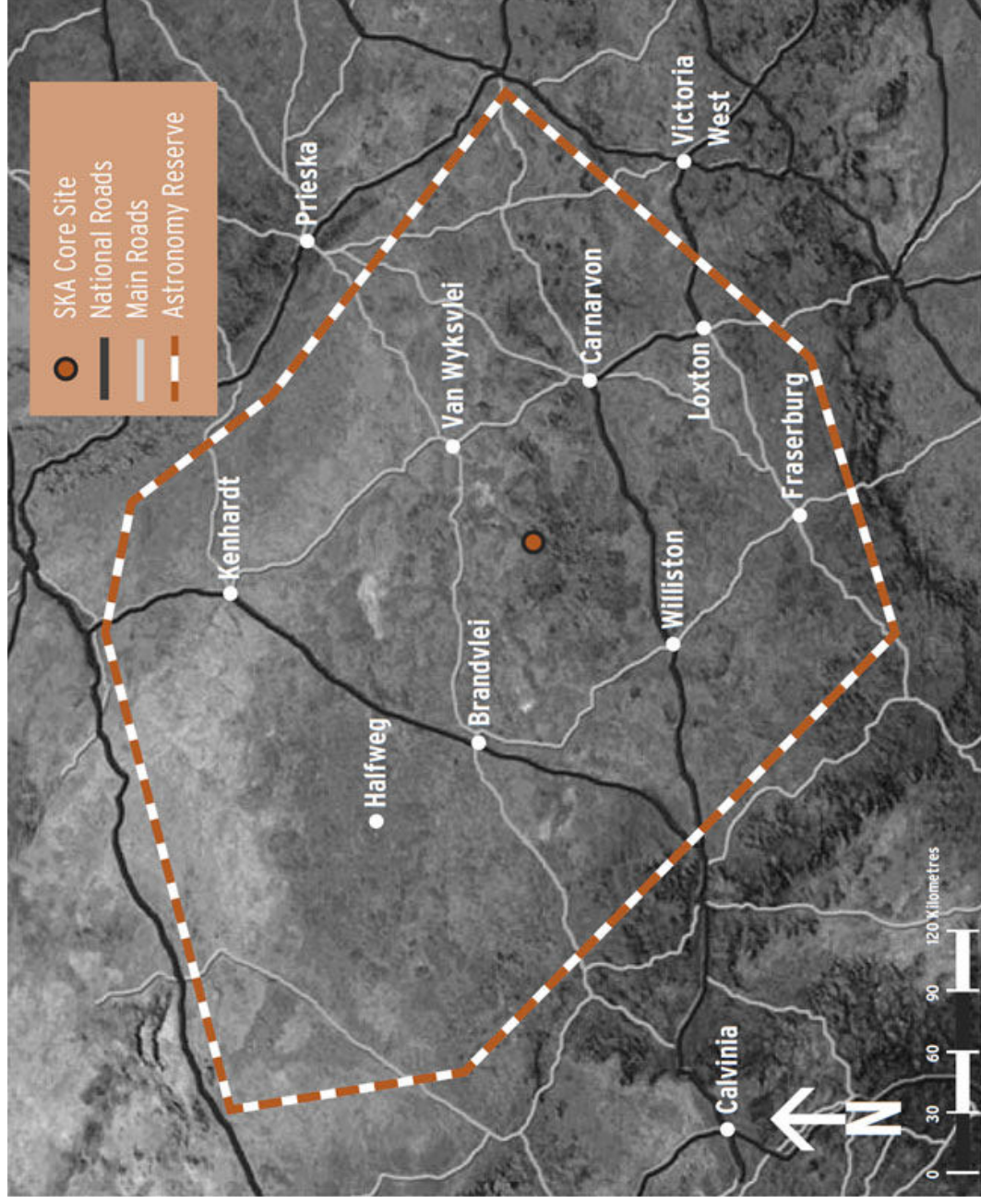
The Team (Who)



Site (Where)



Reserve 21.44E 30.71S



KAT-7 site

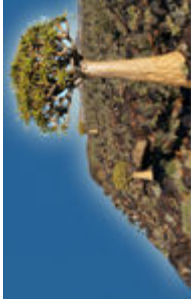


Losberg



KAT-7 (what)

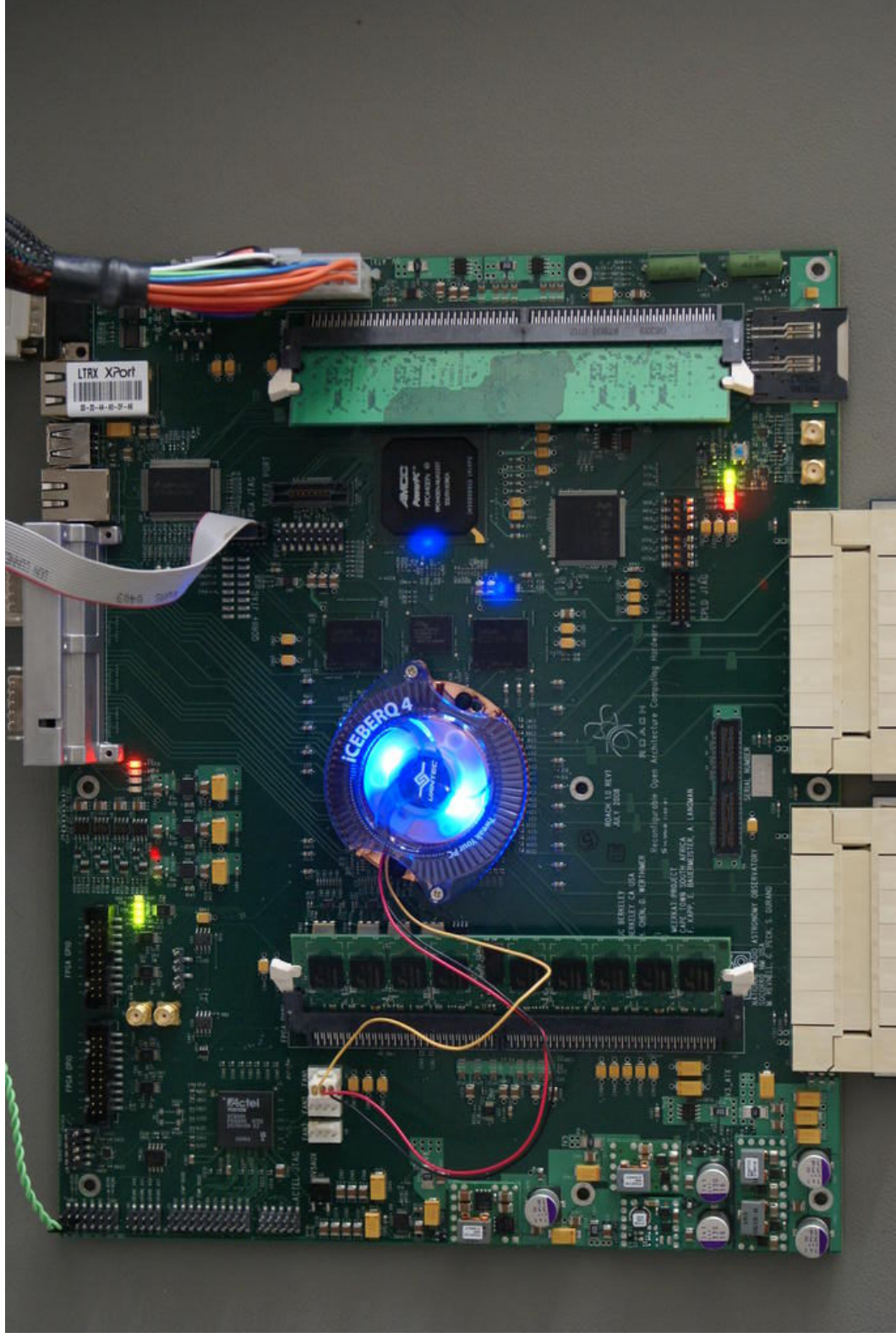
- 7 composite 12m dishes
- Altaz mount prime focus
- 4 operational with uncooled receivers
- Cryogenic receivers from October
- Lband (1200-1950MHz)
- 256MHz instantaneous IF
- RF over fibre links
- LOFAR containers for digital



KAT-7



A ROACH board



KAT-7 Correlator



- ROACH based (FX type)
- Uses the SPEAD (Streaming Protocol for Exchange of Astronomical Data) for internal data streaming
- 'KAT-7' – 16 inputs late 2010/early 2011
- Will have fringe and delay stopping
- Continuum mode and line modes (will support 8192 channels)
- Tied array option for Pulsars, VLBI etc.
- Will be used for more commissioning & some science

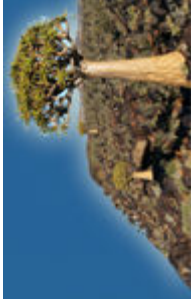
Status

- **Mains power next week (currently diesel)**
- **Cryogenic receivers arrive when mains power is stable**
- **VSAT link site-Cape Town now**
- **10Mbps link October**
- **10Gbps 'soon'**



Also nearby

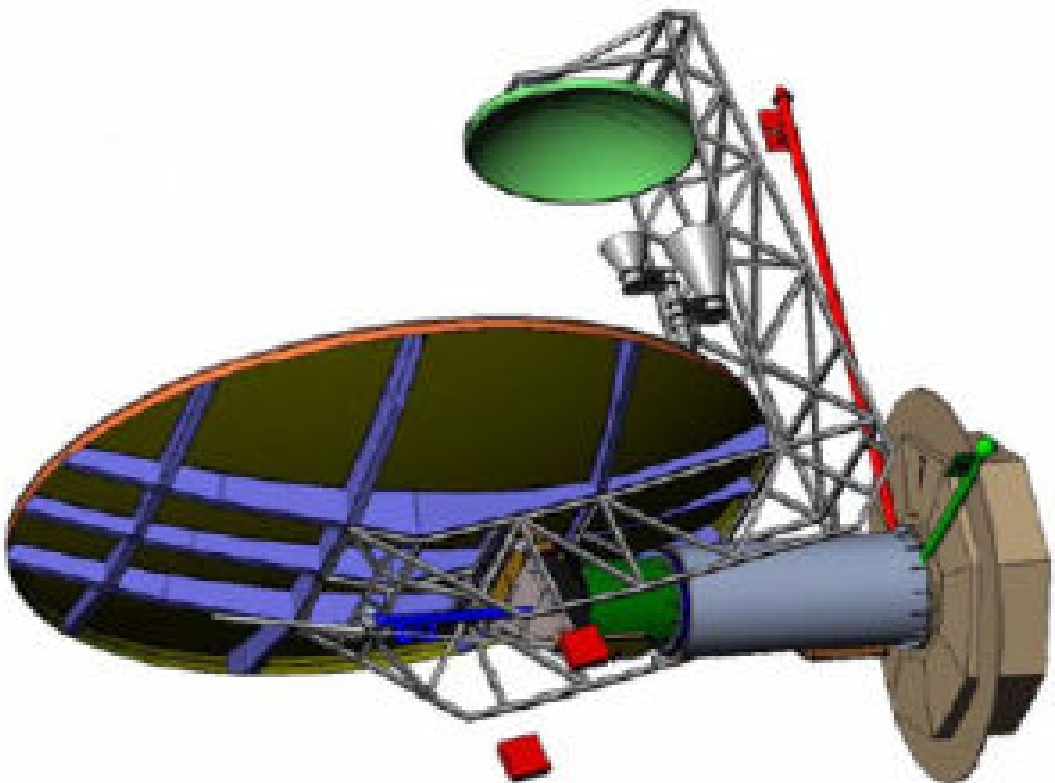
- PAPER experiment
- C-bass dish



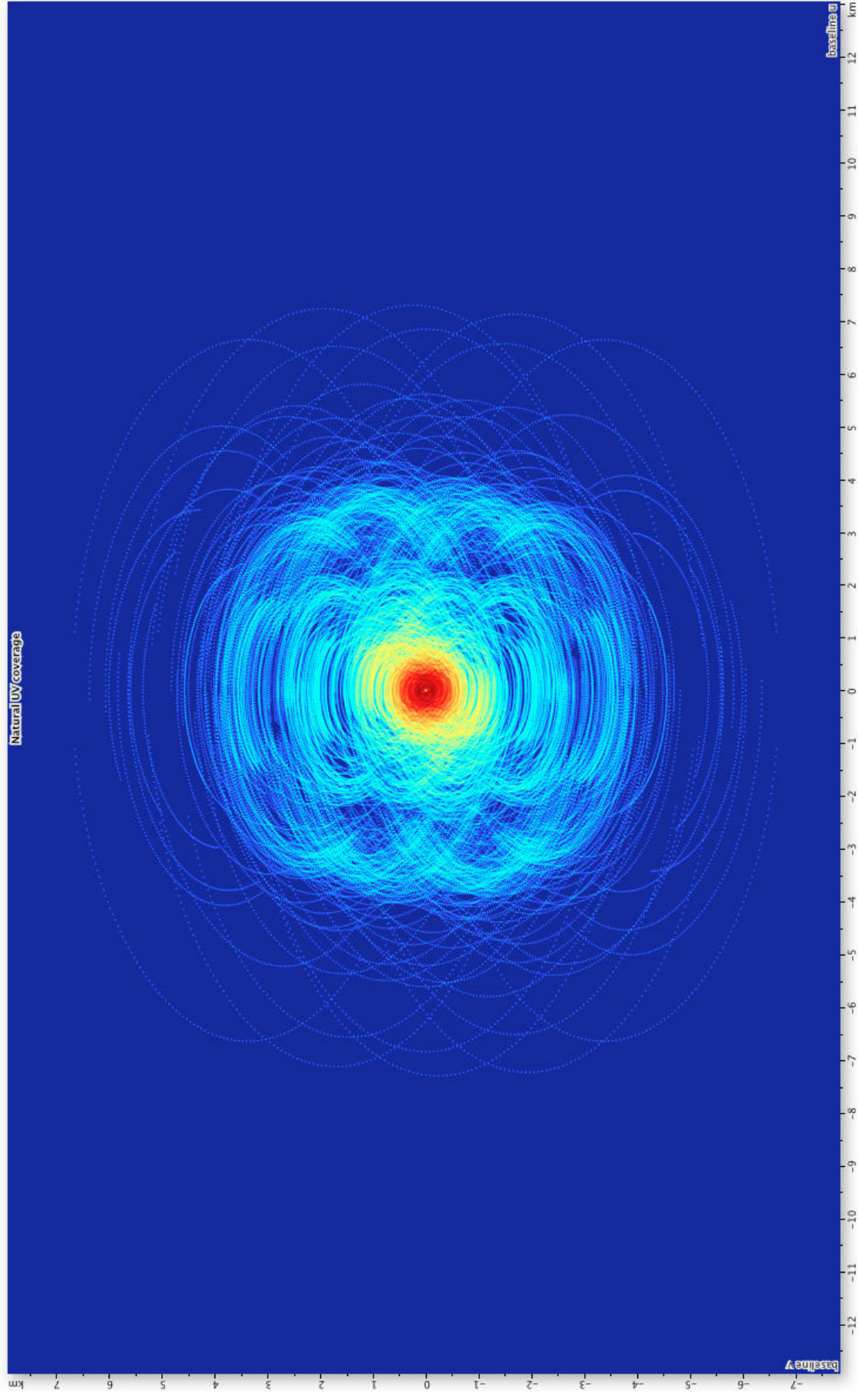
MeerKAT

- Original plan was 80x12m dishes
- Now 64 composite 13.5x12m dishes
- Altaz mount offset Gregorian
- .5-2GHz and 8-14GHz
- The model is only a straw man version
- Correlator will be a mixture of ROACH2 and GPU hardware
- Maybe FFX architecture
- $1 \rightarrow 2 \rightarrow 4$ GHz instantaneous bandwidths





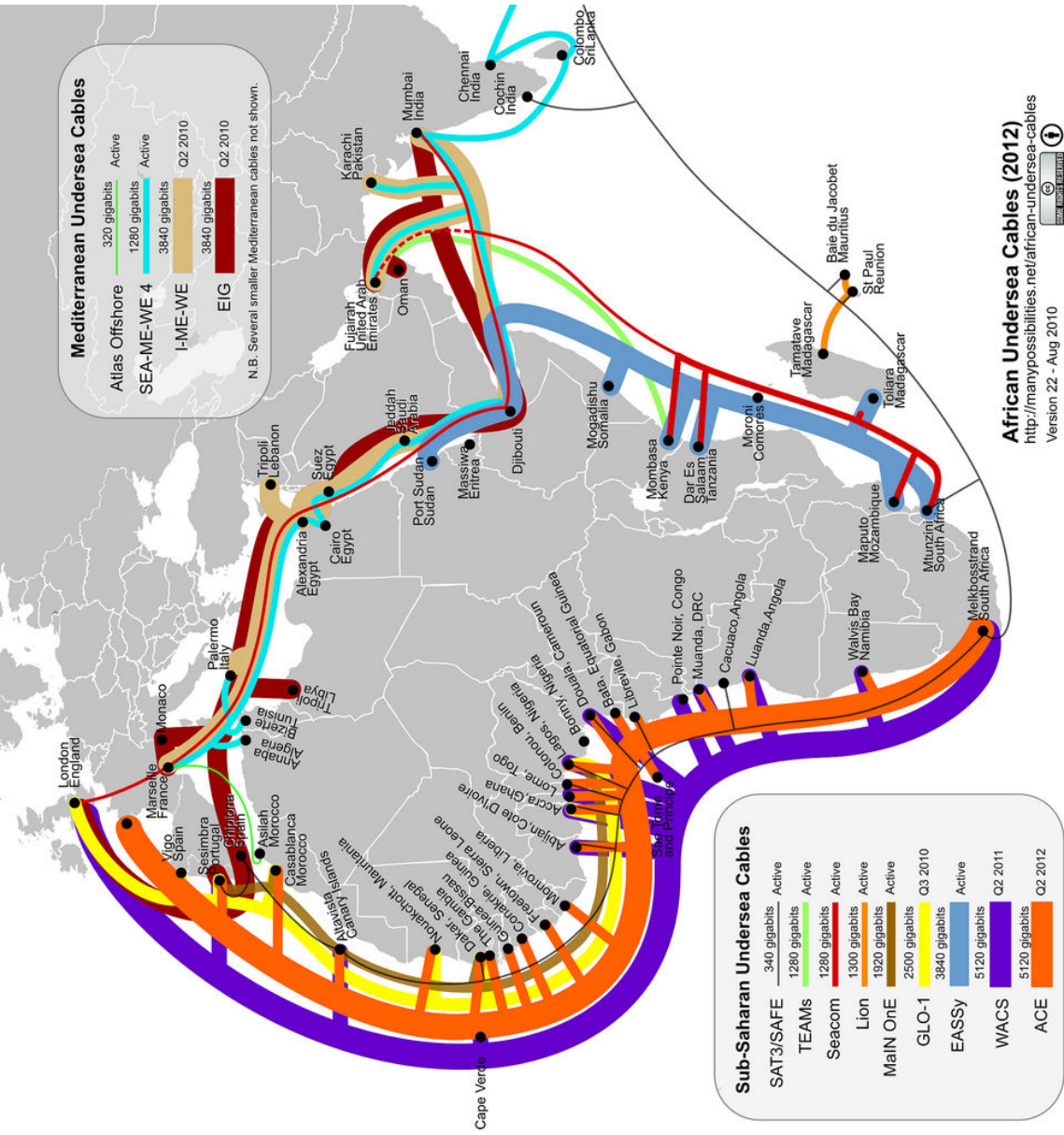
MeerKAT uv coverage



MeerKAT VLBI



- New dish type will delay the project (phase 1 2015..)
- 15° elevation limit prevents VLBI with VLBA
- Spur out to 60km will come last
- There is space for a C band feed (agitate now!)
- The main plan is for eVLBI



VLBI plans

- Both the KAT-7 and MeerKAT will do tied-array VLBI, so testing will be on KAT-7
- Initial tests will be with Hartebeesthoek and the Australians
- 18cm 64MHz bandwidth dual pol, FTP-VLBI
- Single dish early 2011
- Tied array late 2011/early 2012



Current VLBI limitations



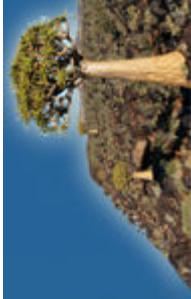
- Only Rb clock at present (will get H Maser for MeerKAT)
- No recorder yet!
- Fiber to Cape Town late 2010
- Need SPEAD → VDIF converter
- Need VEX → local schedule converter
- Only Lband receivers on KAT-7
- Linear polarization
- Tied array operational in 2011
- KAT-7 Total collecting area equivalent to a 30m dish
- Cooled receivers on all dishes early 2011

But...

- Rb should be adequate for Lband
- **Mark5C is a modified ROACH with disk array**
- It can be done manually on site if we have a simple schedule
- **Australians can convert simple raw data formats**
- **Single dish Lband uncooled receiver is simple and robust**



Watch this space



- South Africa is recruiting an astronomer base!
- UCT pwoudt@ast.uct.ac.za
- UWC <http://www.uwcastro.org/jobs.shtml>