MeerKAT will be a 64-receptor aperture-synthesis interferometric radio telescope array. MeerKAT will be the most sensitive L-band radio telescope in the world. It should be completed in 2017. MeerKAT is located in the sparsely populated semi-arid Karoo region of the Northern Cape Province, South Africa.

Receivers antennas are offset Gregorians with a 13.5m main reflector in a feed-low configuration providing an unblocked aperture with optimal optical performance. Multiple receiver systems can be installed and are accessible without a cherry-picker.

First light achieved in 2014, confirmed L-band MeerKAT receiver sensitivity exceeds specification. Locally developed UHF band feeds under construction, S-band receivers to be funded and produced by German Max-Planck-Institute for Radio Astronomy

Connections along directed lines from Karoo Array Telescope Control Protocol (KATCP) clients to servers. Clients observe and/or control servers.

Lead Operator sets up subarrays by allocating resources. Control Authorities manage observations on subarrays.

katpool manages resource allocations (to subarrays) and assignments (to SBs). When an SB (script) completes its assigned resources become available to other SBs again.

katmonitors subscribe to all KATCP sensors (monitoring points). They buffer sensor samples for CAM Sensor Store and calculate aggregate sensor rules.

kataware subscribes to katmonitor aggregates and applies rules for raising alarms. katsyscontroller applies alarm actions. katportal informs users of alarms.

MeerKAT Control and Monitoring System Architecture (MOP067)

Author: Neilen Marais (nmarais@ska.ac.za)

Receivers and digital control enable central KAPB, a first for radio telescopes; received by Correlator Beam Former (CBF).

KAPB partially populated, more MeerKAT coming, ready for SKA phase 1. Double-door RF-“airlock” in inset.

Receiver Test System (RTS) CBF using ROACH2 (Virtex-6 FPGA) boards. MeerKAT will upgrade to SKARAB (Virtex-7 FPGA) boards. SKARAB board shown in inset.

CBF performs first level of computation and data reduction (averaging), output sent to Science Processing (SP) subsystem for archival and imaging.

MeerKAT Control and Monitoring (CAM) Architecture

First dish enroute from assembly shed at MeerKAT site compound to its pad.

First light achieved in 2014, confirmed L-band MeerKAT receiver sensitivity exceeds specification. Locally developed UHF band feeds under construction, S-band receivers to be funded and produced by German Max-Planck-Institute for Radio Astronomy

8 receptors on site by end October, rolling deployment continues till early 2017.

Site collaboratively hosts other radio telescopes like the Precision Array for Probing the Epoch of Reionization (PAPER).

Radio Frequency Interference (RFI) is a radio telescope’s natural enemy, so MeerKAT avoids people.

The MeerKAT site compound. Earthworks, power and other civil infrastructure completed in 2014, including fibre to all receptor pads and the underground RF-shielded data centre (KAPB)

8 receptors on site by end October, rolling deployment continues till early 2017.

Receptor arrays digital volume control to central KAPB, a first for radio telescopes; received by Correlator Beam Former (CBF).

MeerKAT will be completed in 2017. MeerKAT is located in the sparsely populated semi-arid Karoo region of the Northern Cape Province, South Africa.