



Meerkat construction imminent

By Leon Engelbrecht

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Government wants to begin construction of Meerkat, a successor to the Karoo Array Telescope (KAT), near Carnarvon, in the Northern Cape, by October next year, says project leader Bernie Fanaroff.

By then, the selected site must be purchased, fenced, serviced with an access road and electricity “and obviously, a very big fibre optical pipe,” Fanaroff says. “We are talking to Infracore at the moment, but these things are a long way from being finalised,” he cautions.

Meerkat, perhaps a pun on the Afrikaans word for “more”, is more ambitious than KAT, which would have seen the erection of 20 15m radio telescope dishes in a dusty part of the Karoo. “Once the minister [of science and technology] gave us further funding, we were able to look at something bigger than that. We are now going through the design and development phase,” Fanaroff says.

This includes consulting international and local astronomers to determine a user requirement and employing an engineering team in Cape Town to determine the engineering specifications.

Farsighted ambitions

“Meerkat is interesting in a number of respects,” says Fanaroff. “It is essentially a software telescope. Unlike a traditional radio telescope, this has a wireless feed in front and converts captured data from analogue to digital almost immediately.”

Meerkat is a precursor to the even more ambitious Square Kilometre Array (SKA) telescope. SA is in competition with Australia to host the R10 billion device and a decision is expected in about three years' time. This array could have as many as 4 500 dishes.

Meerkat will commission in 2012 regardless of the outcome of the SKA competition, Fanaroff adds.

A prototype dish was installed last month by IST at the Hartebeesthoek Radio Astronomy Observatory (HartRAO), located to the north-west of Johannesburg. Just a concept a year ago, the 15m dish is the largest constructed on site from composite materials.

Willem Esterhuyse, SKA/Meerkat subsystem manager of antenna structures, says the dish “shows great potential and promises to be significantly better than originally specified”. He says the antenna structure will be fully installed by August.

Fanaroff says he wants as much prototyping done at HartRAO as possible to reduce risk. Carnarvon is too remote a site to tackle with immature technology, he notes.

High expectations

Fanaroff expects Meerkat and the SKA to generate extremely large dataflow – 70 to 100 terabytes a second in the case of the SKA. This means the project will require a high-performance computer centre in the Karoo to cut the cost of data transport to Cape Town, where the Meerkat project is based.

Fanaroff says early pay-offs from the project include recognition in the field of digital signals processing. “We really leapfrogged to the front of international developments.”

He adds that his scientists are working as equal partners with the acknowledged leader in the field, the University of California, at Berkeley, which is developing new digital signal processing boards. These, Fanaroff says, are “the same as a motherboard, but a bit more complicated”.

SA only entered the field 18 months ago. “The fact that they regard us as equal partners is recognition of the skill of the guys in Cape Town.”

Future benefit

This role means SA will be a vital player in design and development of the SKA, whether it be based here or in Australia.

This is key to government's science and technology strategy that sees high-performance computing, digital signal processing and radio frequency engineering as next-generation technologies in very short supply around the world.

“We want to create a substantial and critical mass of expertise in all these technologies,” Fanaroff says. To this end, he is funding 50 students' masters and doctors degrees in astronomy and engineering. More are being sought for next year.

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