

SA steps up SKA bid

By Leon Engelbrecht

Posted: 21 April 2008

SA is gathering together African science and engineering experts tomorrow and Wednesday, to coordinate their participation on the one billion euro (about R12 billion) Square Kilometre Array (SKA) radio telescope.

The meeting follows in the wake of a conference held in Australia earlier this month to flesh out the project that SA SKA project leader Dr Bernie Fanaroff calls "the world's biggest ICT project". SA is competing with its sporting rival to host the mega-project.

Fanaroff says that, while the bulk of the 3 000 dishes that make up the telescope will be at a site near Carnarvon, in the Northern Cape, outstations could stretch as much as 3 000km away and be located in Botswana, Ghana, Tanzania, Kenya, Madagascar, Mauritius, Mozambique and Namibia.

SA has already created the Broadband Infracore company to provide the SKA's data backbone and passed the Astronomy Geographic Advantage Act to protect the Carnarvon site from radio-frequency (RF) interference. It now wants partner countries to take measures to safeguard likely remote sites and prepare the necessary infrastructure.

"The SKA itself is a software telescope," says Fanaroff. "What you have at the front end is normal radio telescope dishes, but behind them is what amounts to a giant computer that correlates the signal from each dish."

Since the dishes will collect information in the terabytes range and the correlated data runs into teraflops, the network will rely on fibre-optic cable to carry the bytes to a high-performance computing centre in Cape Town for "number-crunching". The images created that are then transmitted to partners worldwide run into the "hundreds of gigabytes".

Fanaroff says "a lot of the technologies" required to make the SKA work "don't exist yet". He continues that they are in the process of being invented with one of the criteria being that the innovation must be affordable.

"This includes very high-speed data transport and computing – with algorithms to speed it up and to make images – as well as control software."

The project also heavily relies on RF engineering. "Wireless is the technology of the future," Fanaroff says. "But it went through a period that it wasn't fashionable. So there is a shortage of RF engineers."

One of the new technologies they are inventing for the SKA is wideband single-pixel cooled feeds to fit to the dishes to collect the reflected signals collected from space. Because these deep space signals are so weak, the feeds are cryogenically cooled, which Fanaroff says is "stretching the boundaries of RF engineering".

One success already chalked up is the local development of a low-cost very large composite dish antenna. These were previously assembled from steel.

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