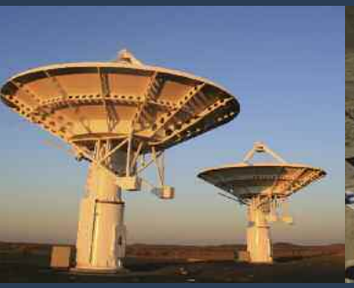
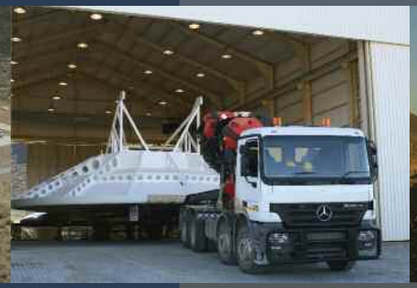




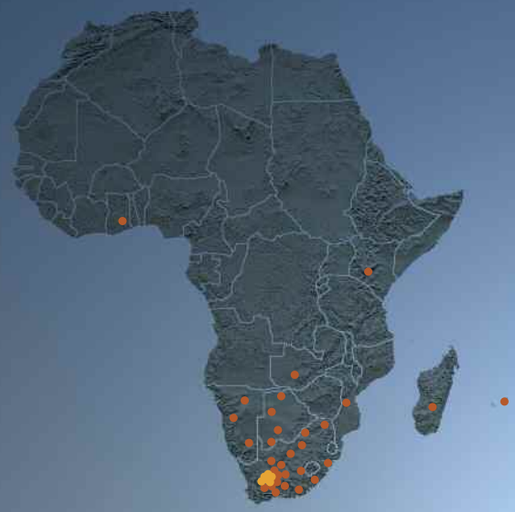


South Africa is shortlisted to host a major scientific facility - the Square Kilometre Array (SKA). The SKA is a next-generation radio telescope that will be powerful enough to explore the edges of the universe. Scientists expect that it will deliver a wide range of discoveries in physics and cosmology, as well as result in major technological spin-offs.

We are proposing to build the core of this mega instrument in a radio-quiet area in the arid Karoo region of South Africa's Northern Cape Province. Further clusters of antennas will extend into Namibia, Botswana, Mozambique, Madagascar, Mauritius, Zambia, Kenya and Ghana. All these antennas – about 3 000 in total – will be connected by fibre optic cable to function jointly as one super-sensitive survey instrument.

The African Union Heads of State recognises the importance of this project for the development of knowledge-based economies and expertise, and fully supports the continent's SKA aspirations.

SPREAD OF SKA CORE AND STATIONS ACROSS AFRICA



Because of its unique challenges and exciting potential to push the frontiers of science and technology, South Africa's SKA project attracts the brightest and most innovative young minds from South Africa and the rest of the world. The young people working on this project are developing critically important skills that will be much in demand in a technology-dominated future for Africa. The project is also a catalyst for the creation of new linkages between African researchers and the global scientific community.

SOUTH AFRICA'S COMPETITIVE ADVANTAGES FOR THE SKA

Good existing infrastructure

Having already built roads, workshops, a construction shed and accommodation on site in the Karoo, substantial infrastructure is already in place, or nearby. Our site is connected to the national electricity grid, optical fibre backbone and road network. Links with multiple undersea cables offer excellent connectivity to the rest of the world. Our construction, engineering and maintenance industries are world-class.

Best value for money

The SKA in South Africa will be more affordable to build, operate and maintain than at other comparable sites. Our cost advantage ensures that the scope of the SKA is more likely to be realised here, with a significantly lower risk of cost and time overruns.

Ideal observing conditions

South Africa's SKA core site is high and very dry – excellent conditions for the high-frequency requirements of the SKA. Our benign climate means that radio observations are not lost due to severe weather or atmospheric turbulence.

Radio-quiet environment

Recent measurements of radio frequency interference, performed with the international SKA consortium, confirmed that South Africa's proposed site is one of the quietest radio frequency environments in the world – and therefore ideal for radio astronomy. Our site is also protected by the world's most progressive and forward-looking legislation – South Africa's Astronomy Geographic Advantage Act.

Cutting-edge MeerKAT Telescope

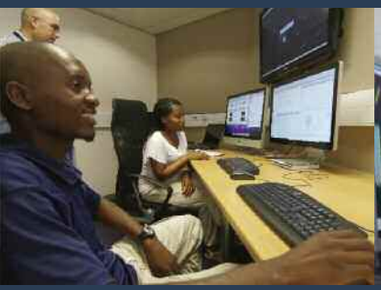
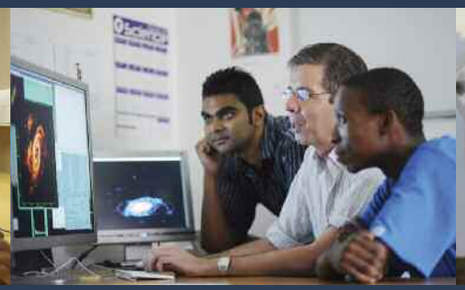
We are already building a next-generation radio telescope in South Africa's Northern Cape Province as an SKA precursor – the MeerKAT. With its 64 dishes, each with a 13.5 m diameter, MeerKAT will be the largest and most sensitive radio telescope array in the southern hemisphere, capable of delivering frontier science. The first five years of MeerKAT's observing time have already been allocated to ten high-priority large survey projects, led by top scientists from South Africa and around the world.

Our MeerKAT team, working with South African industry, is delivering innovative technologies and systems such as world-first composite dishes and cutting-edge signal processing hardware and algorithms. Our expertise enables South Africa to play a key role in developing designs and technologies for the SKA.

Extensive international collaborations

South Africa's excellent site, ideal observing conditions, available infrastructure and technical capabilities are attracting leading international partners. New telescopes at the South African SKA site in the Karoo include:

- The C-BASS telescope, which will map the polarised foreground emission to allow more detailed analysis of the Planck satellite data. C-BASS is a collaborative effort between South Africa and the Universities of Oxford and Manchester, as well as CalTech.
- The PAPER telescope, which uses newly-developed signal processing technology to look for signatures of the very first stars and galaxies. South Africa collaborates with the Universities of California at Berkeley, Pennsylvania and the National Radio Astronomy Observatory of the USA on the PAPER project.


Significant capacity and expanding expertise

Since 2005, SKA South Africa has awarded 293 grants for research chairs, post-doctoral fellowships and bursaries at all levels of tertiary study in physics, astronomy and engineering, as well as for the training of technicians and artisans. Of these, 49 grants went to students from other African countries who are studying in South Africa.

SKA South Africa supports several technology research groups at South African universities and has helped to strengthen existing, and create new, university astronomy departments. Beyond our borders, new astronomy courses have been established in Kenya, Madagascar and Mozambique, while tertiary astronomy education in Mauritius has been significantly strengthened.

Growing interest and expertise in other African countries has led to the discussion of the establishment of the African Telescope Array, to be constructed from recycled, redundant satellite communication dishes. Work has already started in two countries.

A proud track record

The South African Astronomical Observatory (SAAO) has been a leading force in optical astronomy for almost 200 years. The SAAO operates several telescopes, including the Southern African Large Telescope (SALT), the largest single-dish optical telescope in the southern hemisphere. South Africa's Hartebeesthoek Radio Astronomy Observatory (HartRAO) has operated since the early 1970s and plays a key role in global science networks.

South Africa's SKA Project is an initiative of the country's Department of Science and Technology.

The KAT-7 telescope, an engineering prototype of South Africa's MeerKAT telescope, on site in the Karoo

SKA AFRICA
SQUARE KILOMETRE ARRAY

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NRF National Research Foundation

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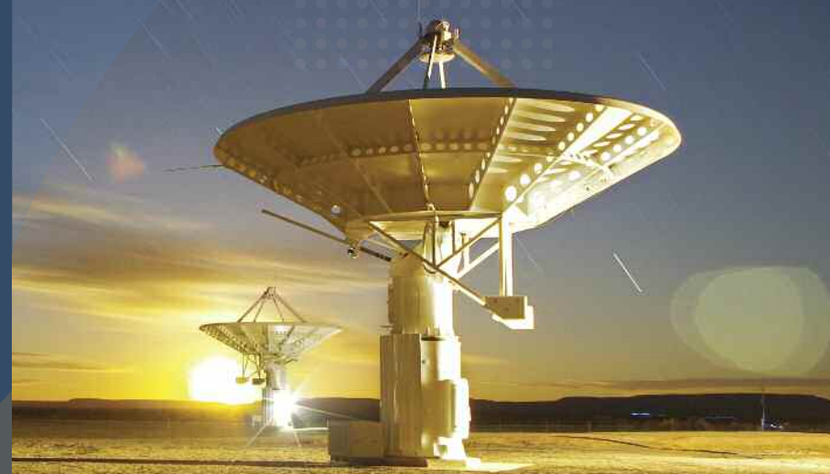
April 2011

SKA AFRICA
SQUARE KILOMETRE ARRAY



SOUTH AFRICA
THE COMPLETE
ASTRONOMY SOLUTION