the 90-kilometre drive
starts in the sheep-ranch-
ing town of Carnarvon in
western South Africa, and
runs northwest through
the semi-desert plains of
the Karoo, where the only
sign of human settlement is an occasional
sheep farm. But as the road begins to pass
north of the flat hills of the Losberg moun-
tains, it suddenly comes upon seven huge
white radio dishes.

This is the Karoo Array Telescope (KAT-7),
a government-funded facility sheltered by dis-
tance and the Losberg from human-generated
radio interference. Commissioned just this
year, KAT-7 is both an operational radio tele-
scope and a prototype for the much more ambi-
tious MeerKAT project, a 64-antenna array that
will be the largest radio-astronomy facility in
the Southern Hemisphere when it is completed
at this site in 2018. But KAT-7 also symbolizes
an even bigger ambition: South Africa hopes
that by 2024, this remote expanse will be the
centre of a radio facility spanning the continent.

The Square Kilometre Array (SKA) — named
after the total collecting area of its 3,000 or so
antennas — was by far the largest radio
telescope ever built (see ‘The biggest array’), and
would need international funding to cover its
estimated US$2.1-billion cost. It would allow
astronomers to see how primordial gas formed
the first stars and galaxies; how mysterious ‘dark
energy’ has shaped galactic clusters; and how
Earth-like planets form around young stars. It
might even allow researchers to eavesdrop on
the faint radio emissions of extraterrestrial life.

Or maybe not: South Africa’s quest faces
long odds. The most immediate hurdle is a
fierce competition with Australia to host the
facility. The two nations submitted their sealed
bids in September to the international SKA
Program Development Office at the University
of Manchester, UK, and a decision is expected
by March 2012.

SOUTH AFRICA IS VYING FIERCELY WITH AUSTRALIA
TO HOST A GIANT RADIO TELESCOPE THAT MAY
NEVER BE BUILT — BUT THE COMPETITION ITSELF
IS CHANGING THE COUNTRY’S SCIENCE LANDSCAPE.

“ It is not clear that the technology for the
required correlators is in hand, or even over the
horizon,” says Adam Burrows, chair of the US
National Research Council’s physics and astron-
omy board. “It just may require another decade
to establish a credible financial and technologi-
plan for such a massive undertaking.”

But the SKA’s proponents in South Africa are
undeterred. The act of competing has given the
country’s astronomy programme a major boost
and, they argue, could do the same for science
and technology across the board. “By giving the
country a major opportunity to raise its level,
and to inspire and train a new generation, the
SKA could represent a new dawn for science in
Africa,” says Roy Maartens, a cosmologist at the
University of the Western Cape in Cape Town.

The prospect of an astronomy renaissance
was a big draw for Bernard Fanaroff, the direc-
tor of South Africa’s SKA effort. A radio astron-
omer by training, Fanaroff left academia in the
1970s to pursue racial and economic justice in
South Africa — first with the country’s nascent
trade-union movement, and then as a senior
civil servant in the reconstruction and devel-
oment programme of the first post-apartheid
government. After leaving government in
the early 2000s, Fanaroff seized on the SKA’s potential for inspiration as yet another way to pursue change.

International planning had been under way for a decade by that point. But the country still had a fighting chance. All of the site-selection criteria, starting with the need for a good view of the centre of our Galaxy, favoured the Southern Hemisphere.

Fanaroff soon found an ally in Rob Adam, then director-general of the South Africa Department of Science and Technology. Adam wanted to address the chronic lack of maths and science skills in the black majority of the country’s population — a legacy of both apartheid and a stagnant education system. And he believed that high-profile science projects such as the SKA were the best way to excite young people and draw them into research.

**BIDDING WAR**

With Adam’s backing, Fanaroff prepared a bid for the SKA and submitted it in 2004. Bids also came in from Australia, China and Argentina. But only when the field was narrowed to South Africa and Australia in 2006 did the race really begin. Ever since, the two countries have chased the SKA with as much fervour as they strive against each other in cricket and rugby.

In 2007, for example, Australia vowed to build the Australian SKA Pathfinder (ASKAP) at its proposed site near Murchison, in the arid west of the country. The 36-dish facility would demonstrate antenna designs and other technologies, and together with associated infrastructure and human-capacity development would cost an estimated US$490 million (ref. 3).

In 2008, despite the global recession, South Africa countered with a commitment to its own pathfinder, MeerKAT. (The name refers to Meer, Afrikaans for ‘more’, as well as to a famously photogenic mammal found in the Karoo.)

The $275-million estimated cost of the South African scheme represents the country’s largest-ever investment in a pure-science project — and a source of major irritation for researchers in more tightly funded disciplines. But officials say that the project is good for economic development: not only were MeerKAT’s antennas designed by Land Systems Dynamics, a subsidiary of British Aerospace Engineering based in Pretoria, but they will be manufactured and assembled mainly in South Africa.

The ruling government, which was elected in 2009, is determined to protect the bid. This year, when oil company Shell applied to drill for natural gas just south of the MeerKAT site, for example, Naledi Pandor, the science and technology minister, made it clear that she would invoke the country’s Astronomy Geographic Advantage Act to block interference with the array, whether it came from radio activity or seismic disturbances.

Pandor has also moved to resolve a major embarrassment: last year’s suspension and subsequent exoneration of Phil Charles, then director of the South African Astronomical Observatory in Cape Town, who had tangled with his bosses in the National Research Foundation for reasons that are still unclear. The incident left many South African astronomers mistrustful of the foundation. In October, Pandor announced that control of the country’s astronomical facilities would eventually be taken from the agency and vested in a new organization.

The South African and Australian bids for the SKA are being evaluated this month by a site advisory committee. The committee’s recommendation will be sent to the directors of the SKA organization before its final decision.

**DOWN TO THE WIRE**

It could be a close call. Radio interference is minimal at both sites, and other observing conditions are equivalent, so the SKA directors will have to look at other criteria, such as antenna design. The technical differences boil down to a trade-off, says Tony Foley, head of science operations at MeerKAT. “The Australians can catch a larger patch of sky” at any one time, he says, “whereas we are operating at higher sensitivity” — meaning that the South African antennas will look farther into the Universe with a shorter observation time.

Another factor will be the strength of the host country’s astronomy community. Australia has a longer and stronger tradition of radio astronomy, but South Africa has poured money into closing the gap. The country’s roster of radio astronomers currently numbers about 65, many of whom have moved from elsewhere during the past decade.

Then there is what some see as the moral imperative. “There is a need for the first world to help the third world build up science,” says George Ellis, a cosmologist at the University of Cape Town. “This is an ideal opportunity.”

How the international SKA organization will weigh these factors is hard to predict. But astronomy isn’t rugby; it could be that both sides will win. In July, recognizing the bleak prospects for international funding and the computational challenges, European astronomers proposed a cheaper alternative: fund modest expansions of both ASKAP and MeerKAT, then combine their signals as if they were a single instrument. The combined array wouldn’t have nearly the same sensitivity to very faint signals as the full-scale SKA. But it may well be the most realistic option.

Win, lose or draw, the competition has already given South Africa a symbol of national unity. From government officials to cab drivers, everyone there seems to know about the SKA. The Department of Science and Technology sponsors a monthly performing-arts festival in support of the bid. And South Africa’s financial daily, Business Day, often runs front-page advertisements sponsored by the SKA project, featuring a full-colour photo of the KAT-7 antennas with the boastful headline: “South Africa is ready to host the SKA.”

Michael Cherry is Nature’s contributing correspondent in South Africa.