Draft regulations

To implement the required protection measures, the Minister's next task was to publish a set of draft regulations governing the Karoo Central AAAs, which she did in November 2015 with a comment deadline of 22 February 2016. On 20 April 2016, the commenting period was further extended by 60 days. These regulations address four main areas, namely spectrum regulations, administrative procedures, compensation and electromagnetic interference.

Schedule A: Spectrum regulations

These outline the restrictions and exemption of radio spectrum use and the restriction of transmissions that might cause an interference. In terms of the regulations:

- The use of the frequency spectrum from 100 MHz to 25.5 GHz will be restricted, subject to a prescribed assessment process. Existing operators between 100 MHz and 200 MHz will be able to continue operating.
- All existing and future frequency use and transmissions within the Karoo Central AAAs will have to be assessed.
- Permits will have to be obtained for permissible use.
- Essential radio communications services may apply for exemptions.
- Short range devices (SRDs), as defined by the Independent Communications Authority of South Africa (ICASA) will be exempted for units with an output of less than 250mW.
- Any interferences that arise will be investigated on a case by case basis.

Schedule B: Administrative procedures

These determine the procedures and criteria for the exemption of frequency use, the assessment of transmissions to determine interference impact, and for the granting of permits by the management authority.
They also outline the technical specifications, report format and qualifications of the person who will do the assessments and include the requirements for classification of an essential service and any possible concessions.

Schedule C: Compensation

These prescribe procedures for applying for possible financial compensation, as provided for in the AGA Act read together with section 25 of the Constitution.

Schedule D: Electromagnetic interference

These provide for the restriction of electromagnetic interference caused by electrical infrastructure, including electricity generation and distribution and the use of electrical machinery and equipment within the AAA.
Electrical infrastructure with a power rating of less than 10 kVA and further than 6 km from an SKA protection corridor (see map) is exempted from the requirement to acquire and possess a permit unless a disturbance is caused.
An assessment, as prescribed in the regulations, must be carried out before a permit can be granted.
A separation distance must be maintained between electrical infrastructure and protection corridors or a 20 km circle around the SKA Virtual Centre.

SKA by numbers

8 The number of **partner countries South Africa worked with** on the project (our partners are Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia).

9 The number of **years** South Africa and its partners **worked on the bid** to host the SKA.

10 The number of **countries currently members** of the international SKA organisation (namely Australia, Canada, China, India, Italy, New Zealand, South Africa, Sweden, the Netherlands and the United Kingdom).

About SKA SA

The Square Kilometre Array (SKA) is a radio telescope to be built in South Africa and Australia which will have a total collecting area of approximately one square kilometre. It will operate over a wide range of frequencies and its size will make it 50 times more sensitive, and up to 10 000 faster (in terms of its survey speed) than the best radio telescopes of today. It will be powerful enough to detect radio waves from objects millions or even billions of light years away from Earth. (A light year is the distance light can travel in one year, at a velocity of 300 000 km/s.)

The SKA will focus on addressing questions that can only be answered using a radio telescope. Scientists will use it to help us understand how the Universe evolved, how stars and galaxies form and change, and what "dark matter" really is. Scientists expect that the SKA will make new discoveries that we can't even imagine now. They may even find life elsewhere in the Universe!

Contact information:

Square Kilometre Array (SKA) SA
3rd Floor, The Park
Park Road, Pinelands
Cape Town, South Africa, 7405
(+27) 21 506 7300
www.ska.ac.za

Any instance where information contained within this brochure may be interpreted to be different from that contained within the draft AGA regulations, the information as contained within the draft AGA regulations shall be deemed to have precedence.

Understanding the ASTRONOMY GEOGRAPHIC ADVANTAGE ACT

INFORMATION SHEET

Why SKA matters

In 2012, after a nine-year bidding process, South Africa, together with its eight African Partner Countries, and Australia were named as co-hosts for the SKA (or Square Kilometre Array), one of the most ambitious international scientific projects of our time.

South Africa truly has joined the world stage by signing up for this global, multi-billion rand project to build what is described as the world's largest scientific instrument.

Eventually, the SKA will make use of thousands of radio dishes across Africa and Australia to gather information from space by monitoring faint radio signals given off by stars and galaxies, allowing scientists to expand our understanding of the Universe.

To bring all this information together, the SKA requires enormous computing power and the development of techniques that promise to deliver major spin-off developments. One of these is "Big Data", which could change the delivery and processing of information to people on a global scale.

Already, many young people in South Africa are benefiting from SKA bursaries to study astronomy, engineering, computer science and other related fields. The SKA is also creating jobs on the ground during the construction phase.

Along with the benefits of being part of a global project come commitments that we have made as a country. This document explains the legislation that was put in place to protect the radio frequency environment of the Northern Cape Province, making it possible for the SKA to do its work over its expected lifetime of 50 years while limiting the impacts on local people.

How does radio astronomy work?

Radio telescopes work in much the same way as your normal radio. As you tune your radio to different frequencies, the receiver in your radio picks up different music stations. The big difference is that radio telescopes collect cosmic radio waves from outer space. These radio signals are processed by computers that can interpret the signals to form images that give us snapshots of the Universe.

Why a special law?

Because cosmic radio signals have travelled for millions, or even billions, of years over vast distances to reach earth, they are so faint that even the slightest disturbance can interfere with them.

These cosmic signals, for example, can be up to 15 orders of magnitude (that's 1,000,000,000,000,000) times weaker than those of an ordinary cell phone, which is why our radio and electrical activities might cause problems if we do not take some precaution.

To ensure protection of the SKA project, the government had to pass a law to protect areas suitable for astronomy studies by, among others, regulating radio and electrical interference.
This law, the Astronomy Geographic Advantage (AGA) Act of 2007, and the regulations that go with it, has implications for people living within an astronomy advantage area (AAA).

Why the Northern Cape?

Scientific studies found that the Karoo was one of the best places in the world for radio astronomy because it offers good atmospheric conditions, radio quietness, geotechnical stability, good security and good infrastructure. The core site (or SKA Virtual Centre) lies about 90 km north of Carnarvon, where 64 MeerKAT receptors, part of Phase One of the SKA, are currently being built.

How a law gets made (in South Africa)

The promulgation of the AGA Act followed the same process by which any law in South Africa gets made. This is as follows:

1. A Minister, in this case the **Minister of Science and Technology, proposes a Bill** based on advice from the department.
2. The Bill is **referred to the department's portfolio committee**, which consists of sitting members of the National Assembly.
3. During its deliberations, the portfolio committee **consults the public** and holds public hearings.
4. Once the Bill has been finalised at portfolio committee level, it is **sent to the National Assembly** for the vote.
5. During the debate in the National Assembly, the **political parties debate the Bill** and say whether they support or oppose it before casting their votes.
6. If the Bill is passed, and it affects the provinces, it is then **referred to the National Council of Provinces (NCOP)** which has the power to make further amendments.
7. Once passed by the NCOP, the Bill is **signed into law by the President** and becomes an Act of Parliament.

So what does the Astronomy Geographic Advantage (AGA) Act of 2007 say?

The Astronomy Geographic Advantage (AGA) Act of 2007 is legislation that gives the Minister of Science and Technology the power to protect areas, through regulations, that are of strategic national importance for astronomy and related scientific endeavours.

An area can only be protected after it has been declared as an Astronomy Advantage Area (AAA). The Minister must undertake an extensive and consultative public participation process with all interested and affected parties, recorded on a permanent data base.

Once the Minister has declared a AAA, detailed regulations that flesh out what is and isn't allowed in the area, must also be published. The promulgation of these regulations must also follow an extensive public participation process.

AAAs that have been declared to date

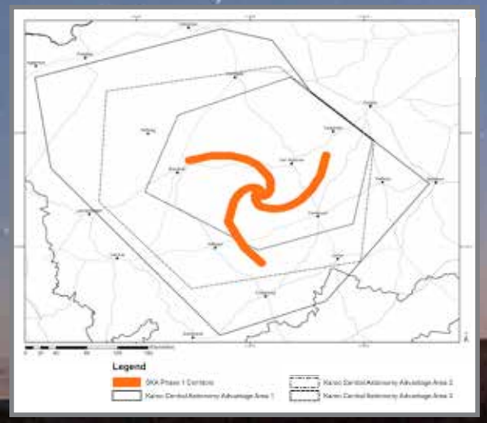
- The Northern Cape Province, excluding Sol Plaatje Municipality
- The Karoo Core AAA (consisting of 13 406 hectares of land owned by the National Research Foundation, 90 km north of Carnarvon)
- The Karoo Central AAAs, as published in the Government Gazette on 12 March 2014. (See map below).

Protection philosophy

Maximise the radio frequency spectrum available for the SKA so that the scientific work is not significantly compromised.

Minimise the impact on local people and residual radio interference, and facilitate access to alternative radio communications.

Restrictions on sources of radio frequency interference, for where there are no alternative options, will be highest close to the SKA Virtual Centre (or core) but decrease with distance.



Will FM radio and television signals be affected?

Existing FM radio transmissions will not be restricted and reception will remain as is.

The government is currently undertaking a national program to migrate to digital television, in order to meet its international obligations. This national program will require all households with televisions to obtain a set top box to receive the new digital transmissions – either via terrestrial transmitters or from satellite. The poorest households, including those located within SKA areas in the Northern Cape, will be given subsidies for these set top boxes.

What about cell phone reception?

Based on the current draft regulations, the decreasing restrictions on sources of interference from the SKA core, together with the identification of essential services, means that it is unlikely that the availability of cell phone reception in towns such as Carnarvon, Van Wyksvlei and Williston will cause an increased detrimental impact on the SKA. This would need to go through a proper assessment process resulting in some re-engineering of base stations. However, a circular area within a radius of about 80 km of the SKA Virtual Centre (or core) may be affected.

To compensate for the loss of communication and to support the SKA operations, an alternative radio communication system is in the pipeline. This system is based on an advanced, multi-channel, duplex radio communication system operating with mobile, handheld and fixed radios. This network will use similar frequencies to the existing low frequency mobile communication network (Marnet), which is not affected by the protection requirements. However, the new system will also enable users to make conventional phone calls.

A scheme for low-cost satellite VSAT communications is also being rolled out to provide for telephone and internet access.

Will the use of electrical machinery be affected?

Only electrical machinery or activities close to the core SKA area (up to 36 km from the centre) or close to a remote SKA station (up to 16 km, although some only as close as 2-3 km), depending on the topography and type of equipment, will be affected. None of the local towns will be affected.