The Square Kilometre Array
Fact sheet
Exploring the Universe with the world’s largest radio telescope

What is the SKA?
The SKA will be a revolutionary radio telescope made of thousands of radio wave receptors, or antennas, linked together across an area the size of a continent. The total collecting area of all the SKA antennas combined will be approximately one square kilometre, making the SKA the largest and most sensitive radio telescope ever built.

What will the SKA do?
Radio telescopes detect radio-frequency signals from space. They provide alternative views of the Universe than those seen with optical telescopes and can reveal areas that are obscured with cosmic dust. The SKA will be 50 times more sensitive, and will survey the sky 10,000 times faster, than any other telescope. It will give astronomers insight into the formation and evolution of the first stars and galaxies after the Big Bang, the role of cosmic magnetism, the nature of gravity and possibly even life beyond Earth.

How much will it cost?
The target cost for the SKA is €1,500 million.

What will it look like?
The SKA will use three types of antennas arranged on the ground in five giant spiral arms. In the higher part of the frequency band the SKA will use dish antennas, each about 15 m in diameter. In the middle and lower frequency bands aperture array antennas will be used to observe large areas of the sky simultaneously.

How will it work?
Astronomers, engineers and industry partners from around the world are designing the SKA which will cover the radio frequency range 70 MHz–10 GHz. Signals will be transferred to a central high performance supercomputer over optical fibres.

Where will it be built?
The ASKAP and MeerKAT precursor telescopes in Australia and South Africa will be integrated into phase one of the SKA, building on their unique science capabilities.

The SKA will be constructed in two phases:
Phase one
190 SKA dishes and 64 MeerKAT dishes equipped with single pixel feeds will be located in South Africa.
60 SKA dishes and 36 ASKAP dishes equipped with phased array feeds will be located in Australia.
50 stations of low frequency aperture array antennas, with about 10,000 antennas per station, will be located in Australia.

Phase two
The dish array will be extended to about 3,000 dishes with a maximum separation of 3,000 km across Southern Africa.
The low frequency aperture arrays will be extended to 250 stations in Australia.
A new component comprising 250 mid frequency aperture array stations will be located in South Africa.

Timeline
2008 – 12 Telescope conceptual design
2012 Site selection
2013 – 15 Detailed design and pre-construction phase
2016 – 20 Phase one construction
2020 Full science operations with phase one
2020 – 24 Phase two construction
2024 Full operation
SKA science

**Was Einstein right about gravity?**

The SKA will investigate the nature of gravity and challenge the theory of general relativity.

**How did the first black holes and stars form?**

The SKA will look back to the Dark Ages, a time before the Universe lit up, to discover how the earliest black holes and stars were formed.

**Are we alone?**

The SKA will be able to detect very weak extraterrestrial signals and will search for complex molecules, the building blocks of life, in space.

**What generates the giant magnetic fields in space?**

The SKA will create three-dimensional maps of cosmic magnets to understand how they stabilise galaxies, influence the formation of stars and planets, and regulate solar and stellar activity.

**How do galaxies evolve and what is dark energy?**

The acceleration in the expansion of the Universe has been attributed to a mysterious dark energy. The SKA will investigate this expansion after the Big Bang by mapping the cosmic distribution of hydrogen. The map will track young galaxies and help identify the nature of dark energy.

The unique sensitivity and versatility of the SKA will make it a discovery machine. Who knows what else it could discover?

---

Artist's impressions of the three SKA receptors

For more information contact:

SKA Organisation
Jodrell Bank Centre for Astrophysics
Rm 3.116, Alan Turing Building
Manchester, M13 9PL, UK

Tel: +44 (0)161 306 6464
Email: enquiries@skatelescope.org
Web: www.skatelescope.org