The Square Kilometre Array in Africa

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SKA SOUTH AFRICA
SQUARE KILOMETRE ARRAY

science and technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

SKA ANNOUNCEMENT

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- On the 25th May 2012, a historic event in the history of South Africa's development in the global community of science and technology
- SKA Board announced that:
  - Africa was the recommended site, based on scientific and technical criteria, according to the independent SKA Site Advisory Committee
  - To maximise the investments made by both sides, Africa would receive two of the three receiver components (dishes, mid frequency aperture arrays), whilst Australia would receive one of the three (low frequency aperture arrays)

SKA ANNOUNCEMENT

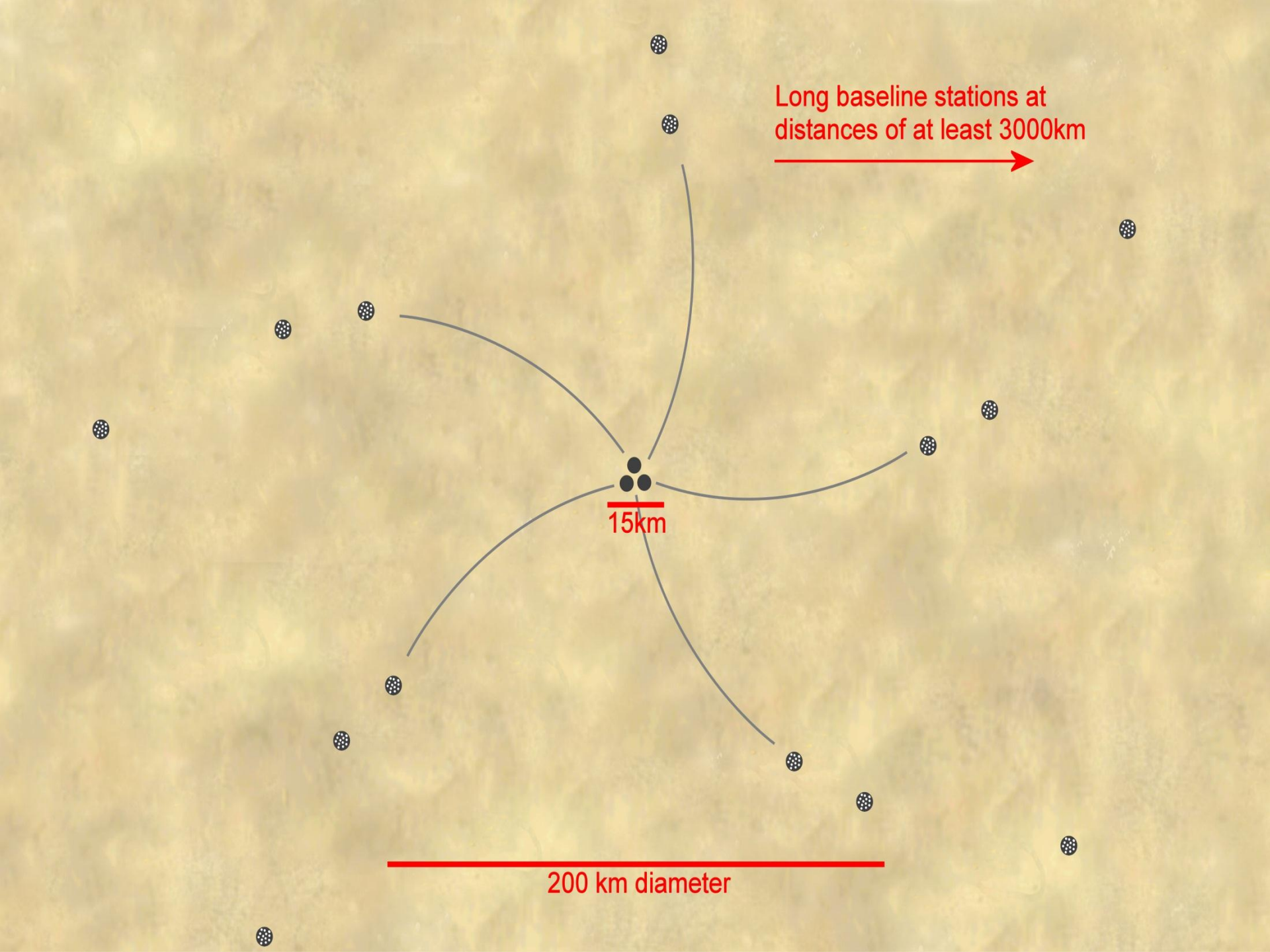
WHAT DOES IT MEAN?

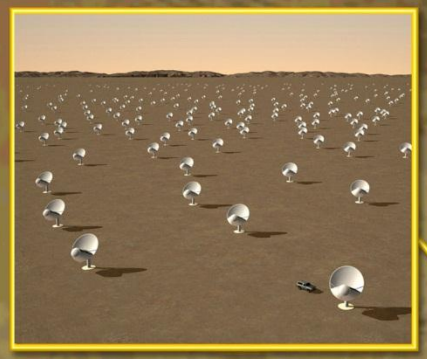
- Africa
  - SKA Phase 1
    - MeerKAT (64) + 190 dishes (SPFs)
    - 100km baseline to core
  - SKA Phase 2
    - Full dish requirement
      - 3,000 dishes
      - 3,000km baseline to core
    - Full dense aperture array requirement
      - 250 stations
      - 180km baseline to core
- Australia
  - SKA Phase 1
    - ASKAP (36) + 90 dishes (FPAs)
    - <100km baseline to core
  - SKA Phase 2
    - Full sparse aperture array requirement
      - 250 stations
      - 180km baseline to core

Radio Astronomy Protection in NCP

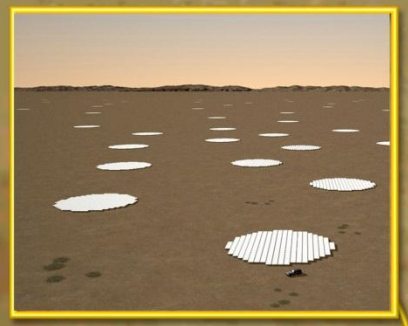
Impact on Protection Requirements

- Frequency ranges of SKA receivers
  - Aperture array sparse: 70 MHz – 200 MHz
  - Aperture array dense: 200 MHz – 500 MHz
  - Dishes : 300 MHz – 10 GHz
- Frequency range of PAPER receivers: 100 – 200 MHz
- The following amendments have been made to draft AGA regulations for the Karoo Central AAAs
  - Lower frequency limit has been increased from 70 to 100 MHz
  - No restriction of any existing transmissions between 100 MHz and 200 MHz will be required, however all new transmissions will be required to obtain a permit involving an assessment of possible interference
  - Migration of existing VHF-FM to below 100 MHz is no longer required.

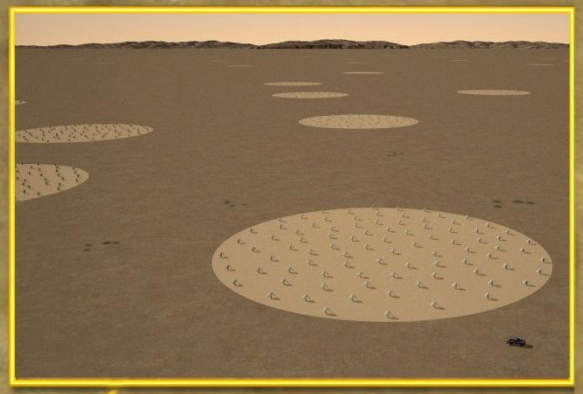

Long baseline stations at
distances of at least 3000km
15km
200 km diameter



Dishes



AA-hi



AA-lo

5 km

MEERKAT CONSTRUCTION

- ROADS
  - Scrapping from dish shed to the MeerKat site
  - Making access between MeerKat proposed telescopes positions
  - Emergency landing strip
  - Trenching for the fibre optic
  - Schedule: 12 – 15 months
- Substation expansion
  - Adding 2 x 5MVA

MEERKAT CONSTRUCTION

DIGITAL MIGRATION

Regulation 3.6 re Framework for Digital Migration

The SKA Project Office acknowledges and supports the draft regulation, i.e.

For certain analogue television transmitters located in the Northern Cape Province, it is required that the analogue broadcast signal switch-off occurs before the end of December 2015 in order to provide the required protection for radio astronomy in terms of the Astronomy Geographic Advantage Act (Act No. 21 of 2007).

However, reference to "certain analogue television transmitters" leaves an uncertainty on which transmitters are included and whether those excluded poses a radio frequency interference threat to radio astronomy. Therefore it is proposed that the draft DTT regulation be amended as follows:

For analogue television transmitters located in the Northern Cape Province that will cause radio frequency interference to radio astronomy as determined in terms of the Astronomy Geographic Advantage Act (Act No. 21 of 2007) and the Regulations made in terms of that act, it is required that the analogue broadcast switch-off occurs before the end of December 2015 in order to provide the required protection for radio astronomy.

DIGITAL MIGRATION

Regulations 14(1) & 14(1)(b) re Roll-out Targets

The regulations states the following:

> *The electronic communications network service licensees appointed to provide signal distribution services to the terrestrial television broadcasting service licensees must ensure that the digital broadcast signal for public service DTT services reaches:-*
>
> *(1)(b) 95% of the population of the Republic by the end of the dual illumination period.*

It is uncertain which transmitting stations in the Northern Cape will be included in the 95%, and if not, when DTT will be installed considering that the analogue transmitters at the affected stations will be required to be switched off in terms of regulation 3(6).

If it is considered that analogue television transmissions cannot be switched off without an alternative being provided in the form of DTT or Satellite DTH, then the matter would seem to be in order.

DIGITAL MIGRATION

Possible Radio Frequency Interference from DTT Transmitters

High power DTT in the Northern Cape may cause radio frequency interference to radio astronomy if it is not correctly configured. It is requested that the following proposed regulations be included in the DTT Regulations as a part of the framework for digital migration:

(a) *High power DTT transmissions in the Northern Cape Province that exceed an effective radiated power of 60 dBm and may cause radio frequency interference to radio astronomy as determined in terms of the Astronomy Geographic Advantage Act (Act No. 21 of 2007) and the Regulations made in terms of that act, is required to restrict transmission in the direction of the Core Astronomy Advantage Area as declared in Notice No. 723 in Government Gazette No. 33462 published on 20 August 2010 in order to provide the required protection for radio astronomy.*

DIGITAL MIGRATION

(b) DTH satellite is deemed to be acceptable in the context of possible radio frequency interference to radio astronomy.

(c) Low power transmissions with an effective radiated power of less than 60 dBm located at towns in the Karoo region of the Northern Cape Province with the transmission directed at the town but not in the direction of the declared Core Astronomy Advantage Area are deemed to be acceptable in the context of possible radio frequency interference to radio astronomy.

THANK YOU

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