

QUESTIONS 25 TO 30:

<u>Question from Susan Boehm, Carnarvon:</u>	<u>Answers from Dr Adrian Tiplady, SKA South Africa Site Bid Manager:</u>	<u>Additional inputs from Susan Boehm, Carnarvon:</u>
<p>25. SKA have a very informative website, www.ska.ac.za and it is recommended all interested parties have a look at it. It explains that the South African "Karoo Desert" will host the core of the high and mid frequency dishes. I would like to know why our area is called a desert on the official website?</p>	<p>Will provide feedback on the population analysis of the Karoo.</p>	<p>It is a mistake to call the Karoo a desert, it is obviously a semi-desert.</p> <p>The question has nothing to do with populations density, it only concerns the facts revealed on the SKA website.</p>
<p>26. The website goes on to explain that the two sites, one in Australia and one in South Africa "were chosen due to their radio quietness, which comes from being some of the most remote locations on earth".</p> <p>26.1 Our area was not radio "quiet" before SKA came here. In other words "quietness" was created here and it was not an existing condition before the earliest pathfinders and precursors were erected here. If radio quietness is a prerequisite for such a project I would like to know why it came to our area?</p>	<p>The term 'radio quietness' is used as a general term within the radio astronomy community. Within this context, 'radio quietness' does not mean the absence of radio signals, but is instead interpreted as being an area which has the characteristic of having a very low presence (but not necessarily absence) of radio signals that could interfere with radio astronomy observations. The International Telecommunications Union Report on the Characteristics of Radio Quiet Zones (Report ITU-R RA.2259-0) goes a step further, and identifies Radio Quiet Zones being "any recognized geographic area within which the usual spectrum management procedures are modified for the specific purpose of reducing or avoiding interference to radio telescopes, thereby maintaining the required standards for quality and availability of observational data."</p>	<p>Radio signal for cellular communications were cut off in the area in the past and this practise is currently implemented again, preparing for SKA phase 1. In so doing, the area is becoming radio quiet, it was not so at the onset. Therefore the suitable radio frequency environment has been, and is continuing to be, created.</p> <p>Whilst scientists have "modified" cell phone signals in teri language, ordinary people say that they have lost their cell phone signal, or that it has been cut off. The fact remains that one is speaking about the exact same thing. But I would like to thank Dr Tiplady for being the first SKA representative to admit that modification takes place. Up to now other SKA representatives have not admitted this.</p>

<p>26.2 The word "quiet" and "remote" here actually suggests that our area is very sparsely populated, perhaps even uninhabited. Would you agree that there are many places on this earth far more remote and without inhabitants?</p>	<p>The Northern Cape Province is comparatively sparsely populated, with just 2% of South Africa's population living within approximately 43% of its total land area. As a result, the demand on spectrum is comparatively low, making it an excellent location to undertake radio astronomy observations. The natural terrain also provides additional shielding against any strong radio signals that do exist. The identification of excellent locations for radio astronomy facilities also takes other aspects into account, for example cost of establishment – there may be more remote locations on earth, yet establishing facilities at these locations is extremely cost prohibitive. In addition, other environmental factors that are taken into consideration due to their potential impact on radio astronomy observations – such as altitude, weather, topography, geology and topography.</p>	<p>Clearly there are more "quiet" and remote areas.</p> <p>According to Wikipedia, the Northern Cape covers an area of 372 889 square kilometres and South Africa covers 1220 813 square kilometres. This means the Northern Cape forms 30,5 % of the total area in South Africa.</p>
<p>27. Could some scientific information about radio waves be explained? Do atmospheric, weather, topography and obstructions etc influence them? Or do radio waves move through and around almost everything?</p>	<p>Radio waves are used by cell phones, televisions, wifi and a variety of other devices. They can pass through obstructions (you can use your cell phone indoors), but lose energy when they do so. The bigger or thicker, the obstruction, the more energy the radio waves lose and therefore the weaker they become. Weather also influences radio waves – every time it rains very hard, particular during the Highveld summer thunderstorms, people viewing satellite television often lose signal. This is because all the rain and clouds are</p>	

	absorbing the energy in the radio waves being transmitted by satellite.	
27.1 Is it perhaps of great advantage to place the radio telescope on a elevated site, like a hill or a mountain in order to reduce obstacle interferences?	Although a high altitude is preferable, it is often of significant advantage to have some level of shielding in the form of hills between the proposed site and the nearest towns or sources of large radio interference. These hills provide a good level of protection against radio interference.	
27.2 If it is elevated high enough would it matter how densely populated the surroundings below are, or how remote the area is?	Whilst the population density in surrounding areas is a factor, other factors influence the radio frequency environment such as the distribution of concentrations of population (ie. towns), and any intervening hills and other topographical features that could provide a level of shielding. Also, careful management of the spectrum in a particular area can also have a dramatic effect on the existing radio interference.	When will the radio signals and mobile connectivity be "modified" in towns like Carnarvon, Brandvlei, Vosburg, Willsiton and Fraserburg? Are areas of open farm land between Carnarvon, Brandvlei and Fraseburg currently affected by "modification" since people are complaining there about losing connectivity? Which other areas are currently affected by "modification"?
27.3. I assume that the radio telescopes signals only go up, towards the universe. In other words, are they far above and beyond the signals associated with human activities?	Radio telescopes are trying to detect radio signals of cosmic origin, and hence try to remove any radio noise associated with human activities, and of terrestrial origin.	The oldest bit of wisdom which I have heard in connections with choosing your property applies here; "location, location. location"
27.4. Are there any radio waves from these telescopes which point down, towards earth and intermingle with signals related to human activity or other man made instruments?	Radio telescopes do not emit radio waves (beyond what would normally be emitted by any electrical device), and instead are only aimed at receiving radio waves that are naturally emitted from stars, galaxies and other cosmic phenomena.	Dr Tiplady, could you please tell us the exact amount of radio emissions which come from a radio telescope? Is it similar to a cell phone, a sparkplug, or which normal electric device are you referring to?

<p>27.5. Why have we been told that personal digital equipment may not enter the SKA zone? How damaging can a single small device be next to a huge dish, which stands among several other huge dishes?</p>	<p>When entering the SKA site, which is currently approximately 14,000 ha covering two farms owned by the National Research Foundation, all employees and visitors are bound by the rules of access. These rules are designed to remove all potential risk of permanent damage to radio astronomy receivers that have already been built.</p> <p>-Further information will be provided on the risks associated with personal digital equipment.-</p>	
<p>28. How does the Australian site in Murchison Sire compare to the South African site, regarding remoteness? Is there a land buy-out scheme in Australia as well?</p>	<p>The Australian SKA site is located in the Murchison Shire in Western Australia. It is an extremely remote location, with very low population density. It is also at a lower altitude than the South African SKA site, meaning that the radio signals have to travel through more atmosphere (and hence potentially through more water vapour). The Western Australian government is engaging with the traditional owners of the land in Murchison Shire.</p>	<p>The Australian SKA site is about the size of the Netherlands, but has only 100 (one hundred) people living in it, according to the information found on the internet, www.theguardian.com/the-square-kilometer-array. Therefore SKA Australia's population density is only a tiny fraction of the population density found where SKA SA is planning phase 1, 2 and 3. Personally, I did not find information on the internet regarding land acquisition in Australia, but it did state that the site is on one (1) former cattle farm. www.theguardian.co/the-square-kilometer-array</p>
<p>28.1. What is the total land surface area of Carnarvon. Van Wyksvlei, Williston and Brandvlei together?</p>	<p>The total land surface area of the three towns is 1,800 hectares.</p>	<p>These 4 towns fall in 3 municipal areas, but these municipalities along with all municipalities in the Northern Cape, excluding only one, are all totally affected by SKA, according to the latest map protecting the regulations surrounding the AAA, published in November 2015. Should we rather state the size of the total Central Karoo Area (CKA)</p>

<p>28.2. How many inhabitants in total live in these towns? And how high or low is our population density?</p>	<p>-Further information will be provided on the population density of the study area based on the population analysis of the Karoo.-</p>	<p>In the 3 municipal areas, surrounding the SKA core area, live 46 000 people according to SA statistics 2011. According to SA statistics 2015, 1 200 000 people live in the Northern Cape. In the affected municipalities live about 950 000 people.</p>
<p>28.3. What is the population density in Murchison Shire Australia?</p>	<p>The population density in Murchison Shire Australia is between 0 and 1 person per square kilometre.</p>	<p>SKA Australia lies in the Shire of Murchison, and here 100 (one hundred) people live.</p>
<p>29. Phase 1 of SKA will apparently incorporate the 64 MeerKat dishes and will eventually comprise of 200 dishes. How many antennas will this phase incorporate?</p>	<p>The terms 'dishes' and 'antennas' are typically used inter-changeably. However, you can imagine the dishes having two components – the reflecting surface, and the small radio receiver, typically positioned at some point in front of the reflecting surface. A television satellite dish is very similar, with the reflecting surface, typically 70cm across, and the receiver, which is usually mounted on a small lever arm in front of the surface.</p>	
<p>29.1 Are the dishes sensitive or are the antennas sensitive? Which one will be affected by human activities?</p>	<p>The terms 'dishes' and 'antennas' are typically used inter-changeably. However, you can imagine the dishes having two components – the reflecting surface, and the small radio receiver, typically positioned at some point in front of the reflecting surface. A television satellite dish is very similar, with the reflecting surface, typically 70cm across, and the receiver, which is usually mounted on a small lever arm in front of the surface.</p>	

<p>29.2 Are the antennae attached to the dishes, or placed further away or on top of mountains?</p>	<p>The receivers are attached to the dishes.</p>	
<p>30. How many dishes and antennae will be constructed in Australia during phase 1?</p>	<p>Dishes will not be built in Australia during Phase 1 – instead, small antennae called ‘low frequency phased arrays’ will be constructed, up to 125,000 of them.</p>	<p>In Australia 130 000 antennae will be constructed in phase one, and maybe a million in phase 2. I am uncertain about the amount of dishes due to differences in the number I found. www.ska.gov.au In addition to the above: 1 - In Australia a site of 346 000 hectares have been made radio signal "quiet", in total, but the area is virtually uninhabited; and 2 - The size and scale the SKA Australian project is revealing on the internet, may serve as an indication and a transparent look at what can be expected in South Africa.</p>