The Square Kilometre Array Baseline Design V2.0

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In April 2014 the SKA Organisation initiated a process to re-baseline the first phase of the SKA (SKA1) Construction Project. The objective of this process was the scoping and scaling of a system that delivers the maximum science throughput at a cost consistent with the original cost cap of € 650M. Based on costing information from the elements constituting the SKA telescopes (SKA1-Low / SKA1-Mid / SKA1-Survey), a scalable cost model was developed that allowed the analysis of science performance against cost for different options. Using this cost model a set of re-baselining options were developed, using an objective method based on the Monte Carlo technique, which would provide an optimum range of science impact. These sets of re-baselining options were reviewed by external science and engineering expert panels and finally presented to the SKA Board in early March 2015 for a final decision. On March 6th, 2015 the SKA Board of Directors unanimously agreed to proceed with the design and construction of the € 650M SKA1 consisting of two complementary world-class instruments – one in Australia (SKA1-Low) and one in South Africa (SKA1-Mid) – both expecting to deliver exciting and transformational science.

The presentation will focus on the system architecture, capabilities and targeted performance of the two selected instruments, SKA1-Low and SKA1-Mid. In summary the re-baselined telescopes have the following main characteristics:

	SKA1-Low	SKA1-Mid
Frequency range	50 MHz – 350 MHz	350 MHz – 13.8 GHz
Collecting area (effective)	465,500 m^2 (@ 100 MHz)	26,555 m^2 (η_{ap} = 80%)
Antenna type	Log-Periodic Dipole Array	Off-set parabolic reflector
Number of antennas (approx.)	130,000	200 (incl. 64 MeerKAT)
Maximum baseline	> 65 km	150 km

Figure 1 Artist impression of SKA1-Mid

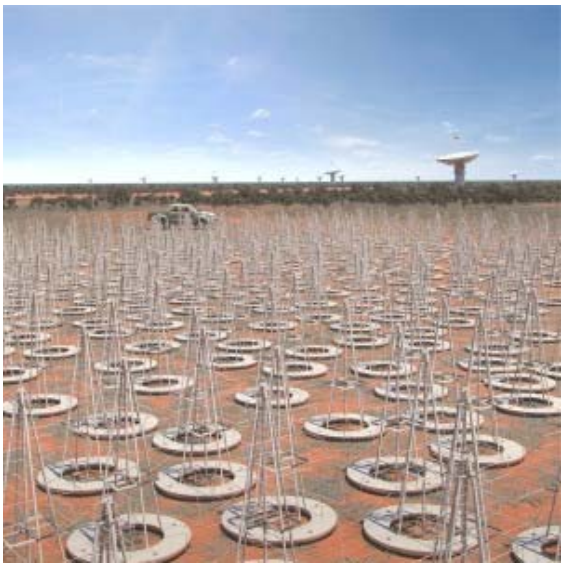

Figure 2 Artist impression of SKA1-Low