

Propagation prediction in establishing a radio-quiet zone for radioastronomy

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In preparation for an exciting new generation of radiotelescopes, Australia has established a Radio Quiet Zone (RQZ) in Western Australia, covering a frequency range of 70 MHz to 25.25 GHz and a geographic area of over 200,000 square kilometres. The site is the core for the Australian components of the Square Kilometre Array (SKA) and already hosts two SKA precursor telescopes. Interference to radioastronomy arises not only from radiocommunication transmitters but also from electrical equipment, and may come from receivers or computing associated with the telescope itself as well as from activities external to the observatory.

The initial definition of the RQZ came from an assessment of potential sources of interference in the region and their impact at the telescope locations. Mechanisms to reduce or control interference are provided in legislation and policy documents, which require that proposed radio systems are evaluated against defined thresholds. Equipment installed on the observatory must also comply with radio quiet standards. Most of these analyses require the prediction of propagation from the interference source to a radiotelescope receiver. This paper will describe a number of unusual applications of propagation prediction methods in support of maintaining the Radio Quiet Zone for radioastronomy.