

# Establishment of a radio-quiet zone at Mileura Station, WA

## **Aim**

To establish a radio-quiet zone at the Australian representative SKA site at Mileura Station, Western Australia. Such a zone will position Australia as a world leader in this area of science policy and will greatly enhance Australia's competitive advantage in hosting the SKA.

## **Why?**

In the past, radio telescopes have been able to use the frequency bands currently protected for radio astronomy by international regulation. However, the more sensitive future telescopes such as the SKA will observe radiation, from distant objects, shifted in frequency by the expansion of the Universe to be outside the bands allocated to radio astronomy.

The radio-wave receivers on the SKA will be the most sensitive in the world and hence will also be very sensitive to man-made radio signals. It is important for the SKA central site to be situated in an area that is "radio-quiet", where the level of man-made radio-frequency signals is as low as possible.

The recent OECD Global Science Forum Report of the Task Force on Radio Astronomy and the Radio Spectrum, in one of its recommendations, suggested that Governments "consider mechanisms to promote cooperation and reduce potential conflict between the interests of LEO satellite operators and those of the radio astronomy community." Suggested approaches include the establishment of "controlled emission zones" around one or more observatories, and the radio astronomy community is encouraged to quickly identify the location(s) of these next-generation sites. Such sites will be remote and small in number.

Australia is a leading candidate as a site for the SKA. To increase our competitive advantage it is important that Australia can demonstrate a willingness to limit the increase in background radio-frequency signals at the site for the SKA by working to establish a radio-quiet zone at the proposed site.

## **What?**

A radio-quiet zone for radio astronomy would be an area where existing levels of radio-frequency signals are low enough to enable future radio astronomy experiments to be conducted, and where any increase in those levels could be limited to be compatible with the successful continuing operation of radio astronomy facilities. A radio-quiet zone may be an area where consultation and collaboration to minimize impact is required before radio-frequency generating activities are carried out, rather than an area where such activities are excluded.

Moreover, occasional increases in activity level (in frequency and/or time) would be acceptable with appropriate coordination, as is currently done when aircraft operators are notified of Defense Department exercises.

It is possible that a RQZ will be a combination of:

- a geographic area (of order 30km radius) within which activities that would generate unacceptable levels of ambient radio-frequency radiation will need to ensure that their emissions are reduced to acceptable levels
- a larger “protection zone” where coordination with communication services will be required to minimize the impact of transmitted signals on the RQZ. The size of the required protection zone may be different for different kinds of services and strength of proposed transmissions.

### ***How?***

The Productivity Commission in its review of the Radiocommunications Act has recommended that “Radioastronomy facilities should be designated as ‘radio sensitive sites’ under the Australian Radiofrequency Spectrum Plan.” This recommendation has been agreed to by DEST and DCITA. The ACA and CSIRO ATNF are developing appropriate guidelines for these ‘radio-sensitive’ zones around existing radio telescopes. These guidelines could be used as a guide to development of the more far reaching RQZ concept, which would only be applied in a few very special radio quiet locations on earth.

A long-term monitoring program of background radio-frequency radiation will begin later in 2004 at Mileura Station in Western Australia. This will quantify the present low levels of radio noise and will set the standard for a future radio-quiet zone on the site. Detailed discussions need to be conducted with local, State and Federal Government representatives to determine the best whole-of-Government approach to the establishment of a zone.

### ***When?***

It would increase our competitive advantage for hosting SKA in Australia if mechanisms were identified and a plan defined for establishing a radio-quiet zone in Australia by the time of the SKA site submission deadline in December 2005.