Korean connection makes an 8,000-km telescope

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Australian and Korean radio telescopes have been linked for the first time, forming a system that acts as a telescope 8000 km across.Australian and Korean radio telescopes have been linked together for the first time, forming a system acting as a gigantic telescope more than 8000 kilometres across and with 100 times the resolving power of the Hubble Space Telescope.

"This is another step in Australia's ongoing collaboration with Asia in the field of radio astronomy," said CSIRO's Astronomy and Space Science Chief, Dr Philip Diamond.

Australia has been making similar linkups with Japan and China for many years, and now is also doing initial tests with telescopes in India. Combining signals from widely separated telescopes in this way is the technique that will underlie the coming international mega-scope, the Square Kilometre Array or SKA.

"Australia has many decades of experience with these long-distance linkups," said Dr Diamond, who sits on the Australia-New Zealand SKA Coordination Committee.

"And we are committed to scientific partnerships with countries in our region and elsewhere - another reason why Australia would be an excellent choice as SKA host."

The telescopes involved in the linkup were two CSIRO dishes near

Coonabarabran and Narrabri in New South Wales, a telescope of the University of Tasmania near Hobart, and two telescopes operated by the Korean Astronomy and Space Science Institute: one in Seoul (at Yonsei University), and a second near Ulsan in the southeast of the country (at Ulsan University).

The telescopes observed the same target simultaneously for five hours and their data was streamed in real time over optical fibre links to Curtin University in Perth, WA, where it was processed "on the fly" at the International Centre for Radio Astronomy Research. The data was sent from each telescope at the rate of 64 MB per second - equivalent to filling a CD every ten seconds.

The high-speed data links for the observations were provided by the Australian Academic Research Network, AARNet, and its Korean counterpart, Kreonet, and are part of the region's existing research and education infrastructure.

CSIRO's Dr Chris Phillips, who organised the tests, was very pleased with their results.

"We were observing at a high frequency, which can be challenging for this technique, but the experiment worked extremely well," he said.

The astronomers targeted a galaxy that emits strongly in radio waves - a source called J0854+2006, which was chosen because it was suitable for the tests. It is located 3.5 billion light-years away, and is thought to house a pair of supermassive black holes at its centre. One of these is among the largest black holes known, with a mass of more than 18 billion times that of the Sun: it is orbited once every 11 to 12 years by a smaller black hole with a mass 100 million times that of the Sun. The two black holes are spiralling together and are expected to merge in less than ten thousand years' time, an event that would release huge amounts of

radiation.

Provided by CSIRO