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SA radio telescope project achieves major milestone early

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South Africa's MeerKAT Precursor Array (MPA) radio telescope has achieved an important milestone more than two weeks ahead of schedule. Previously known as KAT-7 (KAT being an acronym for Karoo Array Telescope and the numeral seven indicating the number of dishes that it will be composed of) the MPA recorded its first interferometry fringes at the beginning of this month.

"This is a really great milestone," enthused South African SKA Project director Dr **Bernie Fanaroff**. "This is the first time we've built an interferometer in South Africa and we got it right first time."

The South African SKA Project is responsible for both this country's bid to host the €1,5-billion international Square Kilometre Array radio telescope project, and for the development of South Africa's 80-dish MeerKAT radio telescope, which will

serve as a precursor to the SKA.

The MPA is the prototype for MeerKAT and will, in due course, be incorporated into the larger instrument. The new name for the former KAT-7 has been adopted because it more accurately describes its role and eliminates confusion.

To date, four of the MPA's seven dishes have been erected, with two having been fitted with their receivers and digital back-ends (for receiving and processing radio waves from the stars and other celestial phenomena). It is these two dishes, working together to create an interferometer, which detected the fringes.

Interferometry involves using two or more radio telescope dishes to look at the same object in the sky. The signals received by each dish are fed into a computer and because the dishes are not in exactly the same place (even if they are only a few tens of metres apart) the distance travelled by the signals to each is not identical and combining them creates an interference pattern – the fringes – that can be analysed by computer to provide high-resolution images of celestial objects.

The detection of the fringes proves that the entire MPA system, from the dishes in the Karoo receiving the radio waves from space, to the final processing computers in the control centre in Cape Town, works. All the different elements in the system had been tested individually, but this was the first time the whole system was tested for real.

The first-time success of the test is partly due to the creation, testing and evaluation of a replica system at the MeerKAT offices in Cape Town, although of course this replica does not have any dishes.

It should be pointed out that this test was an engineering test, not a scientific one, and is only the beginning of a long test programme. That the MPA works has been demonstrated, but its operational performance still has to be determined.

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