

Dwingeloo Telescope returns to VLBI

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The Cleopatra workpackage of the ASTERICS project aims to address the common challenge of time and frequency distribution in distributed instruments and multi-messenger astronomy. We have made improvements to the open hardware 'White Rabbit' time and frequency distribution system to achieve better reach, stability and phase noise. Moreover, we are able to use White Rabbit over public fiber, co-existing with other traffic on different wavelengths. To demonstrate the achieved performance, we are conducting VLBI observations using the venerable Dwingeloo telescope, which will soon receive the Hydrogen maser reference from the Westerbork Synthesis telescope, transported over 165km of fiber in the SURFnet network.

The Dwingeloo telescope is a 25m dish that at its opening in 1956 was the largest fully steerable dish in the world. It participated in some of the earliest VLBI observations in Europe. Nowadays it is run by volunteers of the CAMRAS foundation who have, with great support of its owner ASTRON, restored and rejuvenated the instrument. The volunteers regularly perform single dish observations of pulsars and the hydrogen line of our own and other galaxies. Using off-the-shelf software-defined-radio hardware, and the open-source GnuRadio program, we've recently achieved our first fringes between Westerbork, Jodrell Bank and Dwingeloo.