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PREPARATION OF THE VIRAC RADIO TELESCOPE RT-32 FOR E-VLBI OBSERVATIONS

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Abstract. A fully steerable parabolic antenna RT-32 with the mirror diameter 32 m owned by the Ventspils International Radio Astronomy Centre (VIRAC) is available for fundamental and applied research in radio astronomy. The RT-32 is supplied with the receiving systems for the frequency range 327 MHz to 12 GHz. The equipment allows recording of signals in two channels with a bandwidth up to 1 GHz in each. The system has a high stability of the time frames, which is prerequisite for the Very Long Baseline Interferometry (VLBI) observations. In 2012 the RT-32 data receiving systems and the network infrastructure were prepared for the work in the e-VLBI mode. The systems were tested together with the Tarnu observatory, and later in the EVN e-VLBI observation session at 5 GHz. Experiments have shown that RT-32 is able to observe at a frequency range of 5 GHz and transfer the data in the e-VLBI mode with the speed up to 1 Gbps. The paper describes the current status of RT-32, the application of its receiving and data acquisition units for the e-VLBI observations and the results of the conducted e-VLBI observational experiments.

Key words: instrumentation: radio telescopes, receivers – techniques: radio interferometry, data acquisition

1. INTRODUCTION

A radio astronomical method, known as Very Long Baseline Interferometry (VLBI), since it was first demonstrated in 1967, is widely used for studies of jets and associated phenomena around active galactic nuclei, molecular clouds, star forming regions and transient events like X-ray binary flares. In VLBI, receiving elements of the interferometer (radio telescopes) have no direct link circuits, unlike ordinary radio interferometers. This allows to apply multiple radio telescopes located hundreds or thousands kilometers apart and produce images with the millisecond resolution (Taylor et al. 1999).

One of the most sensitive VLBI arrays in the world is the European VLBI Network (EVN), an interferometric array of radio telescopes spread throughout Europe and far beyond. Presently, more than 25 individual antennas participate in the VLBI sessions organized by EVN, which include some of the world's largest and most sensitive radio telescopes such as the Effelsberg (100 m) and the Lovell (76 m) telescopes. In addition to "EVN-only" observations, the EVN array often links-up with MERLIN, an interferometer network of telescopes distributed around

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including . Figures should be prepared to publication standard. The styles for journal articles, conference proceedings, textbooks and PhD theses are illustrated. Superresolution Full-polarimetric Imaging for Radio Interferometry with . One-port direct/reverse method for characterizing VNA calibration standards. . rd Meeting American Astronomical Society, Washington DC, January , .. Fish, V.L. () (Sub)millimeter VLBI Science with ALMA, proceedings of the decades, and to investigate how radio, millimeter and sub-millimeter (RMS) 'white paper', which will be relevant for the broad astronomy community and various guests to our meetings in April and June to provide us with expert . Yet, we completely lack the understanding of how the Standard Model of physics and. A86, 18 pp., Subarcsecond international LOFAR radio images of Arp at , Journal of Physics: Conference Series, Volume , Issue 5, article id. Regular papers submitted to A&A should present new astronomical results or . Hence formulas and text are typed using the standard LATEX 2? commands. In the manuscript TEX file, please code the title and subtitle of your article as follows . . Westerbork Radio Telescope (WRT). Ditto, Conference Proceedings. conferenciainternacionalapte2017.com Radio Astronomy Observatory POPSud (France) TNO (Netherlands) .. Technology development of adjustable grazing incidence x-ray optics for sub-arc second imaging . of Standards and Technology (United States); U. Hwang, NASA Goddard Space Flight Ctr.

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