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Radio telescope RT-70 in world networks of radio interferometers with very long bases

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Antenna RT-70 located in National Space Facilities Control and Testing Center, National Space Agency of Ukraine, Evpatoria, is one of the greatest antenna systems in the world and a single receiving antenna in Europe, equipped with the high-power transmitter. Key parameters of RT-70: Ţ diameter of the main mirror: 70 m, Ţ the effective area on a wave of 6 sm: 2200 ì2; Ţ power of the transmitter: 100-200 Kw. Ţ factor PG (product of power and antenna gain): 0,5-1 Gw. Ţ width of the directional diagram: 3,5 angular minutes, Ţ pointing accuracy: ˜10 angular seconds, Ţ noise temperature of system with the cryogenic receiver of a range of 6 sm: 40o K; Ţ polarization: circular. In 80th years antenna RT-70 was repeatedly used for radar investigations of planets and asteroids. During last years this receiving-transmitting complex was modernized and equipped with a new radioastronomical instrumentation. It enabled to organize complex radioastronomical researches and to renew radar experiments, including investigations, using new methods of radio interferometry with very long bases (VLBI)). So from 1997 till 2006 24 experiments in Low Frequency VLBI Network (LFVN) were conducted by means of radio telescopes of Ukraine, Italy, China, Russia, including a series of experiments on an VLBI methods optimization for navigation of space vehicles. By means of the transmitter of RT-70 7 experiments on the VLBI-location of space vehicle on geostationary, high elliptical and semidiurnal orbits were conducted, that helped to fulfil procedures of obtaining many-points-measurements of Doppler shift with high accuracy (some thousands of Herz) and interference frequencies on the reflected echo-signals. Besides the VLBI-location of space vehicle echo-signals from the asteroid 2004 ÕÐ14, Mars, Venus, Moon, and also from more than 100 objects of space debris on various types of orbits were received. In October 2005 the

scientists of Radioastronomical Institute (National Academy of Sciences of Ukraine) together with European Mission Control Center performed the VLBI-experiment on radio signals of the space vehicle "Mars-Express" in ranges of 2,3/8,4 GHz on RT-70. In August 2006 on RT-70 the international test experiment in european VLBI-network was conducted by means of the shortly mounted VLBI-detector of a new generation Mark V. The european radioastronomical community is interested in actuation in an european radiointerference network the antenna complex RÒ-70. Thanks to a large size of this device, a good geographical position, a broad band of frequencies (length of waves: 1 sm - 92 sm), its application will considerably increase sensitivity of measurements and quality of imaging of the remote objects of the Universe. Additionally it is planned to equip and to apply two more large antennas of National Space Facilities Control and Testing Centre (diameter is 32 m (Shkolnoe, Evpatoria)) that will provide the further improvement of parameters . Many organizations of Ukraine (main organization is Radioastronomical Institute of the National Academy of Sciences of Ukraine) take part in preparing and outfitting RT-70 as well as in various investigations. Within the program of the Ukrainian-Russian cooperation the Russian organizations take an active part in it. They are Astrospace Center ÔÈÀÍ, Institute of a Radio Engineering and Electronics of the Russian Academy of Sciences, the Russian Scientific Research Institute of Space Instrument Making (Moscow), Institute of Applied Astronomy of Russian Academy of Sciences (St.-Petersburg), Research Radiophysical Institute (N.Novgorod) and others.