

**New Challenge for 0.1 - 0.3 THz Technology:  
Development of Apparatus for Radio Telescope RT-70**

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The 70-m radio telescope is now under construction on plateau Suffa in Uzbekistan at an altitude of 2500 m. It will have an actively controlled main mirror with the goal to achieve the shortest operational wavelength 1 mm. The project started many years ago but was frozen after USSR disintegration. The telescope support and the basic parts of the antenna were manufactured (Fig. 1). During the last few years the project has restarted and plans are being made to complete it in collaboration with Russia and Uzbekistan. The organization which is responsible for the project as a whole in Russia is the Astro Space Center of the Lebedev Physical Institute.

The telescope should operate both in single-dish mode and as a part of VLBI networks, in particular in combination with planned radio telescopes in space such as Millimetron. The collecting area of the antenna greatly exceeds that of existing mm-wave facilities and is comparable to the total area of the ALMA antennas. This provides unprecedented capabilities for studies of compact faint objects which will be the primary targets for this instrument. The scientific program includes a wide range of astrophysical problems from studies of Solar system objects to the most distant radio galaxies and quasars. One of the most important tasks will be investigations of small scale primordial and secondary fluctuations of the CMB. For this task RT-70 will be significantly more efficient than a system of smaller telescopes like ALMA.

In this report we mainly discuss the project status and development of the scientific instruments for this antenna which is still at a preliminary stage. They should incorporate the latest technological achievements and provide a superior performance over the operational frequency range. Both single-pixel and large format array (direct detection and heterodyne) receivers are considered. The receiver design is performed in the framework of a wide cooperation of Russian and Ukrainian organizations but is also open for the international community.

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Fig 1. The Suffa observatory with the radio telescope RT-70 now and after 2012.