



The Upgraded GMRT : Status and Future Plans

Yashwant Gupta⁽¹⁾

(1) NCRA-TIFR, Pune University Campus, Pune 411007, India. e-mail: ygupta@ncra.tifr.res.in

In the first 15 years since its inception in 2002, the Giant Metrewave Radio Telescope (GMRT) has established itself as a major international Radio Astronomy facility in the low frequency regime of 150 MHz to 1500 MHz. Consisting of 30 fully steerable antennas of 45 metre diameter each, it can be used as an aperture-synthesis array for imaging, as well as a phased array to study compact radio sources such as pulsars. The legacy GMRT was designed to work in any of five discrete observing bands within 150 to 1500 MHz, with a maximum bandwidth of 32 MHz.

The GMRT has recently completed a major upgrade that is targeted to improve its sensitivity by a factor of upto three and make it a much more versatile instrument [1]. The goal has been to provide (a) seamless frequency coverage from about 50 to 1500 MHz, with a maximum instantaneous bandwidth of 400 MHz; (b) improved receiver systems with higher G/Tsys; (c) a versatile digital back-end correlator and pulsar receiver using the latest FPGA and GPU technologies; (d) a revamped servo system; (e) a sophisticated monitor and control system; and (f) matching improvements in infrastructure and computing. This upgrade will keep the GMRT at the forefront as one of the most sensitive facility in the world in the 50 to 1500 MHz range, till the SKA phase I comes along.

Most of the sub-systems of the upgraded GMRT (uGMRT) are now completed and installed, and the upgraded observatory has been made available to users in a phased manner from April 2016 onwards, and the full uGMRT with all the receiver bands and final version of the back-end was released in April 2018. Some of the remaining targets of the upgrade will be completed by March 2019, and the uGMRT in its final configuration is expected to be available from April 2019 onwards. Already, several exciting new results are being reported with the uGMRT.

This paper will present an overview of the upgrade activities, describe some of the challenges faced, detail the performance being achieved with the uGMRT, present some of the early results, and spell out the plans for future enhancements.

1. Y. Gupta et al., "The upgraded GMRT: opening new windows on the radio Universe", *Current Science*, **113**, 4, August 2017, pp. 707-714, doi: 10.18520/cs/v113/i04/707-714.