Observatory Report for the GMRT

Yashwant Gupta

1National Centre for Radio Astrophysics, Pune University Campus, Pune, India. ygupta@ncra.tifr.res.in

Abstract

The Giant Metrewave Radio Telescope (GMRT), located near Pune, India, is today a major international facility for research in Radio Astronomy in the frequency range of 150 MHz to 1500 MHz. Consisting of 30 fully steerable antennas of 45 metre diameter each, that are spread out over a 30 km region, it can be used both as an aperture synthesis array for continuum and spectral line imaging, as well as a phased array with a highly directive beam to study compact radio sources. During its first ten years of operation, the GMRT has produced many interesting new results. We describe the current operational status of the GMRT, and highlight some of the recent discoveries. We also present some recent improvements, including the GMRT software back-end, improved RFI mitigation techniques, VLBI capability etc.

In addition, a major upgrade is presently underway at the GMRT, which will result in a significant enhancement of its capabilities. One of the main aims of this upgrade is to provide close to seamless coverage from 30 MHz to 1450 MHz, with a maximum instantaneous bandwidth of 400 MHz. This involves new, broadband feeds with matching low noise receivers, accompanied by a broadband transmission scheme on the existing optical fibre network, and new generation digital back-ends to process the enhanced bandwidth. A revamped servo system and a modern, flexible control and monitor system are also part of this upgrade. Prototypes for many of these systems have been developed and tested, and some are in mass production stage. Here, we describe the details of the status and plans of this upgrade.