New Monitor and Control System for the GMRT

To control and coordinate the newly upgraded GMRT systems for performing astronomical observations, the new GMRT Monitor and Control (M&C) system has been developed. The new M&C system has a modern hardware and software architectural features as compare to the existing GMRT control system.

New Hardware Rabbit MCM :

The new Monitor and Control Modules (MCM) developed based on Rabbit RCM 4300 micro-controller are used to tune the RF signal receiver chain systems like Front-end, signal conditioning and Analog-backend. Rabbit processor support 1 GB miniSD memory card, 10/100T base Ethernet port for the communication along with a configurable 32 bit TTL control and 64 analog channels inputs to monitor. Dynamic C Intergated development environment support provided on Rabbit processor is used to develop and run the embeded control software. This software handles low level M&C functionalities like implementation of control logic, monitoring interpretation and safety of the instrument. Total 71 MCM cards have been tested & 42 cards used in new GMRT analog back -end system.

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Online_Version 2 :

A new M&C system software called ONLINE Version 2.0 (Online-V2) developed in-house by operation group member. Online-V2 follows a client-server software architecture and the design is based on the TCP/IP communication. The multi-threaded M&C Application server program developed in C runs under Linux operating system.

Online-V2 has been tested with sub-systems of two antennas in the Lab environment as well in multiple antenna. The new M&C system has improved performance with minimal time for configuring the telescope facility to restore the default values after power failure hence capable to keep minimum down time during it's operation.

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Next generation M&C system :

Towards the next generation GMRT M&C System development, User Requirements Specification (URS) and Software Requirement specification (SRS) documentsuccessfully completed in collaboration with the TCS,India. The URS and SRS describe functional requirements of the GMRT M&C systems, operational & user-interface constraints and performance of the system that will govern design and development of the M&C system software. The URS and SRS document captured all stakeholder requirements that need to be met by the new GMRT M&C system. This helps to avoid development gaps and errors at the beginning of design phase of the M&C system. Since the GMRT is a specialised facility in a specialised domain with complex astronomical observing capabilities and telescope functionality, the URS and SRS document was developed in close consultation with the NCRA astronomers and engineers. A technology prototype for the M&C system study using open source technologies like EPICS (Experimental Physics and Industrial Control System) and CSS (control System Studio) also has been undertaken in collaboration with the TCS. NCRA plan to develop end-to-end M&C system software package which can execute the scheduled observing sessions and support in collecting the final astronomical data along with the meta-information and observation logs to improve the science data quality.

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