

## **Design and Development of Optical Control Signal Distribution Network for 1024 Element Active Phased Array Indian MST Radar**

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Indian MST Radar located at National Atmospheric Research Laboratory, Gadanki is being operated for atmospheric research applications for the past two decades. The 1024 antenna element system works at 53MHz with tube based transmit systems. The major challenges with the existing transmitter units are degradation due to ageing and critical high power spare parts are obsolete, making it difficult to sustain the radar operations. Hence, to sustain the MST radar operations and to support the new scientific requirements with latest technologies, Active Phased Array MST Radar (AAMSTR) is being developed.

AAMSTR works at the same frequency i.e; 53MHz which uses the existing 1024-antenna array with linear polarization, each connected to dedicated 1-kW solid state transmit-receive module (TR) located in the antenna field over an array of 130mX130m. For the synchronous operation of the radar, TR module requires control signals namely transmit and receive Ethernet data, Inter Pulse Period (IPP) and clock (CLK). Generally radar systems use copper cables to transfer signals, the signal speed and bandwidth are limited in such cases. In addition to this, the electromagnetic interference of the electric cable also affects the transmit and receiving signals. To overcome these problems, latest technology of optical control distribution network adopted for active phased array radar.

The control signal distribution network has been successfully developed, installed and validated. Currently the AAMSTR is providing consistence data and supporting the ISRO satellite launch missions.