Technical Description of 205MHz Wind Profiler Radar for Stratosphere Troposphere Probing

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A novel Stratosphere Troposphere Wind Profiler Radar operating at 205MHz has been established in Advanced Centre for Atmospheric Radar Research, Cochin University of Science and Technology (Latitude:10.04°N Longitude: 76.33°E). Unlike the traditional Wind Profiler Radars operating at 50MHz or 400MHz this can probe lower atmosphere from 315 meter to an altitude of 20km. The main advantage of 205MHz radar is that the background sky noise is less, so with less transmit power and lesser area for installation we can probe into higher altitude as compared to 50MHz radar.

205MHz Active Phased Array Wind Profiler system with 619 Transmit/Receive (T/R) modules is capable of giving wind information with a resolution of 45 meters. Each T/R module is connected to a 3 element Yagi-Uda antenna which is arranged in a circular array which has a Half Power Beam Width of ~3°. The peak power aperture product of the system is 1.8×10^8 W/m^2 and the beam can be steered from 0° - 30° in off-zenith and 0^o - 360^o in azimuth with a step of 1° in Doppler Beam Swinging (DBS) mode. The scientific focus of the radar is on the study of boundary layer dynamics, Stratosphere Troposphere interaction, Indian monsoon etc. The system is validated using collocated GPS radiosonde measurements. Echoes from 80km and 200km are observed while pointing beam to higher altitudes which seems to be from Mesosphere/ Ionosphere. More investigations are required for the validation of these observations. Detailed system description with block diagram and technical aspects of system will be presented.