

Development of 445 MHz multi-receiver atmospheric radar at NARL

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NARL is expanding at a rapid pace with multi-dimensional research activities such as climate research, weather forecast, etc. Atmospheric observations at single location are not sufficient to unravel scientific problems like weather forecasting. Wind profiler network is a potential system for multi-point observation and providing initial conditions for NWP simulations. Further, profilers can be installed in locations, which are prone for natural disasters, to enhance understanding on wind and precipitation structures in those systems. 400 MHz class wind profilers are very popular and many networks employ them for research/operational meteorological applications, because these can be realized at lower cost and provide optimal performance with optimal size, in contrast to massive 50/200 MHz class radars, despite providing very good height coverage and 1 GHz class radars, which probe atmosphere only upto 4-5 km in clear air and provide erroneous results during convection/precipitation.

Keeping the above in view, as a first step, NARL has initiated the development of 445 MHz radar which can be used for wind profiling and also for multi-receiver applications like imaging. To make the radar cost effective spaced antenna configuration is chosen for wind profiling application, which does not require complex beam steering network. The proposed radar will have seven antenna sub-groups, each with 36 elements. Out of seven sub-groups, four will be arranged for spaced antenna mode in such a way to get two different base line lengths. Each sub-group will be fed with one 2 kW Transmit Receive Module. Hence, the total transmit peak power is 8 kW. Remaining three groups can be located to get even longer base lines. There will be possibility for repositioning these three sub-groups, to obtain various antenna configurations. The subsystems of the radar are developed through local industry. Testing is under progress. More details will be presented in conference.