# Simulations of a Paired Antenna Atmospheric Delay Correction Scheme for CARMA

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Extending observations at CARMA (Combined Array for Millimeter-wavelength Astronomy) to its highest resolution using baselines up to 2 km long will require correction for the atmospheric seeing, which would otherwise limit resolution. A scheme being investigated uses smaller antennas paired with the observing antennas to make local measurements of delay at 30 GHz on a source sufficiently close to the science target.

We present the results of some numerical simulations of this concept. A model of an atmosphere with Kolmogorov-type distribution of humidity is passed over two simulated arrays, one to accumulate data for the science image and another paired array to monitor the delay variations on the line of sight of the antennas. The model is made as complete as possible, and includes the effect of atmospheres with different degrees of turbulence, multiple layers, and various wind speeds. Parameters of the array, such as baseline lengths, spacing between monitor antennas and science antennas, angular offset of the reference source, are varied over a realistic range of values.

Additional features of a non-ideal system are also captured in the simulation. Separate instrumental drifts of the two arrays are included with temporal characteristics derived from measurements on CARMA. Radiometer noise is also included to study the tradeoff between the brightness of the reference source and its proximity to the science target. Separating the instrumental components of the delays from the atmospheric ones requires observations of a bright calibrator simultaneously by both arrays, and the simulations are used to explore the effects of observing parameters such as calibration intervals, integration times etc.