

## ABSTRACT

This thesis presents the design and use of stacked patch antennas to form a 2-D array, which is cylindrical and thus is able to provide full azimuth coverage. The antenna array can be integrated into a portable, near range target sensing Step Frequency Continues Wave (SFCW) radar system. The performance of every component in the antenna array and the behavior of many combinations of these components were measured. Experiment shows that a 2x2 stacked patch antenna module doesn't suffer from cross-talk between elements. The radiation pattern of a 2x2 flat module was measured in the compact range at The Ohio State University ElectroScience Laboratory. It is also noticed that the interference between two vertically separated modules is substantial. When modules are populated on a curved surface, it is shown that the performance of each module is not substantially degraded. Arrays formed by populated modules on a cylinder were tested as a radar component. When used in conjunction with a portable SFCW radar, the system was able to sense a human target 15 meters away.