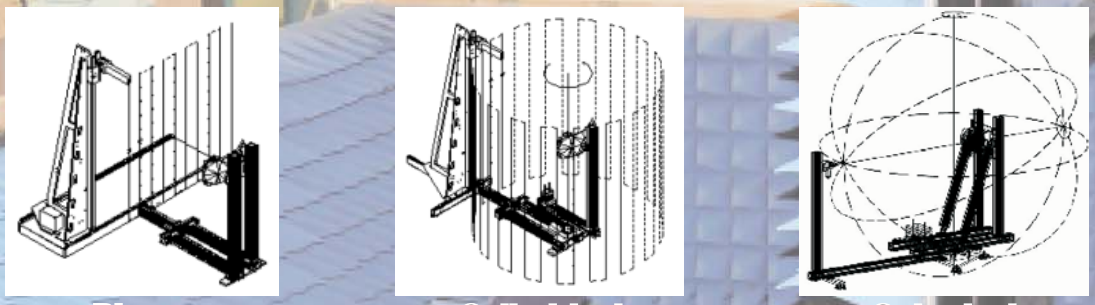
APPLIED RADAR, INC.

Cylindrical & Spherical Near-Field Antenna Measurement System

1.0 Introduction

Near-Field systems come in various configurations, depending on the type and shape of the antenna to be tested. The three most common configurations are the planar, cylindrical, and spherical. An example of each configuration is shown in Fig 1. The simplest configuration is that of the planar Near-Field system. This configuration is suitable for measuring antennas which are planar in shape. The cylindrical Near-Field system is an extension of the planar Near-Field system and is ideal for measuring antennas that are curved or located on a curved body, such as on a missile. The spherical Near-Field system is an extension of the cylindrical Near-Field system and is suitable for measuring antennas of almost any shape.



Planar Cylindrical Spherical

Figure 1: Examples of Near-Field system configurations

Applied Radar sponsored a Capstone project during the 2009 academic year which resulted in a functional 8' x 8' planar Near-Field measurement system which operates at X-band (8.4 to 12.4 GHz). The proposed Capstone project for the 2010 academic year is an extension of the previous project to add cylindrical and spherical capabilities to the previously constructed planar system.

2.0 Project Goals

The overall goal of this project is to design, construct, and test modifications to the existing 8' x 8' planar Near-Field system to add both the cylindrical and spherical measurement capabilities. Design aspects will include modifications to the existing planar system which will involve adding additional mechanical stages to the design, modifications of the RF and cabling system, and updating the control software and processing software. It is envisioned that the Fall 2009 semester will be dedicated to adding the cylindrical configuration and the Spring 2010 semester will be dedicated to adding the spherical configuration.

3.0 Required Skills

It is envisioned that the project team will consist of three students, two electrical engineers and one computer engineer. The electrical engineers will be primarily responsible for the physical modifications to the existing planar near-field system and RF cabling system. The computer engineer will be primarily responsible for the control software and the processing software. The control software is written using Visual Basic 6 and the processing software is written in MATLAB.