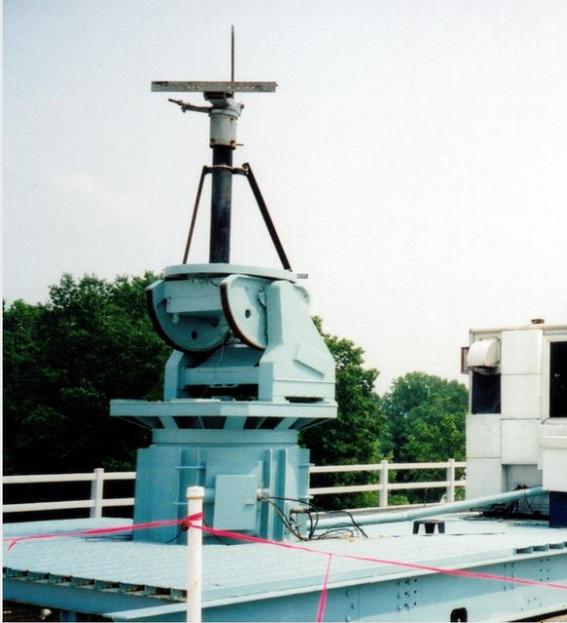




**MOREHEAD STATE UNIVERSITY**

Ronald G. Eaglin

**Space Science Center**



*MSU Antenna Test Range Positioner*



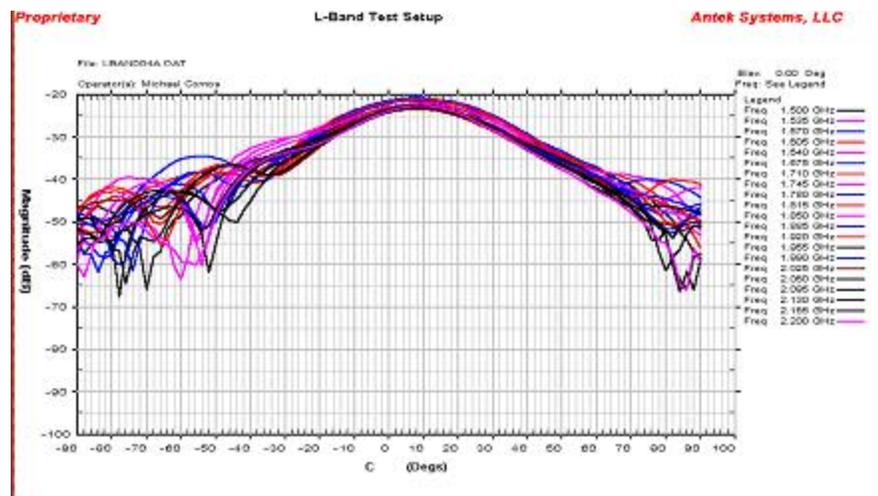
*Control Room for Antenna Test Range*



*The remote location of Morehead and RF shielding provided by mountains, provide an ideal RFI environment for this research*

## The MSU Antenna Test Range

Antenna design, fabrication, and performance verification is key to the success of both the astrophysics program and the satellite telecommunications program. To support these efforts, a free space antenna range capable of testing antennas from 100 MHz to 18 GHz (with range extension to 40 GHz planned) has been developed by the SSC. The antenna test range is used to measure performance characteristics of test antennas. Parameters such as gain, pattern, VSWR (return loss), cross-polarization rejection, among others will be measured to research-grade precision with the test range. This is done by using a 3-axis pedestal for the antenna under test, to allow accurate movement in azimuth, elevation and polarization, under computer control. The receiver system uses a scalar analysis measurement system (based on a source and receiver, both under computer control). The range source consists of a remotely controlled synthesized generator, driven by IEEE-488, capable of covering the frequency range from 50 MHz to 18 GHz, with sufficient output power to drive power amplifiers. The receiver currently uses a spectrum analyzer (a scalar network analyzer is used for specific tests, such as VSWR). As the measurement system evolves, vector measurement capability (a vector network analyzer) will be added to permit array optimization through phase front measurement techniques. A broadband source antenna set, using horns and log spirals, remotely selectable, can be used to provide the measurement excitation.



*L-Band antenna measurements made using the Far Field Range*

The antenna test range will be used to design and verify a variety of antennas and feeds for commercial and research purposes. The outdoor range is used to characterize feed systems for the 21 M antenna to provide high performance operation in both the telemetry/tracking missions and the radio astronomy roles. The range is also being used to validate and characterize the communication systems for the KySat series of Earth-orbiting satellites.