

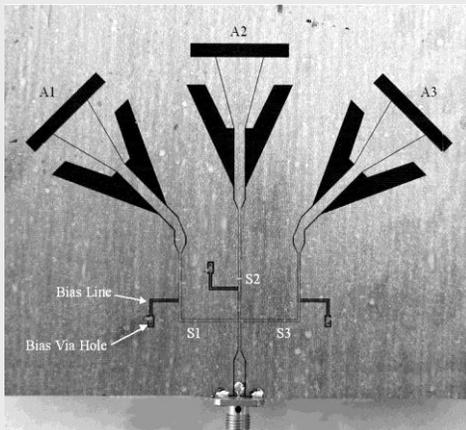
RF MEMS antenna.



Cascade M150 multipurpose station



Four-point resistivity probe



Multifunction reconfigurable RF MEMS antenna developed by MSU (B. Cetiner and Q. Xu 2006)

## RF Micro/Nano Laboratory

Research in micro/nano technologies at the Space Science Center focuses on MEMS devices for space applications, particularly in the areas of micro and picosatellite systems. The lab serves as an instructional facility to foster student experimental skills and promote efficient teaching and learning in various existing courses. The instruments in this lab provide the complete capability for conducting the reliability testing on RF MEMS switches; the device characterization on diodes, transistors and solar cells; and the non-destructive I-V and C-V measurements on dielectric and high-k metal oxide films. The entire lab room can be switched to the yellow light condition for performing photolithographic processes.

The RF/micro characterization lab at the Morehead State University Space Science Center was developed to meet the need of measurement and characterization from DC up to 40 GHz on electronic and MEMS devices as well as their related materials. Meanwhile, the lab serves as an instructional role to nurture students experimental skills and promote efficient teaching and learning in various existing courses. The instruments in this lab are deliberately acquired to provide the complete capability for conducting the reliability testing on RF MEMS switches; the device characterization on diodes, transistors and solar cells; and the non-destructive I-V and C-V measurements on dielectric and high-k metal oxide films. The entire lab room can be switched to the yellow light condition for performing photolithographic processes.

A class 100/1000 clean room supported the development and fabrication of RF MEMS systems including reconfigurable MIMO antennas and devices. Plans for the Micro/Nano lab include wet etch, photolithography, e-beam lithography, material growth, and metallization processes. The proposed facility will facilitate MEMS/MRA development process from the theoretical electromagnetic construction process, through fabrication, packaging, testing and characterization. A Space Systems Development Laboratory shares space and facilities in the clean room.

### On-going Projects include:

1. p-type ohmic contact for heterojunction bipolar transistors
2. Reliability of RF MEMS switches
3. Photovoltaic decay of thin-film CdTe solar cells
4. High-dielectric constant metal oxide materials

### MEMS for Space Applications

NASA and the aerospace industry have a special interest in MEMS technology.. Some of the systems utilizing MEMS devices for space applications are:

- Microthrusters
- Mass Spectrometers
- Magnetometers
- RF Switches
- Microgyroscopes
- Microsatellites