Ole Miss Engineering Group to Build and Launch Satellite

UNIVERSITY, MS - For a group of undergraduate engineering students, their small satellite research will soon become a reality. Students in Computer Science and Electrical Engineering have been working for the past year on the development of the Mississippi Imaging Space Satellite 1 or “MISSat-1”. Its primary mission is to capture images of the entire earth, with a focus on the State of Mississippi. All images collected will be relayed back to earth via the University’s ground station which is located in Anderson Hall and was recently configured and tested by the engineering students.

The satellite under development falls into the CubeSat category. They are very small in nature, measuring 10x10x10 cm³ and weighing only about 1 Kg, and are designed to operate in the lowest of earth’s orbits. CubeSats follow specifications and guidelines put forth by founders of the CubeSat project at Cal Poly and Stanford Universities. The objective of the “MISSat-1” project is the quick and efficient development of a CubeSat that can perform basic operations.

CubeSats are generally developed using commodity components in a modular configuration. This allows each team of students to select the appropriate systems necessary to build a complete satellite. Each student in the MISSat-1 program takes complete responsibility for one of the major system components in the satellite which may include power, communications, structure, or programming.

The primary mission of MISSat-1 is to capture images of the earth with a small, inexpensive satellite. The advantage of using the CubeSat platform is its ability to acquire modules that perform the necessary functions of the satellite as well as the ability to assemble those modules in a “plug-and-play” manner.
The student team is currently working on the development of software which will be necessary for the satellite to operate. They are also building imaging payload for the system by using a small camera sensor commonly found inside cellphones.

Being able to make contact with the satellite once it is in orbit requires a new state-of-the-art satellite ground station for communications. The team recently designed and installed such a station on the roof of Anderson Hall. The station includes VHF/UHF satellite transceivers, a new antenna structure, high gain satellite antennas, and an automated computerized rotator control for tracking orbiting satellites. Even though many of the components can be purchased, students have assembled their own components into this impressive satellite ground station. They have also designed and implemented computerized control of the antenna rotator system. The station will allow the team to practice making contact with orbiting satellites until they can launch their own CubeSAT, the “MISSat-1”.

While learning opportunities are many, so are the challenges these young engineers face. However, they are confident that hard work and determination will translate to success. The engineering students are led by their Electrical Engineering advisors, Professor Atef Elsherbeni and Instructor Matthew J. Inman. Funding for the MISSat-1 project has been provided in part by NASA, and The School of Engineering and the Department of Electrical Engineering at the University of Mississippi. Additional sponsors are being sought to assist the team in the continued achievement of their goals. For further information please email atef@olemiss.edu