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RESEARCH ABSTRACT FORM

TITLE: Development of a Tracking System Applying GPS and APRS Technologies for use in Student Scientific Ballooning Missions

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Development of a Tracking System Applying GPS and APRS Technologies for use in Student Scientific Ballooning Missions

Over the last 10 years there has been a sharp increase in the number of student-led scientific balloon satellite missions. The increase is primarily due to advances in sensor technology and the miniaturization of tracking and communication electronics. Students are now able to be involved in the design of the balloon vehicle, the scientific experiment, and the payload. A typical mission allows data to be collected at altitudes approaching 100,000 feet. A balloon vehicle at such altitudes must withstand 99 % of the extreme conditions of outer space. By definition, such altitudes are labeled as near space. For the first time, students can be directly involved in space science and aerospace engineering at an affordable cost. Usually, the communication and tracking system of the balloon satellite is the most expensive component of the entire balloon vehicle.

The focus of this effort centers on integrating the appropriate technologies and components needed to develop a balloon satellite tracking system. A Global Positioning System (GPS) on the balloon allows its position and velocity to be measured. Amateur radio can be used to communicate the balloon's location to a ground station. Automatic Packet Reporting Systems (APRS) formats the data sent via radio in a manner similar to internet communication between computers.

A tracking system was developed from off the shelf hardware and software. Ground testing the system would occur before using in an actual mission.