Gabriel Piatt

WVUER Funded Project: Astraeus

WVUER is predominately an SRAD team using student created devices in competition and in personal rockets. However, historically we use “store-bought” electronic components aside from some electrical payloads our altimeters are always commercially available. Project Astraeus seeks to develop an altimeter family in house, fully developed, funded, and produced within West Virginia University with an emphasis on open-source development. The plan is divided into two stages, development, and testing. The development phase will be the Fall semester and will involve club members using an Intel or an ARM microcontroller and additional IC logic to design and create 6 circuit board variants ready to test. The goal is to produce a pressure-based altimeter and related boards for under 25$ per board (end cost) and producing a full, thorough documentation on every step of the process. Including pictures, drawings, flight data, full cost breakdown, and videos. All to create a cheap and effective SRAD altimeter which can function within current altimeter standards and can compete with COTS altimeters.

Major stages of development will include the decision and development of a breakout board which utilizes a microcontroller to act as the “brains” of the device. We will need to develop an inert flag which would pop and indicate a firing of a black powder charge. This will be used in phase two to test efficacy of the device at altitude. We will do preliminary pressure tests in a vacuum pot then send it as an inactive payload on student’s rockets in the spring semester. Hopefully, having at least 5 test flights of various heights.

One of the development goals is to make the system somewhat modular, so various components can be added and removed as necessary to increase or decrease functionality as needed. I also aim to have similar total function as the Telemega with GPS, accelerometer, and of course deployment charges. Using a standardized microcontroller platform should make this easy as well as allowing our code and designs to be open source and available on GitHub or various platforms.

The vision is a board with a microcontroller base, using GPS, accelerometers, and pressure sensors to collect data about flight and provide electronic deployments. The board will have a main section for the microcontroller and pressure sensor with the GPS and accelerometer devices being on separate boards (however probably printed on the same chip and removed post-manufacturing). These will plug into the main unit and several through holes and Molex connectors will allow for expansion or other sensors the be added. After retrieving the device data will be collected from a micro-SD card.