



La ACES Student Ballooning Course

A16.02 –Capstone Report : Sensors Interface and Calibration Report

A. Cover Page

1. Title (e.g. Sensor Interface Report)
2. Name(s)
3. Date submitted

B. Principle of Operation

What measurements is your circuit going to make? What techniques will you use to make these measurements? How do your sensors function? How do your measurements flow from your scientific and technical goals.

C. Electrical Design

Describe your electrical design including sensors, sensor interface, controllers, data acquisition, data storage, and data retrieval.

1. Sensors

What sensor or sensors will be used in your payload? Give the part numbers and specifications. Show how the chosen part satisfies the measurement requirements. Also discuss the performance and linearity of the sensor in variations (i.e. temperature, pressure, magnetic field, electrical bias, etc.).

2. Sensor Interfacing

Here you will need to show an electrical schematic as well as describe how the signal from your sensor is conditioned and converted to digital information. You will need to discuss how you set the readout gain and accuracy to satisfy the technical requirements.

Figure(s) showing the electronic circuits for sensor signal conditioning and conversion to digital format.

D. Software Design

This section describes the design of the controlling software in device as well as your analysis used after retrieving data.

1. Data Format & Storage

Detail your data record format including time stamp, digital sensor data, environmental information, GPS data, counters, etc. At what rate will you be acquiring data? You should be able to show how many bytes each data record will require, plus how many bytes of on-board storage will be required.

2. Operating Software

Here you need to discuss the design of your operating software including the processes involved in data acquisition, data storage, time stamping, commanding and flow control.

3. Data Retrieval Software

How will you get the recorded data out of memory. How will you analyze and display it?

Flow chart diagram(s) showing how your software will function.

E. Proof of Performance

Discuss what sensor calibrations need to be done to take into account environmental variations. Much of this information comes from the sensor datasheet. Show the results of tests or calibrations you actually performed

One of the primary purposes of this section is to prove that your chosen sensors and signal conditioning circuitry will A) function as designed and B) will provide the measurement specified in the requirements.

Table of test and/or calibration data.