



<Team Name>

<Member Names>

Balloon Fest Equipment Validation

Disclaimer:

This document is meant only as a model of the type of content and the format for a properly written Equipment Validation. All of the numbers and other information in this example were made up for this exercise and should NOT be trusted without checking it yourself.

Description of Experiment:

The atmospheric pressure and temperature varies with altitude. Can we predictably and accurately measure the altitude by sensing the pressure and the temperature?

Equipment to be Tested:

We plan to use a Vernier Barometer sensor with a LabPro DAQ. The LabPro will be programmed with a laptop computer running Logger Pro software. Data will be collected remotely and then downloaded into Logger Pro for analysis.

Research (specifications and expected values):

The Barometer Spec sheet (available on the Vernier.com Website) provides the following information: ...

We should expect that the pressure will vary from ... to ... due to typical weather and it should decrease by about ... as the balloon rises from ground level to 1000 ft elevation. (source = Atmospheric Research Website or other)

The Temperature is expected to vary from ... to ... over the course of the morning and is expected to drop by ... as the elevation increases to 1000 ft.

The Atmospheric Research Website states that we should expect that 54.5 m of elevation will cause a 1 kPa change in pressure.

This section should detail as much as you can find that is relevant to the equipment and its expected use. It should make specific predictions and estimates. For example, given this experiment, it would be appropriate to graph and compare the differences in pressure for each of the three models. Estimate the normal fluctuations in surface pressure due to weather. Estimate the corrected station pressure due to our launch site not being at sea level. Then predict the probable error caused by these fluctuations.

Test Plan:

Step 1 ...

This section should include detail how you plan to test the equipment to check for the proper operation of equipment and what would make it not function as expected (i.e. reliability). The test should specifically measure the instruments resolution, precision, and accuracy. Be sure to test using conditions that are reasonably similar to conditions expected during the Balloon Fest Event.



Data:

...

Analysis:

From analysis of the data, we calculate (be sure to show how you calculated) that the resolution of this equipment is 0.02 kPa and the precision (uncertainty) is ± 0.04 kPa. Repeated measurements of the same situation commonly vary over this range. The sensor is accurate within ± 2 kPa or about 2%.

Conclusion:

This means that we should be able to use the sensor to measure altitude with an uncertainty of ± 2 m ($0.04 \text{ kPa} \times 54.5 \text{ m/kPa}$). This is limiting but ...

Be sure to write clearly and explain fully. Use MS Word. It is suggested that you use MathCad for analysis. Copy and paste any graphs or calculations into your report. Make this report carefully thought-out, detailed, and professionally written. Remember this is for publication.

Save a copy of this file as "VAL-<team name>.doc in V:\Endeavour\Student Files\Balloon Fest"