

Battery Analysis

Note: The balloon launch site is around the area of Mount Barker. The proposed launch site is at a farmer's property in Wistow. Pictures of the launch site are at: http://pipe2.darklomax.org/pics/2012-10-07_Horus_29/ and the location is: <https://www.google.com.au/maps/place/35%C2%B007'39.2%22S+138%C2%B050'51.4%22E/@-35.1279687,138.847769,388m/data=!3m1!1e3!4m2!3m1!1s0x0:0x0>. The proposed launch is scheduled for the third week in September.

Description of problem

As part of the design process, different alternatives for a particular component can be investigated to ensure that the most suitable component is selected. This can include issues such as reliability, weight and cost. There are two alternatives for the GoPro battery. This investigation will look at the alternatives and recommend the most suitable for the task. Note: this is different to testing, but rather it looks at alternatives as part of the design process. Testing for space qualification checks that it works as designed, and this point should be highlighted in the final report and presentation.

Alternative Solutions

The GoPro camera internal battery should be sufficient for 2 hours video recording. However, a LiPo cell may potentially not work well at cold temperatures. There are two alternatives to investigate in order to come up with a recommendation of the battery to be used.

- The battery supplied with the GoPro, with an extra 9V battery for the processor.
- An external battery pack, consisting of 6 Energizer AA's. The battery is connected to a buck converter to supply 5V to the camera (the buck converter has an input of 8V and output of 5V). This is connected to the GoPro via its USB port, which should power the camera for upwards of 6 hours.

Investigation

Investigate if the LiPo cell battery is appropriate for this investigation, and the factors to be taken into account if an external battery pack is needed.

The investigation needs to take into account

- Will the camera operate for 2 hours at less than 0 °C with the existing battery? How can you test this?
- The Arduino processor requires a 9V source, which has a mass of 37g. The external battery pack will be 6 AA batteries, each of a mass of 25g. Will the extra mass have any implications?
- There will not be enough space for two sets of batteries so the camera and processor would have to share external battery pack. What does that mean for the circuits connecting the camera and processor to the batteries?
- The external battery pack requires that the plastic casing of the camera (which is sealed to avoid moisture covering the lens) has to be drilled. What implications might this mean and how can they be overcome?

Report

Prepare a report which:

- Describes the goals of your task
- The investigation you undertook
- Report on the solution for the batteries that you have developed