University of Calgary HASP Group
Monthly Status Report
February, 2015

HASP Meeting #7 Minutes: Feb. 4, 5:00 PM - 6:00 PM

- There is a telecon this Friday.
- Anyone who can join, will.
- Justin M. starting literature search for gamma ray bursts and lightning
- We want to set up a time for a weekend writing session.
- Casey found a mechanical engineer to help us. Mark Russell. M. Patrick to add him to the email list.
- NSERC / PURE applications are going in for summer undergraduate work related to HASP with Dr. Cully.
- We need to send an explicit participation poll email, to get an accurate number of people who are actively in the group.
- We will try to meet at Wednesday, 5:00 pm each week.

HASP Meeting #8 Minutes: Feb. 11, 5:00 PM - 6:00 PM

- Prof. D. Knudsen went over the geiger counter mode of operation and what is required to get them up and running.
- We will need three of the following modules: http://www.amptek.com/products/a111-charge-sensitive-preamplifier/
- The new science question is whether the gamma ray emissions from lightning also come with charged particle emissions. The first guess is that this is new. Justin M. is taking the lead on the literature search / background information.
- The geiger tubes are LND Inc. 712's, the most basic model, without any added parts.
- C. Cully is going to get the CaNoRock specs and send them to us. We'll need these by Saturday to do the preliminary drawings, etc.
- Geiger tubes are going to be mounted with the camera facing the horizon, three of them, spread out in horizontal angle. Each tube is on its own potted daughter board, which will be completely compatible with the CaNoRock interface, both mechanical and electrical.
- Digital outputs from the geiger daughterboards are combined with an analog voltage monitor for each one.
- Remote power on/off will be implemented.
- Angular acceptance of the geiger tubes is about 30 degrees.

- Horizontal mounting for the tubes and camera is ok.
- Mark needs specific dimensions to render the HASP plate attachment and the new dimensioned drawing of the cubesat chassis
- D. Knudsen will be written as supervising the geiger counter aspect of the project.
- Geiger counter daughter boards will be stacked vertically inside the cubesat chassis in case they're too big to fit all three in the 10x10 plates. There is no downside, so we will just do it.
- We will have two people assigned to future telecons so they do not get missed.

HASP Meeting #9 Minutes: Feb. 18, 4:00 PM - 6:00 PM

- M. Russell says that the mostly empty upper part of the 2u cubesat is a hazard in that it could break under stress with the camera mounted in it. We decided to move to a 1u design.
- J. Mansell notes the dead time of the 712 geiger tubes could be a problem for achieving our sample rate. There are slightly smaller model 716's available that have a shorter dead time and might help this problem. Switching one tube for the other should be trivial - the 716's are smaller and the electrical interface is the same.
- The mechanical drawings are being modified to conform to the 1u design. M. Patrick will ensure that they get included in the right part of the submission this Friday.
- M. Patrick to recompute mass and electrical totals to reflect the 1u design.
- M. Patrick will make clear that we will be trailing a 1m wire whip antenna out the bottom of the unit.
- The name of the circuit board on the bottom of the stack is now the "Regulation / Interface" board. M. Patrick will modify the application to refer to it by this name.
- All 3 geiger tubes will likely fit on one circuit board. We are drawing them as such for the time being.
- The high sample rate required by the scientific objectives is a technical problem that will need careful design. Time stamps cannot be stored with microsecond resolution. Data management here will be key. Alex and Dr. Cully say it is not an impossible problem, but one that requires careful thought and probably lots of work.
- E. Grono offered to proof-read the application. M. Patrick to implement any grammatical changes that need to happen.
- Machining the cubesat chassis ourselves is an option.
- The GoPro is going to be inside the cubsesat chassis to allow for better thermal control.
- The regulation / interface board uses PC104 connectors.
- M. Patrick will investigate what has to happen to make the HASP group an officially sanctioned student club, and whether this would be useful to the members.

- M. Patrick will look into finding a good, citable (in the ideal case), target for peoples resumes. This will likely be the technical reports submitted to HASP for now, and hopefully a scientific paper in the future. I'm optimistic the science objectives are novel enough to pursue this.

HASP Meeting #10 Minutes: Feb. 25, 5:00 PM - 6:00 PM

- PSIP document - Mark needs some weeks of lead time to produce the dimensioned drawings that HASP wants, as it is due right in the middle of finals.
- The HASP plate is going to be shipped out tomorrow. I've sent it to the department, we'll probably store it with either Alex or Dr. Cully until we assemble in the lab.
- J. Mansell will join M. Patrick on the telecon, March 6th, 9:00 AM. We will set this up in my office, there is a phone there we can use.
- M. Rusell notes we need to be a bit more specific about how the boards are stacked inside the chassis. Do we want to have to take them all out to look at one on the bottom? Consensus was that this is probably unavoidable, but they should, indeed, be mounted mechanically to the walls of the chassis.
- Lab safety course is required for everyone wanting to participate in construction. I will coordinate with Dr. Johnathan Burchill this week, get the relevant details, and send them to everyone. As I understand it currently, this is something we do online and on our own time.
- A111's are expensive. We can pay for them, but Alex has a plan B if we can't get them.
- Dr. Cully suggests we push VLF antenna design to the front of the build effort. Group all agrees.
- We want 4 to 5 discrete development fronts / tasks / groups. They are currently:
    - Preamplifier Design
    - VLF Main Board (Cody is working on this mostly, Dr. Cully will check on its status)
    - Geiger Counter Daughter Boards
    - Mechanical
    - Software
- To this end I will distribute a google doc link with a sign-up. We will want these smaller groups to self organize somewhat.
- Software can be tested on the existing ABOVE board FPGA's.
- CaNoRock mechanical specifications are still in the air to some extent. Dr. Cully will ask CaNoRock to send us the exact details of what has to happen to be compatible with their payloads.
- We have 2x 500 volt power supplies available here. We'll want to order additional ones shortly.

- We want a list of parts to order. Alex has added a preliminary one to the Drive folder.
- The sub-group signin will serve as the explicit opt-in for the group. This will be sent shortly.
- After the explicit sign-in, M. Patrick will send out the critical documents for those who just joined the group.
- If we have more than 20 people, we can become an SU sanctioned club. This is regarded by everyone to be a good thing.

Current Group Status

The organizational structure is the same as that which was submitted last month. We have made design changes to address reviewer comments, and these have been submitted to HASP along with a revised application. Changes to the science goals of the project have been made to address practicality concerns with imaging sprites and TLEs. We are currently arranging for physical lab space to start construction, and parts to begin construction have been obtained.

Group contact information has not changed since the application was submitted.