



# HASP 2018 Monthly Status Report

**Report Month:** February, 2018  
**Submitted by:** Vincent van den Moortel/Erik de Schrijver  
**Submit Date:** 02 / 23 / 2018  
**Institution:** Sint-Pieterscollege Jette/Belgium  
**Payload Number:** 2018-08  
**Payload Name:** STRAINS - Stratospheric Radiation Instruments

## I) Activities During Previous Month:

- Collecting information and performing calculations to determine the geometrical factor of STS-5 Geiger Tubes.
- Collecting information and developing risk reduction and hazard mitigation measures (reviewers remarks on our initial proposal).
- Rework and update the STRAINS project proposal.
- The new aluminum beams (with treaded center and assorted corner 'cubes') were ordered and have been delivered a few days ago.
- Midsemester break put us on hold for a full week.
- The newer gammaspectroscopy setup (see 'issues encountered') was studied and its usefulness assessed.
- A financial dossier was compiled and submitted to various officials asking for financial support (especially for travel expenses).
- Software integration for the 3D Geiger Counter proceeding.

## II) Issues Encountered:

- No online information on the geometry of Geiger Tube sensitivity could be found, so the information had to be produced. Multiple contacts with Wouter Gins, Institute of Nuclear and Radiation Physics, Katholieke Universiteit Leuven, were invaluable in performing the online search for relevant information, in performing the calculations and interpreting their results.
- The school's 3D printer had issues loading the new cartridge of ABS. The entire printhead mount was dismantled and thoroughly cleaned. The extruder had to be replaced. The printer table had to be cleaned as well in order to allow easier separation of finished work.
- Further contacts with RH Electronics (the manufacturer of the electronics we intended to use for the Gamma Spectrometer) revealed that - contrary to their earlier assertions - the module we purchased is not all that suitable to spectroscopic work DESPITE their recommended modification we based our original proposal on. This modification was treated in detail in our reworked proposal (submitted before February 16th as requested), but now seems obsolete or inappropriate for the task at hand. Now, RHElectronics claims a newer and improved module, combined with another MCA module of theirs can do the job quite well (and they seem to have video material to back that claim). This means in effect we will switch from the earlier proposed setup to the newer (details in their invoice which

I'm joining here FYI). The pushbuttons on this MCA module will be bypassed by soldered wiring and control over the MCA module will be exerted by an Arduino Nano. This has the added advantage of eliminating the power hungry Raspberry Pi3 and simplifying the overall setup. CERN involvement remains unchanged as calibration and fine tuning are still strongly recommended.

- The Gamma Spectrometer mechanical design underwent a minor change: the opening through which the PMT connects to the signal processing electronics was slightly increased in diameter to allow some slack so as to prevent the buildup of mechanical pressure due to differences in expansion coefficient when at low pressure.

### **III) Milestones Achieved:**

- Flight model aluminum beams acquired.
- Flight model 3D Geiger counter support structure was printed.
- Flight model Gamma Spectrometer support structure is ready for printing on 02/26/2018.
- The 3 Geiger counter circuits were integrated into a single PCB design. Common ground and voltage supply were installed. PCB manufacture scheduled for February 26<sup>th</sup> and 27<sup>th</sup>.
- Gamma Spectrometer HV enclosure: preliminary design finalised. Polycarbonate 3D printer material ordered and acquired.
- Adequate GPS modules were identified and ordered, and have been delivered.
- Insulating foil for the MLI thermal protection ordered.

### **IV) Plans for Coming Month:**

- 3D Geiger counter PCB to be etched, drilled, soldered and tested. Software integrated.
- 3D Geiger counter full systems test.
- Flight model aluminum casing mechanical assembly. Casing's integration validated.
- Flight model 3D Geiger Counter support structure integrated to flight model aluminum casing. Validation of integration.
- Test model Gamma Spectrometer support structure integrated to test model 3D Geiger Counter support plate. Validation of integration at test model level.
- Flight Model Gamma Spectrometer support structure 3D printed.
- Flight model Gamma Spectrometer support structure integrated to flight model 3D Geiger Counter support plate. Validation of integration at flight model level.
- HV enclosure designed and 3D printed.
- Additional sensors PCB design well advanced. Software integration initiated.

### **V) Other Comments:**

Outreach and fundraising activities have started. Production of video material planned.

### **VI) Team Composition and Organization:**

All student work assignments are based on volunteering. Students join forces on specific tasks as they see fit. The team leader's job is to supervise progress, deal with problems, and mind the timeline.

Students working on software and pcb design now have curriculum time to work on their respective projects. It is to be expected this will speed up design and development processes.

When hard- and software on any subsystem are ready for testing, all students involved perform the tests together so any issues can be readily identified and tackled. This 'multidisciplinary' approach also fosters greater understanding in the students of all aspects of the project.

<b>Name</b>	<b>Start Date</b>	<b>End Date</b>	<b>Role</b>	<b>Student Status</b>	<b>Race</b>	<b>Ethnicity</b>	<b>Gender</b>	<b>Disabled</b>
Vincent Van den Moortel	10/01/17	-	Team leader	12 <sup>th</sup> grade (senior high)			M	No
Jennifer Pham Van	10/01/17	-	Mechanical	12 <sup>th</sup> grade (senior high)			F	No
Ellen Van den Bossche*	10/01/17	-	Integration	12 <sup>th</sup> grade (senior high)			F	No
Elie Kochuyt	10/01/17	-	Electronical	12 <sup>th</sup> grade (senior high)			M	No
Jerome Sleewaegen	10/01/17	-	Mechanical	11 <sup>th</sup> grade (junior high)			M	No
Emilie Sanvito	10/01/17	-	Electronical	11 <sup>th</sup> grade (junior high)			F	No
Elise Van den Bossche*	10/01/17	-	Electronical	11 <sup>th</sup> grade (junior high)			F	No
Ebe Coomans	10/01/17	-	Software	11 <sup>th</sup> grade (junior high)			M	No
Jeff Van den Bossche*	10/01/17	-	Software	11 <sup>th</sup> grade (junior high)			M	No

(\*Despite a common family name, these students are unrelated)

('Race' and 'ethnicity' are unfamiliar – and some would argue offensive - concepts in Belgian education)