

June 29, 2012

**To:** Dr. T. Gregory Guzik - HASP Program Director  
**From:** Patrick Doyle – University of Minnesota (UMN)  
High Altitude X-Ray Detector Testbed (HAXDT) Team Lead  
**RE:** HASP Monthly Status Report

## **1. Activities**

We visited Lockheed Martin Corp. and obtained the x-ray detector board.

Material for the structure has been purchased and construction has begun.

All hardware systems have been integrated. Flight software is being debugged and prepared for final testing.

A test plan to perform vertical and horizontal shock tests is being developed with assistance from Honeywell.

We are considering adding a thermal conduit to transfer heat from the flight computer to the photodiode in order to ensure proper photodiode operation temperatures.

## **2. Issues Encountered**

The x-ray detector system will only be capable of detecting very high energy x-rays and gamma rays. This was unforeseen and only discovered when we tested the detector board. However, the system functioned as expected when we performed testing. The issue is that the detector picks up too much noise at lower energy levels, thus we are looking into ways to reduce noise. We also were not expecting our detector to be omnidirectional, which appears to be the case. We are exploring shielding options, but at this point we may focus our scientific objectives on omnidirectional cosmic ray background analysis.

The interior of our structure is fairly cramped (see Figure 1 below). We are considering adding 5cm to our height to alleviate the issue, but a final decision on this has not yet been made. This would put our overall height at 25cm. We moved the detector housing to the interior because we found that high energy rays go through aluminum very easily.

An expected drop in personnel occurred once the school year ended. Operating with a three-man team has generated a heavier workload, but progress has remained steady.

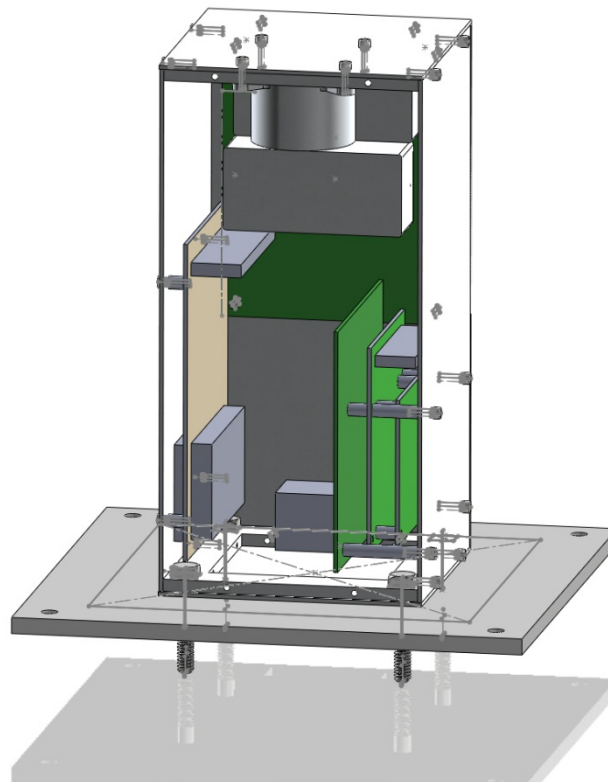
## **3. Milestones Achieved**

All flight hardware is functioning and integrated.

Fabrication and construction of the structure has begun. A mockup was also created and is allowing us to review hardware placement.

#### 4. Current Student Team

Name	Academic Level	Responsibilities
Patrick Doyle	Graduate Student – 1 <sup>st</sup> year	Team Lead. Final design analysis, test engineering, x-ray detector integration.
Curtis Albrecht	Graduate Student – 1 <sup>st</sup> year	Systems engineering. Hardware integration and software debugging.
Mark Abbotosway	Undergraduate – Senior	Structure design and construction.



**Figure 1.** Interior view of the payload. All hardware fits, but the wiring harness for the GPS receiver (tan board on the left) is very close to the detector board. If the walls are raised 5cm, the issue will be resolved.