

April 27, 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**

Two team members reviewed past HASP temperature data and are beginning the development of our thermal protection and monitoring system. Aerogel was decided to be too brittle and expensive for our payload, so we are returning to polyfoam insulation.

The structure is almost completely designed. We have settled on an isogrid configuration that should prove to be both lightweight and durable.

Breadboard tests of the power regulation and protection circuit have confirmed that we are protected against reverse polarity and any current spikes on startup.

The preliminary PSIP was drafted and delivered on April 20, 2012.

## **2. Issues Encountered**

The mass of our x-ray detector system is unknown and largely depends on whether we can run the detector with the power provided by the HASP flight system. We are drawing 356mA through the flight computer, IMU, and GPS, which leaves 144mA to power the detector. If the power draw from the detector board exceeds 144mA, then we will have to add a battery to our payload. We will be unable to measure this current draw until we visit Lockheed Martin Space and Missile Systems (LMSMS) in Sunnyvale, CA.

The detector system's mass also depends on the size of the scintillator we use. We have obtained some scintillator material, and we are confident that we will still be under the 3kg allowed a small payload.

## **3. Milestones Achieved**

We have made an agreement with LMSMS that we will be allowed to visit their facility in Sunnyvale, CA to perform testing on the x-ray detector system. This visit will be scheduled for late May or early June so as to give us enough time to build the detector described below.

We have decided to use a silicon avalanche photodiode affixed to a scintillator as our primary detector. The circuit board that is being provided by LMSMS can accommodate two such detectors, giving us the option to increase our collection area.

#### 4. Current Student Team

<b>Name</b>	<b>Academic Level</b>	<b>Responsibilities</b>
Patrick Doyle	Graduate Student – 1 <sup>st</sup> year	Team Lead and systems engineer. X-Ray detector and GPS integration
Curtis Albrecht	Graduate Student – 1 <sup>st</sup> year	Power management design and flight computer operations.
John Fraatz	Undergraduate – Senior	Attitude determination sensor integration.
Sean Grogan	Undergraduate – Fresh.	Structure design and mechanical drawings.
Zach Fadness	Undergraduate – Fresh.	Structure design, detector placement, and construction.
Ryan Carlson	Undergraduate – Soph.	Thermal protection and monitoring.
Brian Erickson	Undergraduate – Soph.	Thermal protection and monitoring.