Gannon University HARD payload
Status Report #5
5/25/2012

1. Achievements

- Recruited a graduate student to the team to assist the faculty advisors to review and test system modules
- Completed re-evaluation, design & unit & integration testing of the detector module and the comparator/coincidence detector modules, including:
  1) a test LED-driving circuit to emit photos from an LED
  2) 13 solid state photomultipliers (SSPM) and their amplifier circuit boards (the project payload needs four)
  3) Four output inverters based on an OP AMP (Texas Instrument TL972) with a sufficient gain (open-loop gain of 10 dB) at the intended operating frequency of 2.4 MHz to convert the negative pulse from the SSPM amplifier board to a positive pulse to work with the microcontroller logic levels (0~3.3V, with a High/Low threshold of 2.4V)
  4) Microcontroller codes to process a 4-bit logic table to pick 6 "coincidence" cases (two HIGH's and two LOW's) among 16 combinations of the four signals from the four SSPM amplifier boards/inverter circuits; successfully generated a series of time-stamps from a GPS board (the team verified that the latency of this GPS board is about 970 msec. This is the time interval between two consecutive arrivals of GPS strings at the microcontroller – not a major issue).
- Construction of a few payloads began (Styrofoam-based, the exterior dimension of 6x6x12" with 2.2 cm thickness of walls (a thickness of 2.5 cm was initially proposed). A table-top hot-wire cutter (Marvy Uchida, model # 3400) is utilized.

2. Issues

- No major issues

3. Next Steps
- Complete integration of a rotator and position adjustment module
- Complete design and testing of the power module
- Complete misc. features of the microcontroller (e.g., to save coincidence and time-stamp data to a memory card, etc.)

4. Current team members and leader

Nichole McGuire, Electrical Engineering (Team Lead)
Aaron Neiman, Computer Engineering
Joe Veneri, Electrical Engineering
Sriharsha Kotte, Electrical and Computer Engineering (Graduate Student)

Dr. Wookwon Lee, ECE Faculty Advisor
Dr. Nicholas Conklin, Physics Faculty Advisor