

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Student-Built High-Altitude Balloon Payload with Sensor Array and Flight Computer¹ RUSSELL JEFFERY, WILLIAM SLATON, University of Central Arkansas — A payload was designed for a high-altitude weather balloon. The flight controller consisted of a Raspberry Pi running a Python 3.4 program to collect and store data. The entire payload was designed to be versatile and easy to modify so that it could be repurposed for other projects: The code was written with the expectation that more sensors and other functionality would be added later, and a Raspberry Pi was chosen as the processor because of its versatility, its active support community, and its ability to interface easily with sensors, servos, and other such hardware. For this project, extensive use was made of the Python 3.4 libraries gps3, PiCamera, and RPi.GPIO to collect data from a GPS breakout board, a Raspberry Pi camera, a geiger counter, two thermocouples, and a pressure sensor. The data collected clearly shows that pressure and temperature decrease as altitude increases, while β -radiation and γ -radiation increase as altitude increases. These trends in the data follow those predicted by theoretical calculations made for comparison. This payload was developed in such a way that future students could easily alter it to include additional sensors, biological experiments, and additional error monitoring and management.

¹Arkansas Space Grant Consortium (ASGC) Workforce Development Grant

Russell Jeffery
University of Central Arkansas

Date submitted: 10 Nov 2016

Electronic form version 1.4