**Amateur Rocket Avionics System**

PRODUCT DESIGN SPECIFICATION

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Aaron Baker, Andy Rusinek, Daniel Schaeffer, Minh-Nhut Dang

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**1 PROJECT OVERVIEW**

**1.1 Background**

This project will develop a rocket avionics system for small model rockets. After we design a working version, we plan to create sellable kits which others becoming interested in amateur rocketry can use. On the system, we will have sensors for attitude and acceleration during flight, which will be processed on board and stored in a memory chip. The data will be retrievable after flight, and can then be processed on a computer and displayed visually.

**1.2 Overview**

The goal of our project is to create a small flight computer which can collect data in flight and store it for later analysis. To achieve this, we will use an ATTINY processor, an accelerometer, and gyroscope. The gyroscope and accelerometer with collect data during flight, which will then be processed by the ATTINY, and stored to memory. The system will be powered by two lithium-ion cells connected in parallel which will be rechargeable through USB. Because our memory chips and sensors run off of less than 20 mA of current, we will source power for these components through the ATTINY, and will use the lithium-ion cells specifically to power the ATTINY..

**2 REQUIREMENTS**

FUNCTIONALITY:

* Deploy recovery system for reusability of rocket and board.
* Sense acceleration, attitude, and rotation
* Must have ample power management to last at least 10 consecutive 30 second flights.
* Record flight data (acceleration, attitude, rotation) for retrieval after flight
* Be able to transfer data to computer for processing and display

PHYSICAL RESTRICTIONS:

* Must be 1x3 inches or smaller to fit inside rocket nose
* Durable through indefinite number of uses and crash landings
* Easily removed and reinserted into different type of rocket noses

DOCUMENTATION:

* Thoroughly documented schematics, PCB layouts, and design sketches with revision tracking
* General test plan for basic functionality of accelerometer and gyroscope
* Comprehensive User’s Manual for device operation and set-up

ECONOMICS:

* Have low total cost, under $60
* Must use easy to obtain parts from reputable vendors

GENERAL:

* Be visually appealing
* Be modular and expandable
* Have a visually appealing user-interface
* Integratable into other rocketry system