Atmospheric Data Collection
via High-Altitude Weather Balloon

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Mission Overview

Primary Objectives
• Test ionizing-radiation shielding
• Transmit telemetry via radio downlink

Secondary Objectives
• Collect weather information
• Collect EM intensity information
• Collect payload flight information
DESIGN
## Design: at a glance

<table>
<thead>
<tr>
<th>Total Mass</th>
<th>1300g</th>
</tr>
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<tbody>
<tr>
<td>Total Cost</td>
<td>~$800</td>
</tr>
<tr>
<td>Member Count</td>
<td>10</td>
</tr>
<tr>
<td>Initiation Date</td>
<td>January 23, 2015</td>
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<tr>
<td><strong>Highlights</strong></td>
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<tr>
<td>Custom Printed Circuit Boards</td>
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<tr>
<td>Functional Foam-Based Exterior</td>
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<td>LCD Diagnostic Display</td>
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<td>Radiation-Shielding Experiment</td>
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<td>Watchdog Timer</td>
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<tr>
<td>Lithium-Ion Batteries</td>
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<tr>
<td>Heating Pads</td>
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<tr>
<td>Four Solar Panels</td>
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</tr>
<tr>
<td>Eight Temperature Sensors</td>
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</tbody>
</table>
Power, Thermal, & Structure
Sensor Array

Accelerometer  Altimeter  Magnetometer  UV Sensor  Open Log

Thermistor  Geiger Counters
Printed Circuit Boards
Command & Data Handling

16:1 MUX

Arduino Micro (ATmega32u4)

Real-Time Clock
Thermal Testing

Battery and Heater Cold Test

°C

V

Battery Temp  Ambient Temp  Battery Voltage
Radiation Blocking
Geiger Counters
Radio Downlink

- Sensor Data
- Arduino Uno Microcontroller
- Terminal Node Controller
- Transmitter
- Receive Radio
- Display/ Storage on Computer

Diagram showing the components of a radio downlink system with corresponding labels.
Launch
RESULTS & ANALYSIS
Pressure
Battery Voltage
Internal Temperature
External Temperature

External Temperature with Altitude

Temperature (°C)

Altitude (km)
Solar Panel Voltage

Solar–Panel Voltage with Altitude (Panel 2)

Altitude (km) vs. Solar Panel Voltage
Solar Panel Voltage

Solar–Panel Voltage with Time and Bearing (Panel 2)
Ultraviolet Light Intensity
Comprehensive Acceleration

Payload Powered On

1st Launch

2nd Launch

Balloon Burst

Payload Touched Down

Payload Picked Up
Conclusion
QUESTIONS