High Altitude Balloon

Design Review
February 18, 2011

Team: FoxHound
Team Leader: Elliott Moser
Adam Carpenter, Daniel Marietta

Faculty Advisor:
Dr. John Wu

Engineering Mentors:
Bruce Rahn, Steve Overmyer, Nicholas Baine
Outline

• Project Goals
• Purpose
• Design Requirements
• Block Diagram
• Design Specs
• Budget
• Legacy and Other
• Schedule
• Questions
Goals for the Project

• Primary Goal:
  – GPS Repeater System

• Secondary Goal:
  – Tracking Controller System
  – CEG Team leading
  – Provide assistance when needed
Purpose

• GPS Repeater System
  – Imposing physical structure
  – Will allow for indoor testing of HIBAL systems

Design Requirements

GPS Repeater

• L1- 1575.42 MHz
• Received Signal Power
  – -130 dBm (-160 dBW)
• Thermal noise floor (2 MHz)
  – -111 dBm (-141 dBW)
• Climate
  – Cold, Heat, Rain, Snow, etc.
• Buy or build

GPS Repeater Specs

- Active Antenna
- Radiall/Larsen GPS Base Station Timing Antenna #GPS0015-C
  - 25 dB Gain
  - Noise Figure of 2.5 dB
  - BW ±1.023 MHz
  - 4.5 to 12 V
  - 30 mA Max

Source: EBay: www.ebay.com/
GPS Repeater Specs

- LMR 400
- ~5 dB/100 ft Loss
- Noise Figure of ~5 dB
- Need about 50 ft

Source: Google images/
GPS Repeater Specs

- GPS Splitter
- GPS Active Splitter-58535A
- 3 dB Gain
- Noise Figure of 5 dB
- BW ± 20 MHz
- 4.5 to 13 V
- 23-48 mA

GPS Repeater Specs

- Bias Tee
- Build in house
- Low dB loss ~0.2 dB loss
- Low Noise Figure ~0.2 dB
- 4.5 to 13 V
- < 30 mA

Source: Google images/
GPS Repeater Specs

- Passive Antenna
- GPS Antenna 72009002 Rev. B
- Radiates received signal in Russ 018
GPS Repeater Specs

- GPS Amplifier
- 25 dB Gain
- Noise Figure of 3.8 dB
- BW ±1.023 MHz
- 4.5 to 13 V
- May not need

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Legacy and Other

• Learn legacy systems
  – AVMAP/APRS and CW Beacon Subsystems
  – Power Subsystem/Cut Down Subsystems
  – Flight Video/900MHz Experimental C³ Subsystems

• Learn Radios and acquire Ham license (100%)

• Help EE and ME teams when needed
Schedule

• Week 7: Design Review Oral presentation

• Weeks 8-10: Complete design and begin implementation. Parts start to arrive.

• Final week- Design Project Midpoint Progress Conference

• Balloon Launch- Feb 26, Mar 5, Mar 12 ????
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• Web Page
  – www.cs.wright.edu/balloon
Questions
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