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HIBAL DESIGN REVIEW

October 2008
Overview

- Project Overview
- Video Transmitter
- Antenna
- Video Receiver
- Balloon Cut down
- Flight of Saturday October 18, 2008
- Time Permitting Projects
- Summary
Project Overview

- Sending a live analog video feed from the balloon to a ground station
- Alternate three video camera feeds which will be controlled by an altimeter
- On-screen GPS will be displayed on video feed
- Recorded on pocket DVR inside command module
Video Transmitter

- Videolynx VM-70X
- HamTV
- Variable transmission power
  - 0.5 to 5 Watts
- Transmits up to 78 miles LOS
- Powered by a lithium polymer battery
- Heat sink required
- Low weight, small size
Video Transmitter
Antenna

- We will build a pin wheel antenna
- Horizontally Polarized
- Omni-Directional
Video Receiver

- Transmission can be received on cable channels 58, 59 and 60
- Receiver will be laptop PC with a tv tuner USB stick
  - Ability to record signal
- Pinnacle - PCTV HD Pro Stick USB 2.0 TV Tuner
Video Receiver

PCTV HD pro stick
Enjoy live HD or SD TV on your PC
anytime, anywhere

- Instantly turn your PC into a personal digital video recorder
- Record your favorite shows to your hard drive or direct-to-DVD
- Included mini remote control and high-gain telescopic antenna
Balloon Cut Down

- **Purpose**
  - We will not be weight restricted if we can get system to work
  - Emergency cut down

- Attempted three designs
Design #1

- The first design was more of a test design by the mechanical engineers.
- Attempted 9 v battery but couldn’t get enough current draw to sever the rope.
- They directly connect an 18 v drill battery to a piece of nichrome wire.
- Problems:
  - Too heavy
Release Circuit #1

16 V

Nichrome
Design #2

- Altimeter based
- Used command module
- Implemented use of a charging circuit from a disposable camera and a capacitor
- Used a 540 uF capacitor charged to 350 volts to acquire around 33 Joules

Problem:
- UNSAFE!!!!!
Release Circuit #2

charging circuit

\[ E = \frac{1}{2} CV^2 \]
\[ = \frac{1}{2} (5.4 \times 10^{-6})(350)^2 \]
\[ = 33.075 \text{ J} \]

M.C.
Relay
Nichrome
Design #3

- Uses most of the circuitry from the second design with the addition of another relay
- Stops the charging circuit from recharging the capacitor
Accelerometer Readings

WSU HIBAL 18 October 2008 Flight Composite

Tilt (raw sensor count)

Degrees (F)

Time (seconds)

X Axis  Y Axis  Z Axis  Temperature
October 18, 2008 Flight

- The mechanical engineers created a bag in which we will be able to deploy the balloon in non-fair weather
- We attached the balloon cut off system but failed to turn the circuit on
- Acquired acceleration and temperature data for use for later designs
- Acquired data regarding the solar cells
- The mechanical engineers tested out their new flow meter. It didn’t work.
Predicted VS. Actual
Outcomes

- Landed inside of Daniel Boone National Forest.
- Nick Baine flew a couple of the team members down and recovered the balloon.
- The pink parachute one of our faculty advisors picked out helped us in the recovery of the balloon.
- Safety feature on the balloon cut down system worked.
Take Off Video
Time Permitting Projects

- Backup Command Module
- Gyro Controlled Camera System
- Power Bus
- Strobe position so we can fly the balloon at night
- Infrared image capturing of terrain
- Balloon Launch Procedure Manual
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Questions?