




HIGH ALTITUDE BALLOON TEAM

Midpoint Progress Report
19 March 2010



Outline

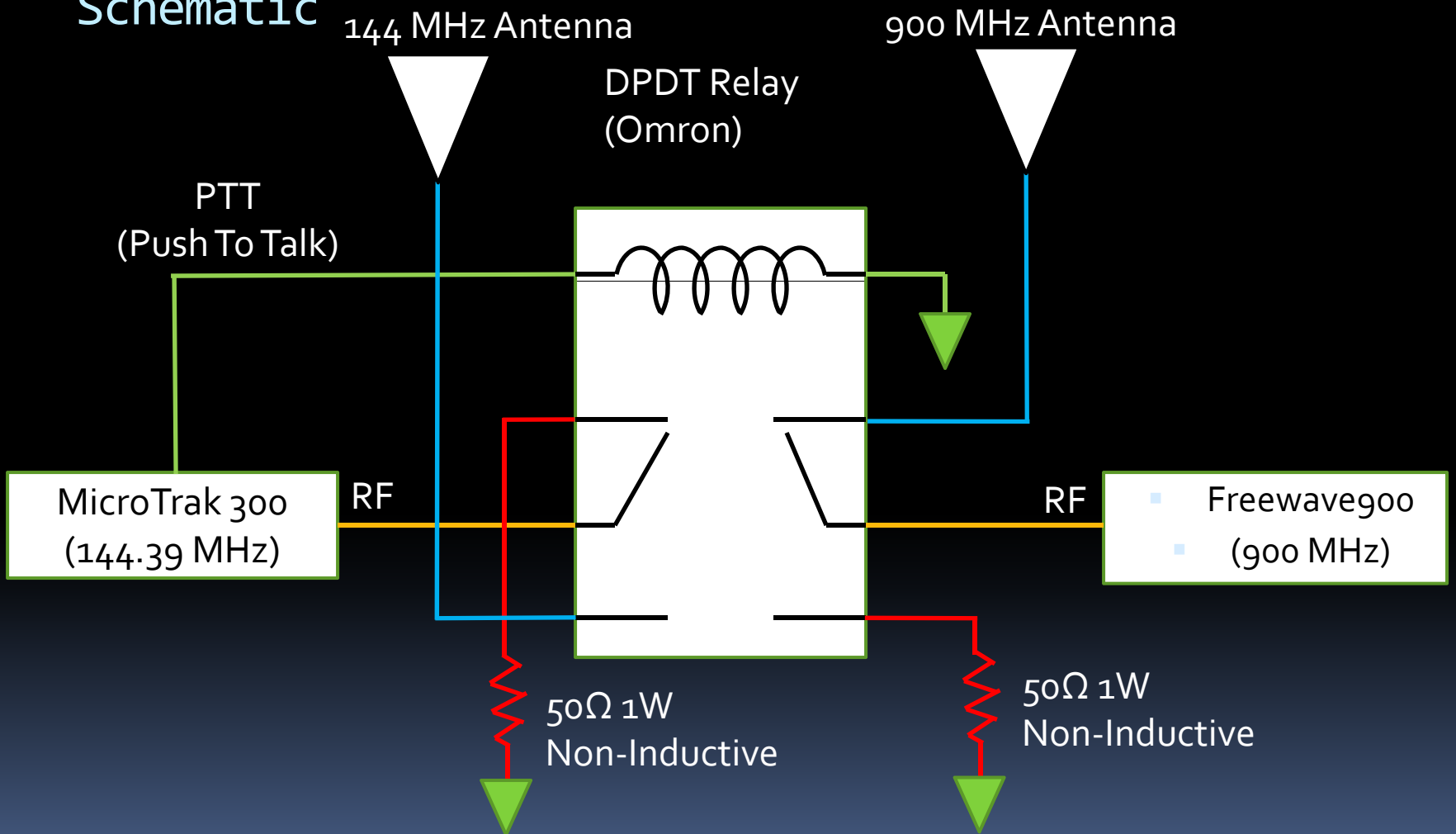
- Package Antenna
 - GPS Repeater
 - Russ Antenna
 - Flight 15!
 - Flight 16...
 - Schedule
- 

Package Antenna

- Design Change
 - Determined Dual Antenna is a MUST!*
- Work with Dr. Riechers
 - Antenna Placement
 - Antenna Radiation patterns
- All parts are here
 - Cables
 - Relay
 - Resistors

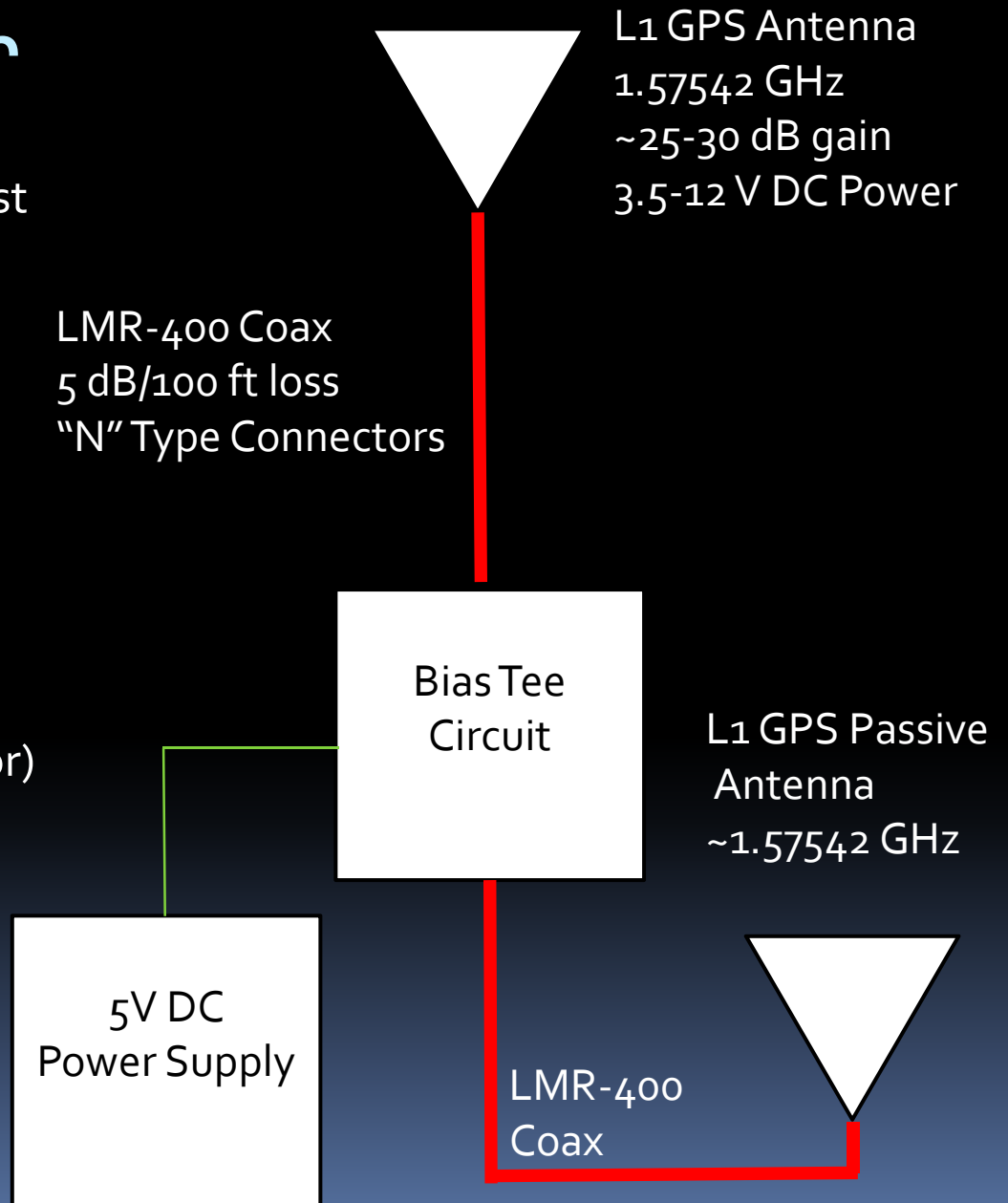
Package Antenna (cont'd)

Schematic



GPS Repeater

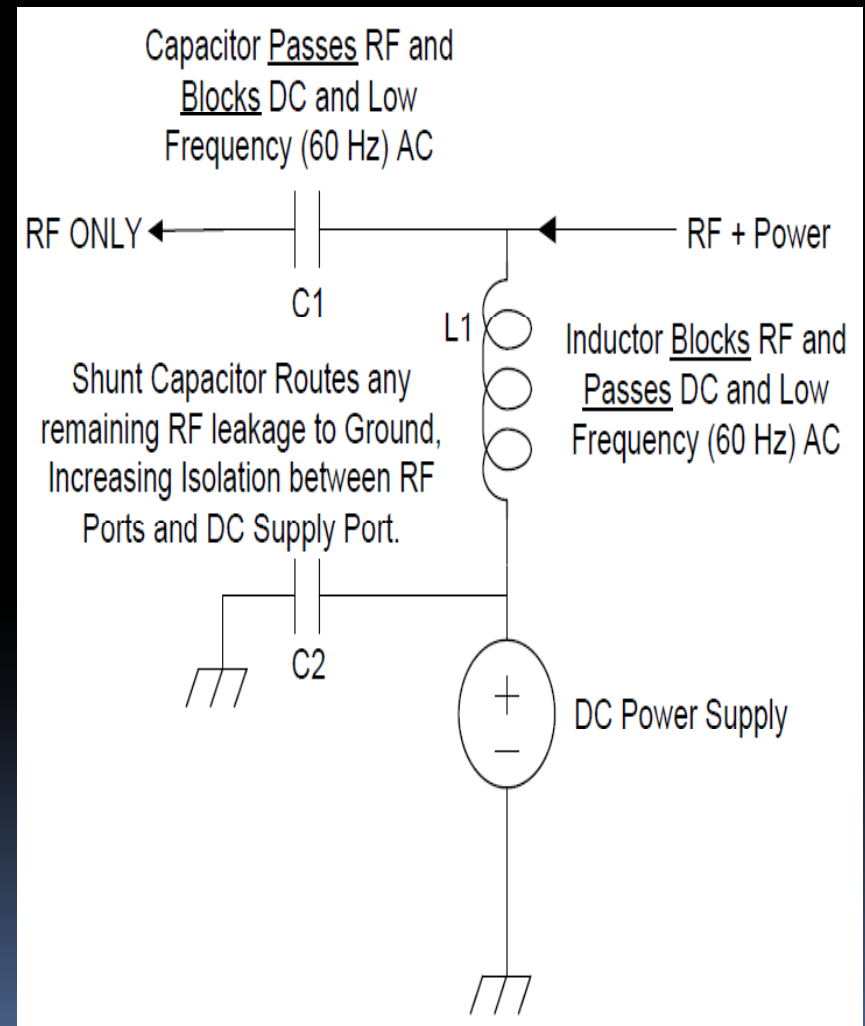
- Mentor Bruce Rahn has most of the parts
 - Active GPS Antenna
 - Passive GPS Antenna
- LNA if needed
 - MMIC
 - 3-5V DC
 - 500MHz ~ 4GHz
 - Surface Mount
 - Possible problem
 - 14 dB gain
- Bias Tee (DC Current Injector)
 - Needs to be built
 - Good design
- LMR-400 Cable
 - Coax
 - 5 dB loss per 100 ft
 - Needs to be run
 - Conduit in place
 - Connectors present



GPS Repeater (cont'd)

Bias Tee Circuit

- Consists of a DC Power source
 - External connection
- At least 1 Inductor
- 1 Capacitor Minimum
- Needs to supply <50mA of current
- $L_1 = 0.6 \text{ nH}$
- $C_1, C_2 = 2 \text{ pF}$
- $f_{\text{Resonance}} \sim 4.6 \text{ GHz}$



Russ Antenna

- Constructed (In Lab)
- Partially tested
 - Elevation (180°): 67 sec.
 - Azimuth (360°): 58 sec.
- GS-232B Problems
 - Can't control via computer
 - Configuration issue???
- Tower Construction Delays



Flight 15

06 March 2010

- Success!!!!!!
- Tested 4 NiChrome Designs
 - All worked properly
 - Slight issue with Zero-G Release
- Both Packages Recovered



Flight 15 (cont'd)

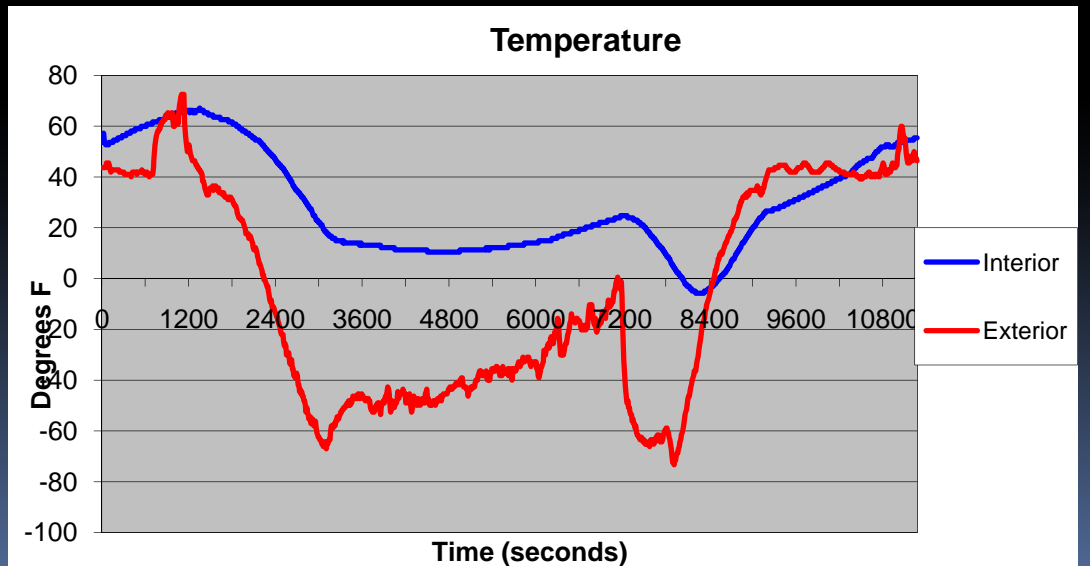
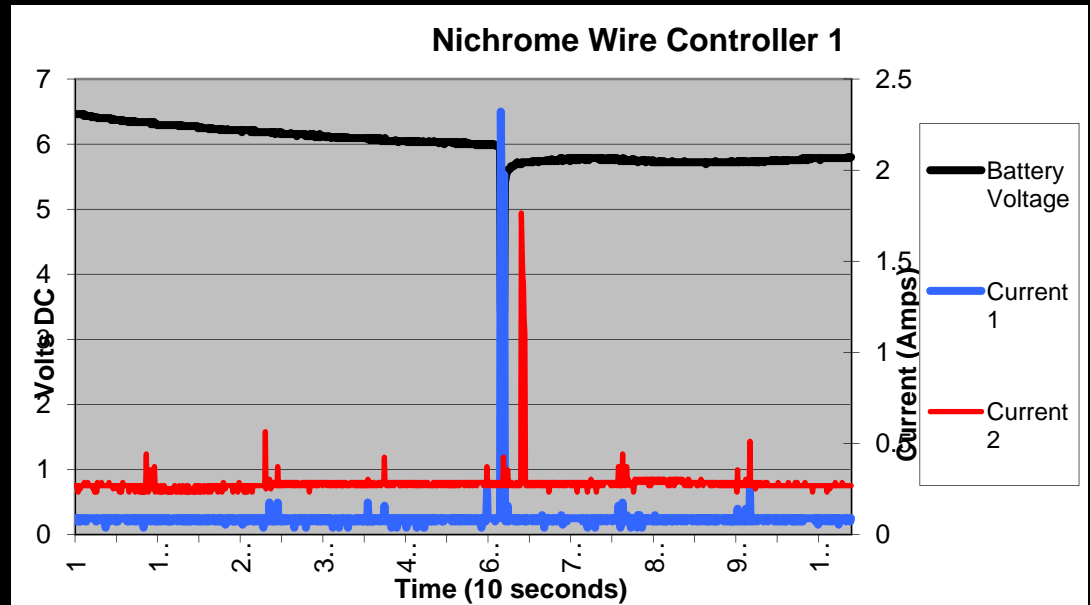
Balloon Path



Flight 15

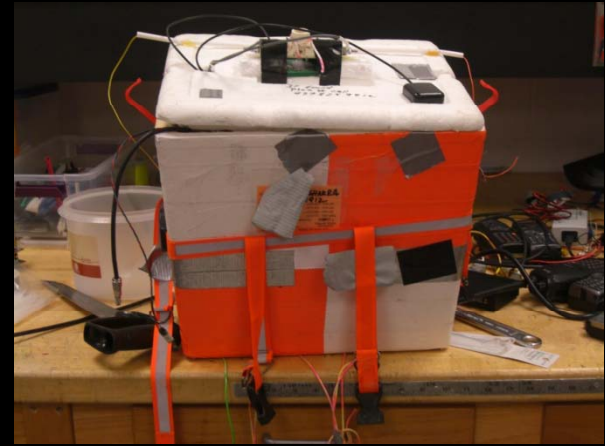
Data

- Device 1 (Zero-G) (Blue Line)
 - Calculated Resistance
 - 0.8 Ω
 - Measured Resistance
 - 0.68
 - Actual Resistance
 - 2.75 Ω
- Device 2 ("lowa" device) (Red Line)
 - Calculated Resistance
 - 0.7 Ω
 - Measured Resistance
 - 1.6 Ω
 - Actual Resistance
 - 3.33 Ω
- No data on other devices
- External Temp
 - Minimum -75°F
- Internal Temp
 - Minimum -5°F



Flight 16

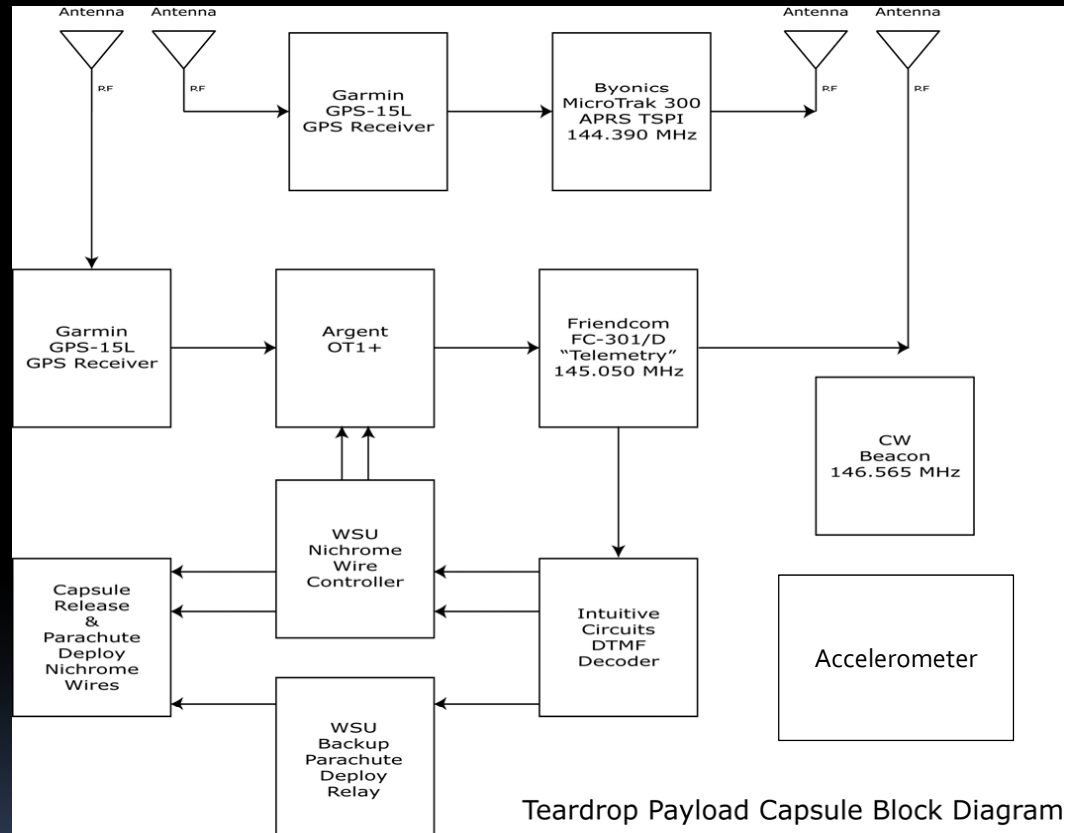
- Scheduled 26 or 27 March 2010
- Top Package same as Flight 15
 - Minus Basic Stamp
- Bottom Package
 - Teardrop Package
 - Re-wired
- Purpose: To collect “freefall” data*



Flight 16

Configuration

- Almost Identical to Flight 13
 - No DVR
 - Accelerometer
 - X, Y, and Z axes



Schedule

- Flight 16
 - Tentatively 26 or 27 March 2010
 - Full Systems Test 19 March 2010
- Construct Russ Antenna Tower (Spring Break)
- Construct Antenna Switching Circuit
 - Week of Spring Break
 - Test at the same time
- Implement GPS Repeater (S '10 Wk 1)
 - Possibly delayed if LNA is needed

Questions?

