Performance Review

Senior Design Team
  Dan Holmes
  Nick Helseth
  Rich Bingham
Goal Statement

• Dr. Edwin Odom and the University of Idaho Formula SAE design team have requested a telemetry package to help analyze performance data of the vehicle and driver. Dr. Odom believes this package will enhance vehicle development, driver performance, and become showpiece for the team. As a showpiece, it will help increase vehicle’s scoring in competition. The package will have a data acquisition system with sensors to log vital data. A wireless transmission system will send signals from the data acquisition system to a laptop base station.
Alternate Methods

• Data Acquisition System
  – Commercially available systems
  – Custom microcontroller based system

• Telemetry System
  – 900 MHz – 19.2 kbps
  – 2.4GHz Solutions:
    • FHSS – 1-2 Mbps
    • DSSS – 1-11 Mbps
Final Design
System Overview

- Data is collected using the DL1
- Data is sampled using Rabbit Microcontroller
- Data is transmitted using MaxStream 900MHz radio
- Data is collected with laptop computer
DL1

- 15 inputs
  - 8 analog
  - 6 RPM / wheel speed
  - 1 digital (lap beacon)
- Internal accelerometers and GPS
- Real-time data output through serial port. (115.2kbps)
DL1

• Working with Race Technology
Microcontroller

- Rabbit 3000
  - UI already has development systems
- Fast – 8 bit, 55.5 MHz
- Extensive I/O facilities
  - 6 serial ports
  - 56+ Digital I/O pins
MaxStream Radio

- Transmitting rate: 19.2kbps
- Range: 3 to 7 miles LOS

Dipole Radiation Pattern
Laptop Computer

- Hardware
- Software
Best Design Decision

- Faster time to market
- Low cost
- Proven technology
  - Race Technology's experience
Deliverables 12/15/04

• Radio range tested
• DL1 bench tested
• Microcontroller code design
Deliverables 4/15/05

• Finished enclosure for all devices
• Power system for all devices
• System bench tested
• System installed on car
• Documentation
Budget

- MaxStream Radio: $315
- DL1: $0
- Rabbit Microcontroller: $60-80
- Misc: $100
  - Enclosure
  - Cables
  - DC/DC Converter