Presentation Outline

- Project Overview
- Background
- Cost
- Team Organization
- Goals
- Team Progress
- Obstacles
Project Overview

• What is power measurement?
• Why are we doing this project?
• How will we do this?
• Who will this benefit?
Background

• Existing Products
  – SRM, Power Tap, Polar,
  – Quarq CinQo
• Bicycle Computer
  – Garmin Edge 705
• Wireless Transmission Protocol
  – ANT+
• Strain Gages
Cost of Current Products

- SRM PowerSystem
  - $2,607.80
- PowerTap
  - $999.00+
- Quarq Cinqo
  - $1495.00
Cost of Components

- **Strain Gages**
  - $5/each, 20 needed
- **Electrical Components**
  - ~$80
- **Garmin Personal Computer**
  - $350
- **Total**: ~$530+
Team Organization

- **Mechanical**
  - Team Leader
    - Brandon Marcellis
  - Team Members
    - Brian Lam
    - Brandon Marcellis
    - Henrietta Tsosie
    - Ivan Voukadinov
    - Rebecca Martin
    - Stefan Stevanovic

- **Electrical**
  - Team Leader
    - Bryan Kaminski
  - Team Members
    - Arkadiusz Ziomek
    - Bryan Kaminski
    - Edumaregbemiro Odunaiya
    - Stephanus Halim
    - Tarun Anupoju
Goals – Mechanical Team

• Apply strain gages to crankset
• Design a holder for Reed switches
• Design a way for the Reed switches to measure crank angle
• Get the strain gage software operational
• Test the crankset/gage combo and develop algorithm for measuring the power output
Goals – Electrical Team

• Implement and develop an algorithm to calculate the applied torque at the crank set
• Implement a fast and efficient switching mechanism for the Wheatstone bridge of gages
• Transmit the data wirelessly with minimal data loss to the Garmin Edge 705 using the ANT+ protocol
• Improve overall power efficiency of the circuit
Team Progress - Mechanical

- Applying strain gages to the crankset
- Sent measuring equipment to manufacturer for upgrade
Team Progress - Electrical

- Soldered the switch IC into a board
- Tested each switch on the IC to a simple circuit containing LEDs
- Researched various documentation and code snippets for ANT+ wireless
Obstacles – Mechanical Team

- Best position to mount gauges
- Make sure the software is calibrated and accurate
- Mounting the Reed switch in a simple manner and a protected location
- Making sure the algorithm is accurate and representative of the real power output
Obstacles – Electrical Team

• Accurate crank angle measurement can be difficult
• ANT+ wireless device continues to be a challenge to write code effectively.
• Maximize battery life
Any Questions?