WaterMainia

Greg Boudreaux
Team Manager

Michael Moran

Jon McAvoy

Professor Hollot
Advisor
Project Description - Watermainia

Water Conservation

Water is wealth
It’s time to save!

Water Pipe Damage
Requirements Analysis: Specifications

1. Must be implemented using 3/4” pipe
2. Water flow data is metered and recorded
3. Store data for previous two years
4. Display water consumption data in tables, line charts and pie charts
5. Close water main & notify owner within one minute from pipe burst
6. Alerts owner of any sized leaks
7. Power < 50W
8. Cost <$500 budget
CDR Deliverables

- Fully Parametrized Flow Data
- Data Analysis
- Integrated and Compacted Design
System Structure - Block Diagram

- Water Source
- Power System
- Flow Sensor
  - Noisy signal created
- ADC
  - Clean signal
  - Data Transfer
- Rasp Pi 3 Model B
- Bluetooth Chip
- WiFi Chip
  - 3.3V
- Solid State Relay
- Emergency Shutoff Valve
- Manual Override
- Cloud Server
  - Alert Message
  - Data Transfer
- Android App
  - Data Transfer
Water Flow Detection

1. Water Source
2. Flow Sensor
3. Flow Algorithm
4. Solenoid Valve
5. Flood Detected
6. Solenoid Closes
7. Water Distributed Through Home

Flow Voltage
Electric Interference

- Our usage of a sump pump in the test system created an unforeseen consequence - electric interference
- We measured extremely large amounts of unexpected voltage off the electrodes
- Our signal from the coil was completely buried under this noise
Hall Effect Sensor

- Mechanical Flow Meter with a semiconductor attached to one fin of a turbine. On every revolution a square pulse is generated when the semiconductor passes the magnet.
Electromagnetic Sensor
Power System
Software
Android App

WaterMania

VIEW WATER USAGE

SETTINGS

Enter Start Date  Enter Start Time

Enter End Date  Enter Start Time

Connect WiFi via Bluetooth
Manual Valve Control
Change Device Mode
Alert System

Change Device Mode

CANCEL  SUBMIT

CANCEL  SUBMIT
Project Outlook

- 3D Printed (and Shielded) Enclosure
- Reduce noise from outside sources
- All analog circuitry moved to PCB
- More accurate water flow data
- Most robust data
Challenges
Gantt Chart

**Dates**


**Project Milestones**

1. Group Solidifying
2. Brainstorm Project Ideas
3. Seek Out Advisors
4. Prepare for PDR
5. Design and Build Power System
6. Design and Build EM Flow Meter
7. Create Software to Close Valve
8. Prepare Presentation
9. Write MDR Draft Report
10. Write MDR Final Report
11. Prepare for CDR
12. Integrate Systems
13. Prepare Presentation
14. Prepare for FPR
15. Finish Prototype
16. Polish Design
17. Prepare Presentation
18. Prepare Demonstration

**Milestones with Dates**

- **PDR** 10/21
- **MDR** 12/5/16
- **SDP Final Report** 1/25/17
- **SDP Draft Report** 12/16/16
- **CDR** 3/9/17
- **FPR** 4/15/17
- **Demo Day** 4/22/17

Colors:
- Red - Greg
- Blue - Jon
- Green - Mike
- Orange - All
Prototype Demo
Thank You

Questions