**489 Final Project Notes**

**Team 1:**

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Jeff Terrell – Hardware

Zach Partal – Server

Jason Moore – Algorithm

Jeff Jensen – App

**Phase 1**

Initial project component setup/configuration.

*Equipment*

* Cantenna (vertically polarized)
* Reconfigurable Patch Antenna (switchable polarization state horizontal 🡪 vertical using +/-12VDC bias) 🡪 need an H-bridge
* Stepper motor
* Teensy 3.0 or Teensy 3.1 microcontroller to control motor
* Android phone

*Tasks*

* Design 3D printed bracket/mounting hardware for cantenna to stepper motor
  + PVC mast/conduit for feed line
  + End-pieces will attach to motor shaft and cantenna
* Characterize the antennas using additional cantenna
  + 3 total characterizations (1 for cantenna, 1 for each polarization state of reconfigurable patch)
  + Phone records geo-tagged RSSI data (take a lot of data points)
  + 360deg characterization @ multiple radii
* Produce a map of RSSI for each antenna
  + Populate database
  + Visualize using fusion tables

*Summary*

1. Pattern measurement
   1. 1deg increments
   2. Cantenna
   3. Reconfigurable Patch
      1. Vertical polarization state
      2. Horizontal polarization state
2. Motor Controller/Mount
3. RSSI/GPS measuring app
   1. Database
   2. Fusion Table

**Phase 2**

Building an idea of the target environment (similar to acoustic sounding). Environment will incorporate scattering objects to leverage multipath propagation.

*Deliverables*

* Software Component - App that takes GPS points and RSSI
  + Sample twice, create 2 maps, 2 perspectives of environment
  + Matrix A – Heat map for point A
  + Matrix B – Heat map for point B
  + RF is not scalar, will need to average measurements…need clarification on this
* Hardware Component -Develop a program to control motor/focus cantenna radiation. Android app will send commands to microcontroller via internet to control motor to maximize RSSI

*Summary*

1. Field measurement using omnidirectional antenna (x2)
2. Field reconstruction in grid
3. GPS tracking of cantenna

**Phase 3**