

**MICHIGAN STATE**  
**UNIVERSITY**

# Project Plan

## Dynamic Spectrum Control for Mobile Platforms

### The Capstone Experience

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*From Students...  
...to Professionals*

# Project Overview

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- Sample surrounding radio frequency spectrum
- Display data on graph, offer recommendations to user
- Provide interface to specify policies used in making recommendations
- Send results to EZ-Connect API to tune military radios to recommended frequencies



# Functional Specifications

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- Clearly displays RFS data
- Provides interface for creating and selecting from a set of policies
- Saves policies from time of use
- Provides user with a set of recommendations (single response to requesting application)



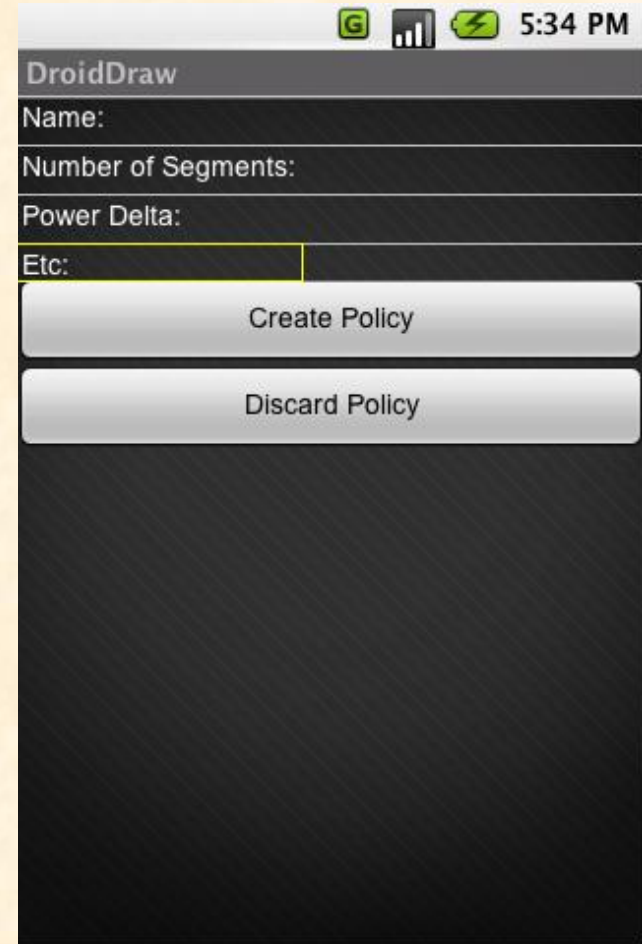
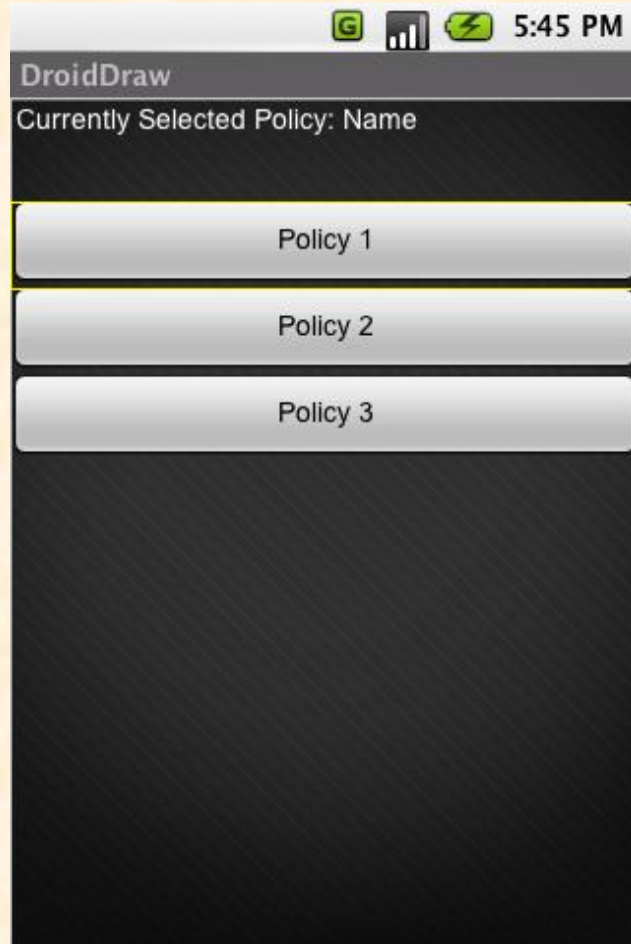
# Design Specifications

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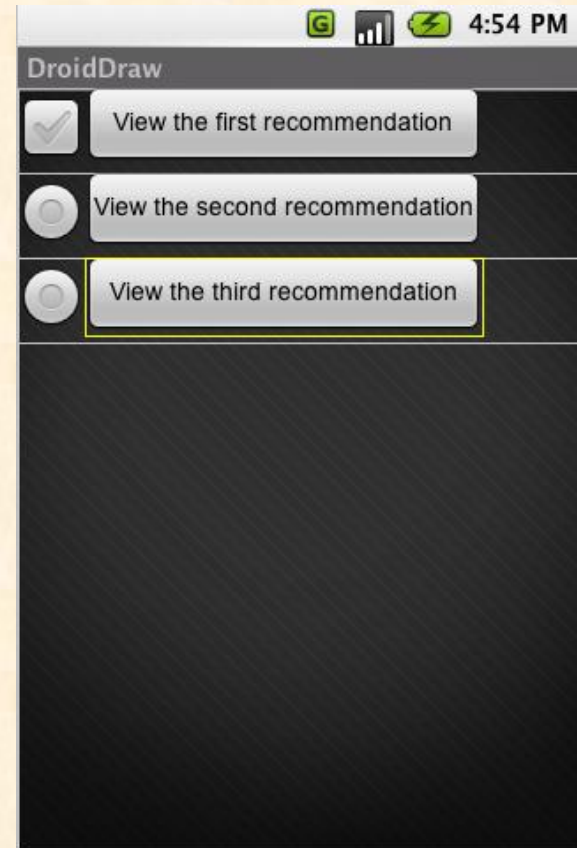
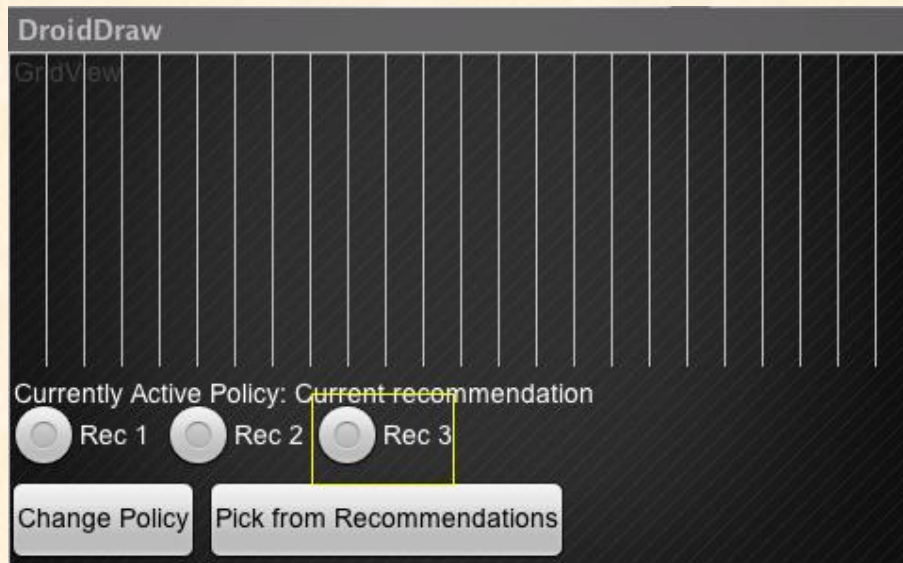
- RFS data graph is scalable, displays multiple recommendations simultaneously (with inactive rec. at ~50% alpha)
- User can specify how many recommendations are selectable
- Controls to edit/delete policies are a context sensitive menu (long touch at menu)



# Screen Mockups



# Screen Mockups



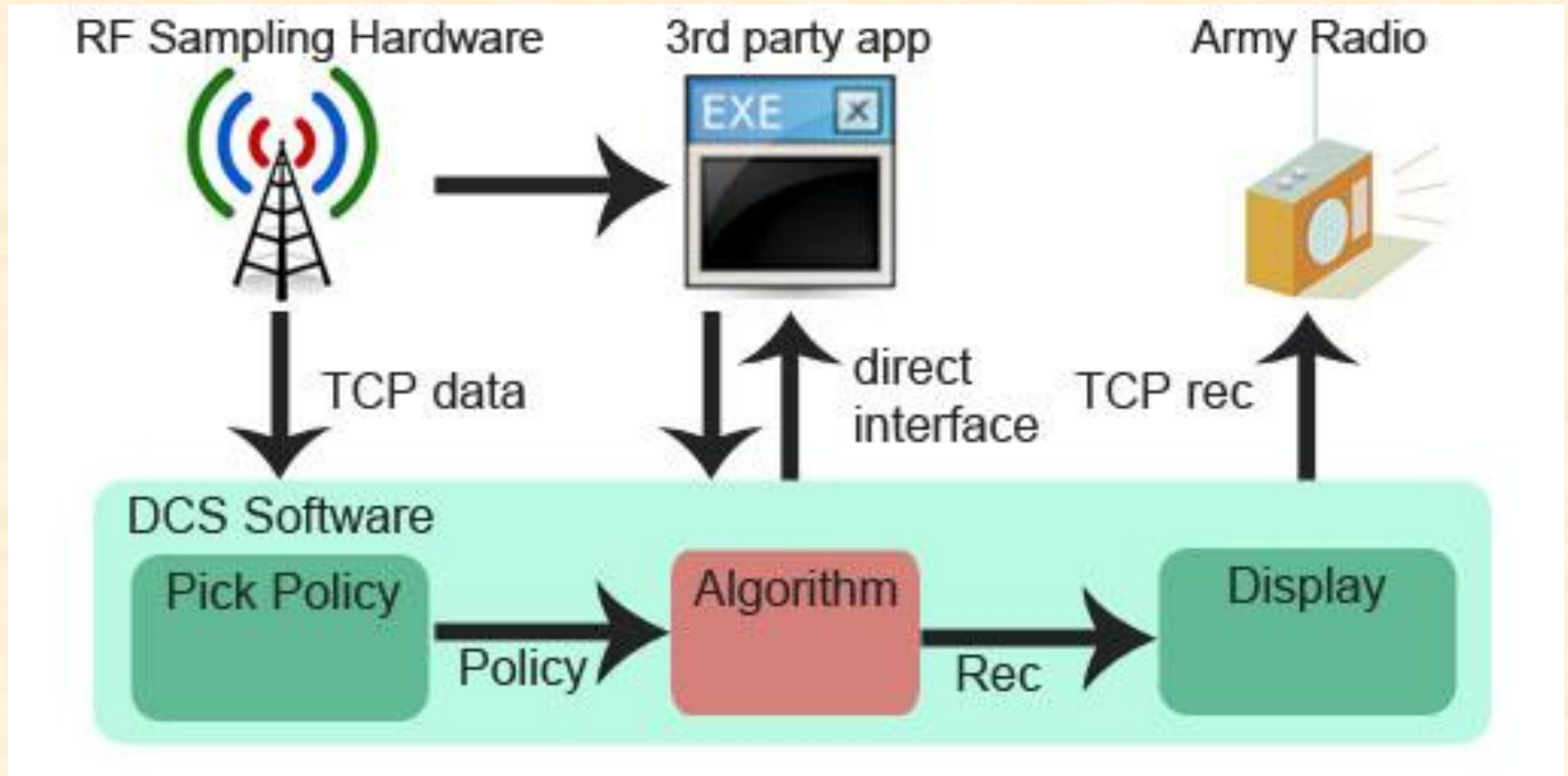
# Technical Specifications

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- Alpha version developed on Android, Beta includes port to Laptop (OS agnostic)
- Primary algorithm written in C, implemented in app with Android NDK
- Policy data stored in SQLite database local to device
- Set of recommendations displayed dynamically



# System Architecture





# System Components

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- Hardware Platforms
  - RF sampling hardware
  - Android/Laptop interface
  - Radio
- Software Platforms / Technologies
  - Android OS, QT
  - C, Java, SQLite
  - TCP/IP



# Testing

- Interface/data testing: Android Emulator
- Algorithm efficiency/accuracy testing:  
Command line
- First round device testing: Visit to Raytheon  
(pre-Alpha presentation)
- Laptop port testing: Lab machine/personal  
laptops
- Full functionality testing: Second visit to  
Raytheon (pre-Beta presentation)



# Risks

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- EZ-Connect
- Real Radio Data
- Connection to someone else would be impossible
- Executing code with the NDK
- Srinivasa is not a US citizen

