Radioactive Simulator
Jesse Chisholm, John Choi, Elliot Lawrence, Brandon Lee, Russ Vick
Sponsor: Lawrence Livermore National Labs
Mentor: Gregory White

Introduction
The dangers of detecting and removing radioactive material can often make training simulations difficult to replicate in respects to the threat of radioactive exposure. Lawrence Livermore National Laboratory (LLNL), a federally funded research facility specializing in the safety and security of the nation’s nuclear research has devised a method of training that eliminates the dangers of exposing trainees to radioactive materials through the use of mobile phones and tablets.

Objective
• Implement the Android Mobile Application for use with Android tablets
• Maps that react in realtime
• Spectrum graph that updates every second
• Dosage graph that updates every second
• Mimic the Windows UI
• XML parsing for different scenarios and isotopes
• Correct calculations regarding simulation of spectrum and dosage

Implementation
GPS:
• Online - Google Maps API for locating and tracking the user.
• Offline - GPS and a PNG map image defined in scenario XML.
Graphs:
• Graphing information uses information scenario file GPS data.
• Uses jJoe64 graphing library to display the graphs.

Future Work
• Implement solutions to scaling constraints to allow for use on mobile phones.
• Support Command mode allowing for trainer to observe the trainee during a radioactive scenario.
• Implement networking capabilities which allow tablets to display their position on a shared map.
• Adjusting some functionalities in the iOS app

Acknowledgements
• Greg White - Provided technical direction and support
• Sepideh Mazrouee - Helped set up meetings and provided constructive feedback on improvements for the application.

Initial Concerns
• Working with jJoe64s GraphView library.
• Loading in various sources (background, ellipse, point).
• Syncing graph with users movement.
• Using stored maps for offline GPS.
• Porting established C# code to Java / Android Studios
• Parsing XML for different isotopes and scenarios.

Design Layout
Map:
• Stores and displays user location.
• Records distance from isotopes in the surrounding area.
• Provides online/offline capabilities in areas of little/no wifi.
Top Graph (Isotope Channel):
• Shows information about the kind of isotope being detected.
Bottom Graph (Dose Rate):
• Shows current dosage exposure. Higher dosage rate indicates closer proximity to a radioactive source.