



SENIOR CAPSTONE FINAL PRESENTATION

TEAM MAHOGANY

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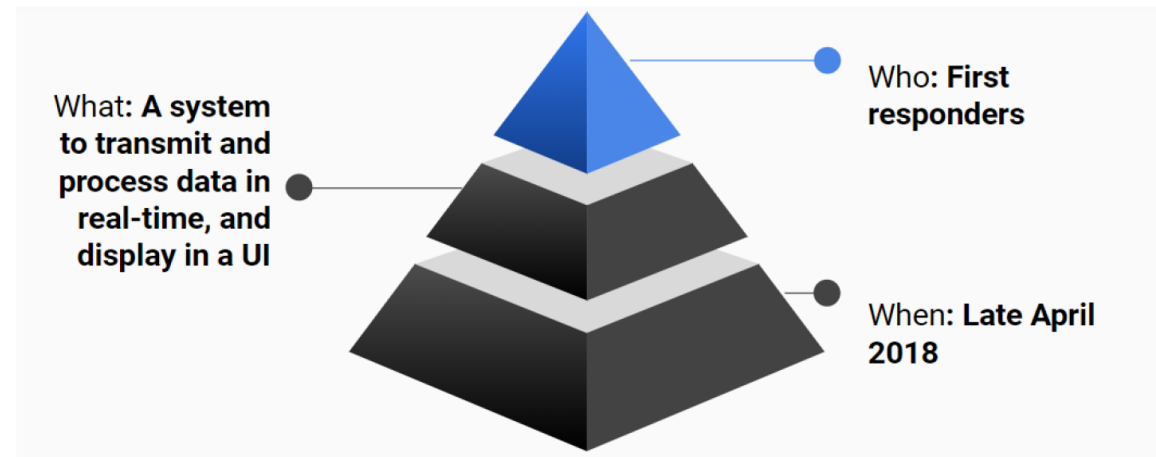
PROBLEM STATEMENT

- DISASTER STRIKES

- Natural Disaster
- Dirty Bomb
- Nuclear Power Plant Failure
 - E.g., Chernobyl or Stuxnet

- Why

- First responders frantically work to quickly assess the situation and respond accordingly
- Open-source drone image processing and displays are plentiful, but they are all focused on post-flight processing/display
- We need a solution that works without an internet connection



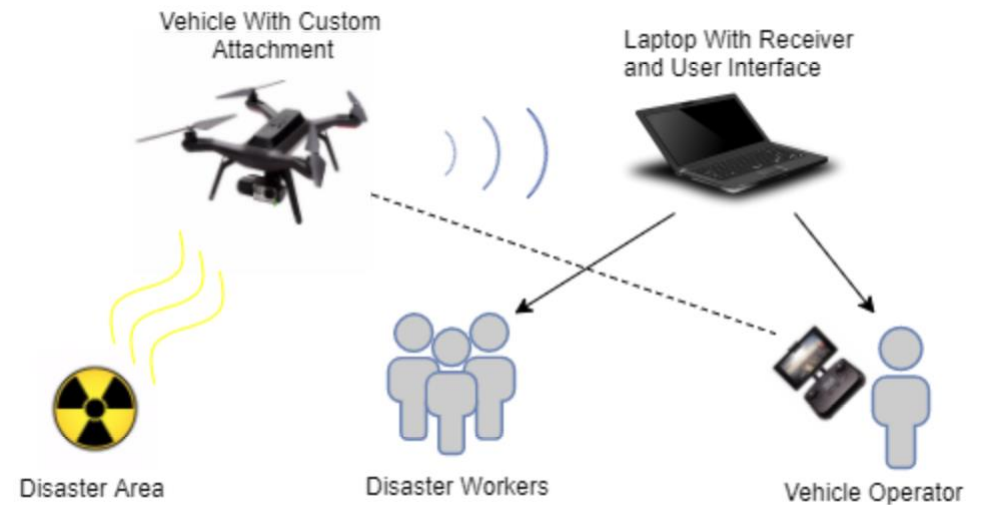
RESOURCES

- Dr. Karen Panetta
 - Sponsor
- Luke Harwath
 - Help.NGO – DIRT Director of Communications since 2011
 - First deployment was to Japan to deliver dosimeters (device used to detect ionizing radiation)
 - Was the motivating factor in our pivot to decoupling from drone software/hardware to a stand-alone black box system
- Professor Guyer and Professor Lasser



OUR FINAL PROTOTYPE

- Receiver and transmitter circuit prototypes
 - “real time” (as close as we can get)
 - GPS, radiation, and image data transmitted via radio signal
- Plug into GUI based on JOSM project
- Future Work
 - Form factor of hardware
 - Improved hardware component selection
 - Reduce connection flakiness
 - Improve range and speed of transmission
 - Improved range would likely mean larger power needs
 - Image stitching on GUI end
 - Simplify steps/driver installs required to talk to our microcontrollers over serial port

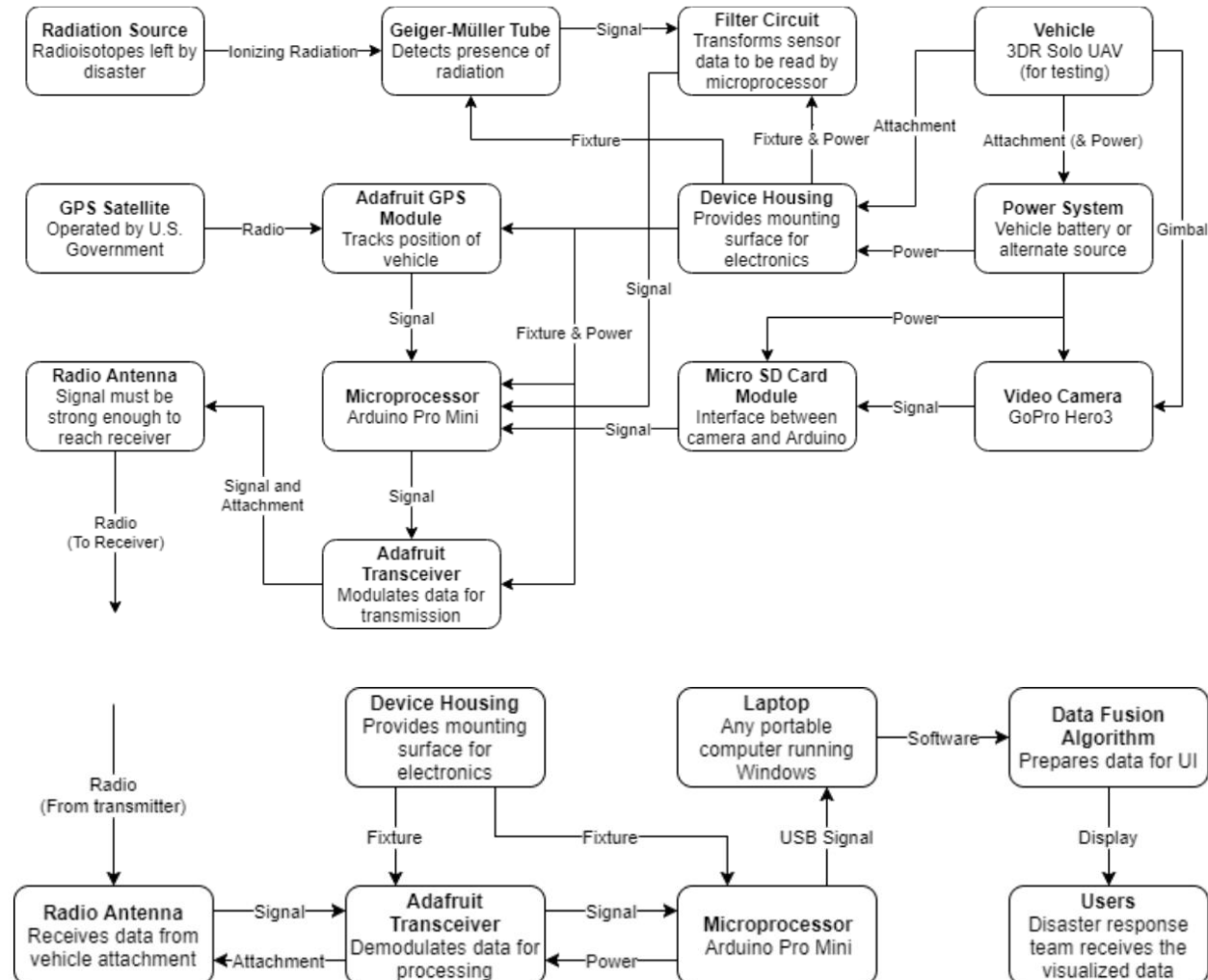


SHORT VIDEO THAT SUMMARIZES THE PROJECT



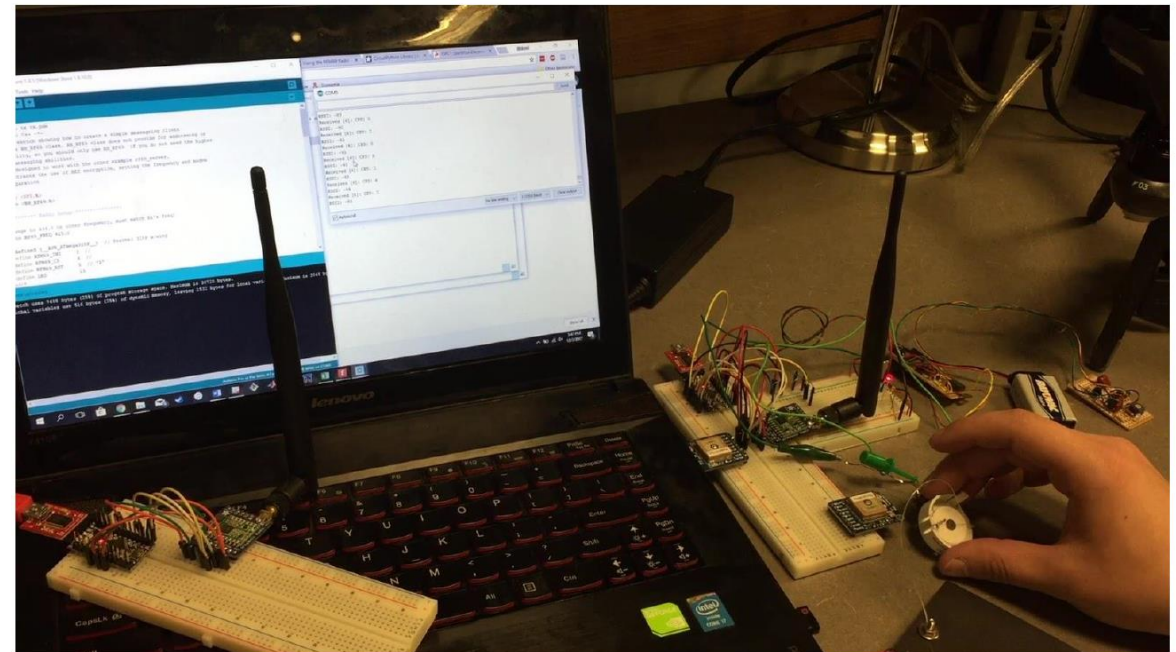
FULL SYSTEM OVERVIEW

- Come talk to me later if you have questions
- I'm going to focus on the software
 - Arduino Pro Minis run C++
 - GUI is written in Java
 - Some test scripts written in python

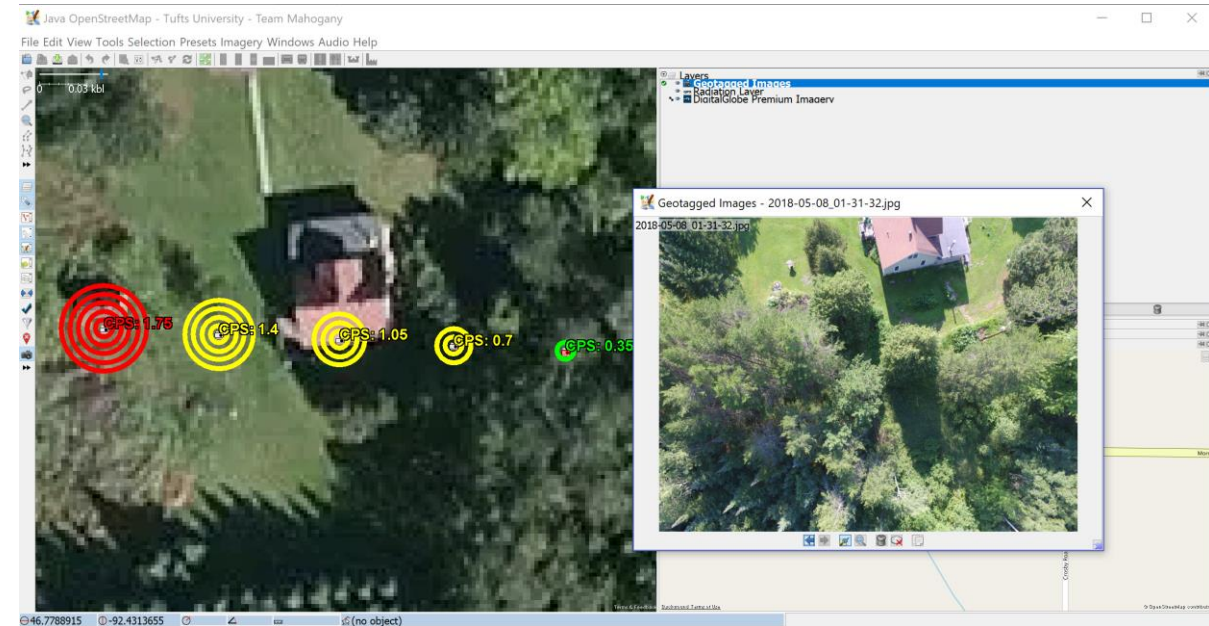
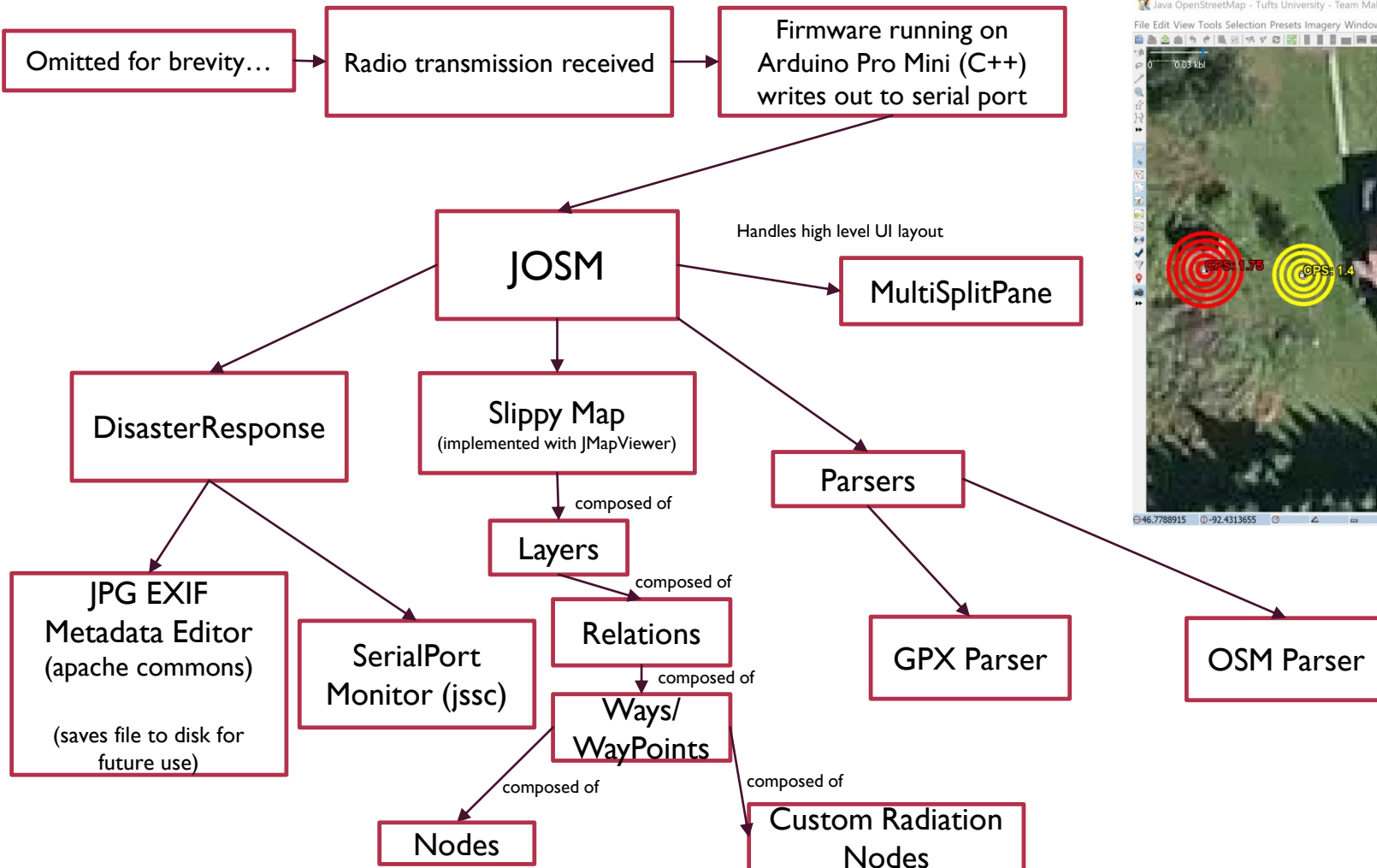


SOFTWARE OVERVIEW

- Requirements
 - Cross-platform
 - Must work offline
- JOSM
 - Java OpenStreetMap editor
 - dubbed "the free wiki world map".
 - Already has free maps
 - Building off the OpenStreetMap project gives us a framework of .osm map files that we can use for a baseline map to overlay on
 - <http://download.geofabrik.de/>
 - Can use newly uploaded maps in the future (don't have to update our software!)
 - Open source
 - Cross platform



HIGH LEVEL OVERVIEW OF GUI



DEMO (SIMULATION)

- Worked (by holding flaky contacts together) during poster presentation
 - Were only transmitting small images (<1 MB)
- GPS chip doesn't work inside either
 - Just demoing the GUI via simulation of the circuit for today





QUESTIONS?