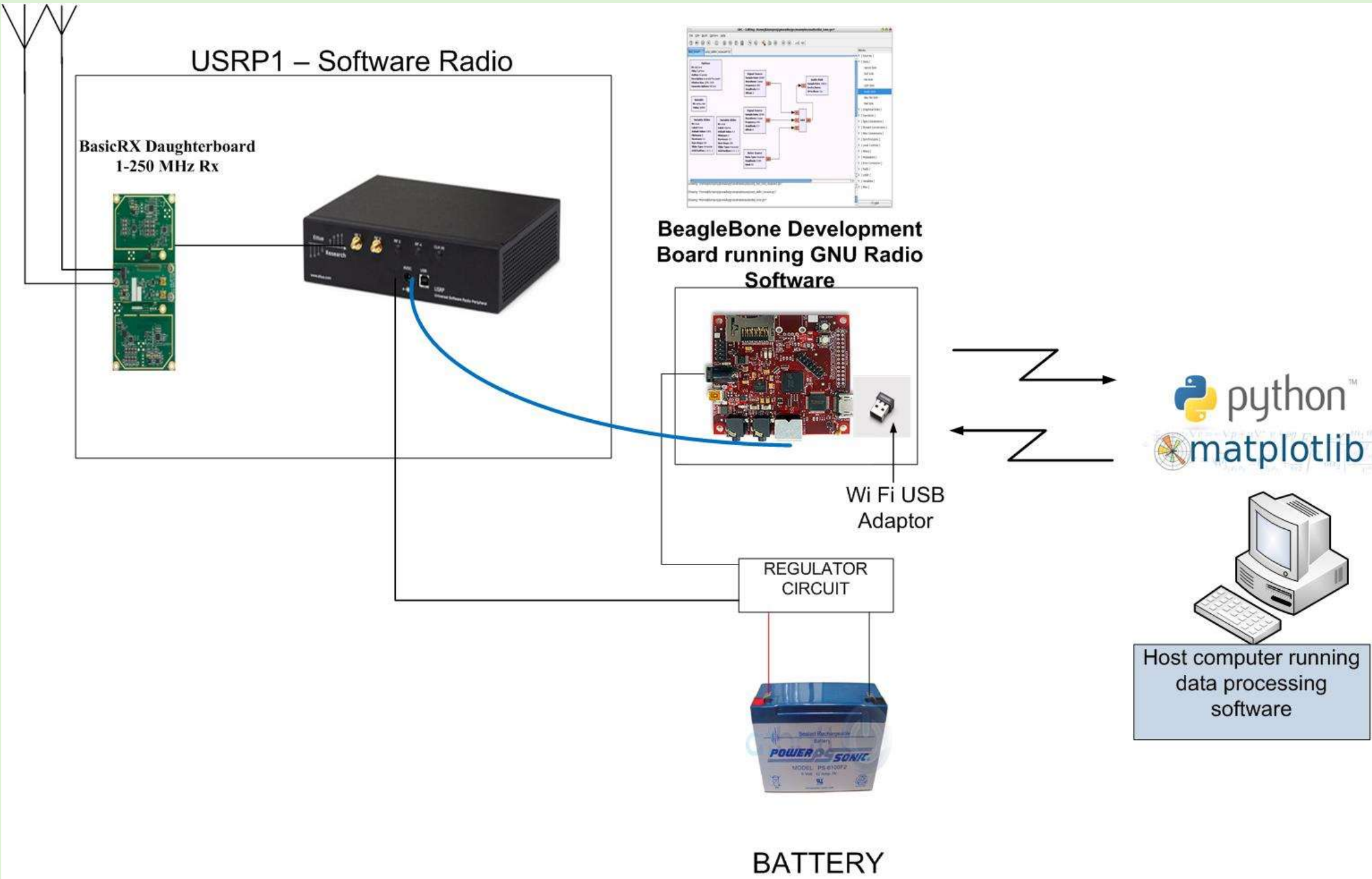


Team 2 - Geolocation of RF Emitter

Project Overview

The ability to accurately detect the location of radio signals provides a wide variety of uses ranging from determining the location of a distress signal from a party or individual in need of help to locating an interfering signal that is jamming communications. The main goal of the Geolocation of RF Emitters project was to create an RF sensor which could be remotely deployed and report acquired RF data back wirelessly to a central hub for further analysis to ultimately find position of the RF signal. Information passed back to the central hub includes: Radio Signal Strength (RSS), Angle of Arrival of signal (AOA), Geo-Location of sensor (via GPS), and Phase. The entire system is designed to be scalable such that by increasing the number sensors which are deployed, the more accurate the position location of the RF emitter will be. With a small, light weight interface unit, known as a Universal Software Radio Peripheral (USRP), coupled with GPS data and a computer, our design has the ability to dynamically receive a wide range of radio signals and pinpoint their location.

Design Concept



Project Summary

Receiving the radio frequency through the two antennas connected to the RX Daughterboard the USRP relays information data to the BeagleBone. The BeagelBone, running the GNU radio software, does all necessary computations and manipulation. Along with the GPS information, all information is sent to the host computer where the end result is displayed through an interactive user interface.

Hardware & Software

Hardware:



USRP 1



BeagleBone Black



GPS



RX Daughterboard

Software:

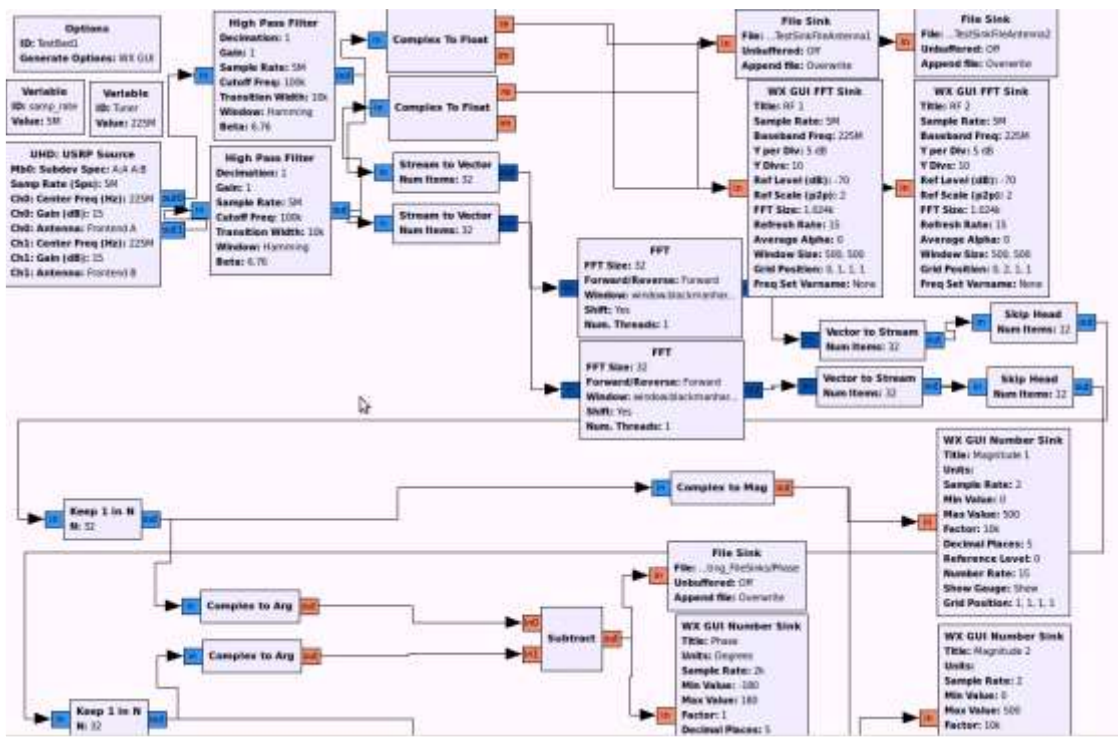
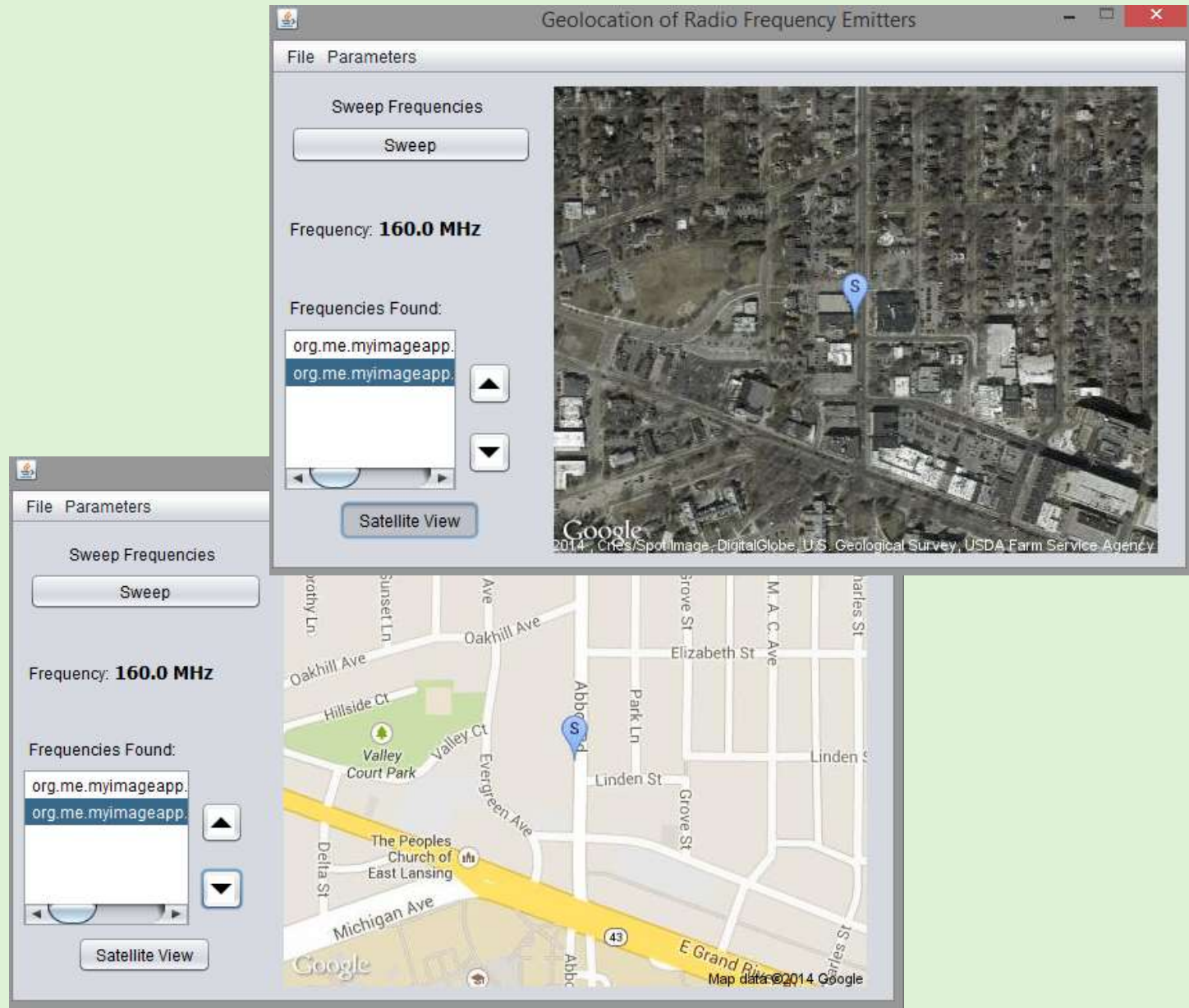


Budget

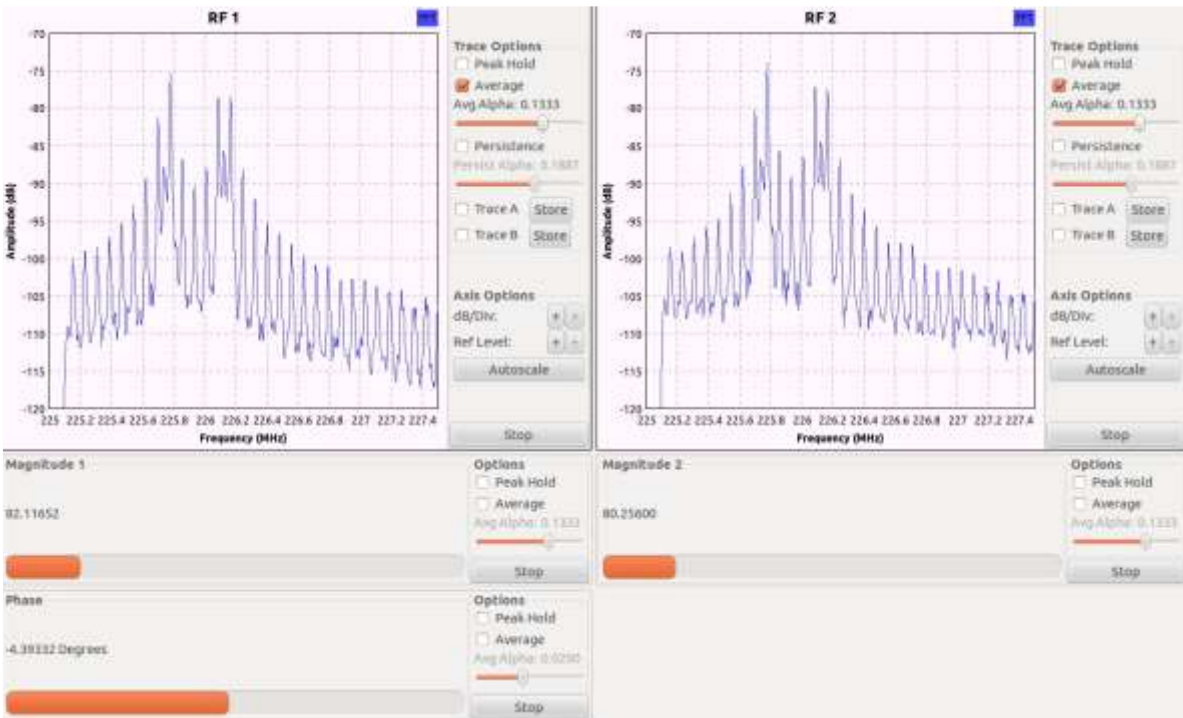
Components:	Price
USRP 1	\$ 700
BasicRX Daughterboard	\$ 75
BeagleBone Black	\$ 64.99
Adafruit Ultimate GPS	\$ 39.95
GPS Antenna	\$ 12.95
Miscellaneous	\$ 14.81
Shipping	\$ 46.08
TOTAL:	\$953.78

Design Requirements

- **Accurate Measurement of Signal Strength:**
The ability to accurately measure the signal strength of the RF emitter.
- **Angle of Arrival:**
Angle of arrival will be the measurement used to determine from which direction the emitter is relative to the receiver.
- **Ability of Mobilization:**
A bulky fragile system would not only be difficult to move but could be susceptible to damage causing inaccurate reading.



GNU Radio Software



GNU Software Spectrum Display



USRP and antennas field testing

Member: (Left to Right Below)	Job
Viktor Simovski	Team Leader
George Godby	Document Prep
Kenneth Wilkins	Web Design
Matthew Roach	Presentation Prep
Justin Mascotto	Lab Coordinator

