

Analyzing Volunteered Geographic Information Accuracy and Determining its Capabilities For Scientific Research

An Undergraduate Research Scholars Thesis

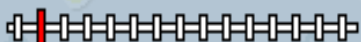
Advisor: Dr. Daniel Goldberg

Research Team: Michael Schwind, Kelsi Davis, Payton Baldrige

What is VGI?



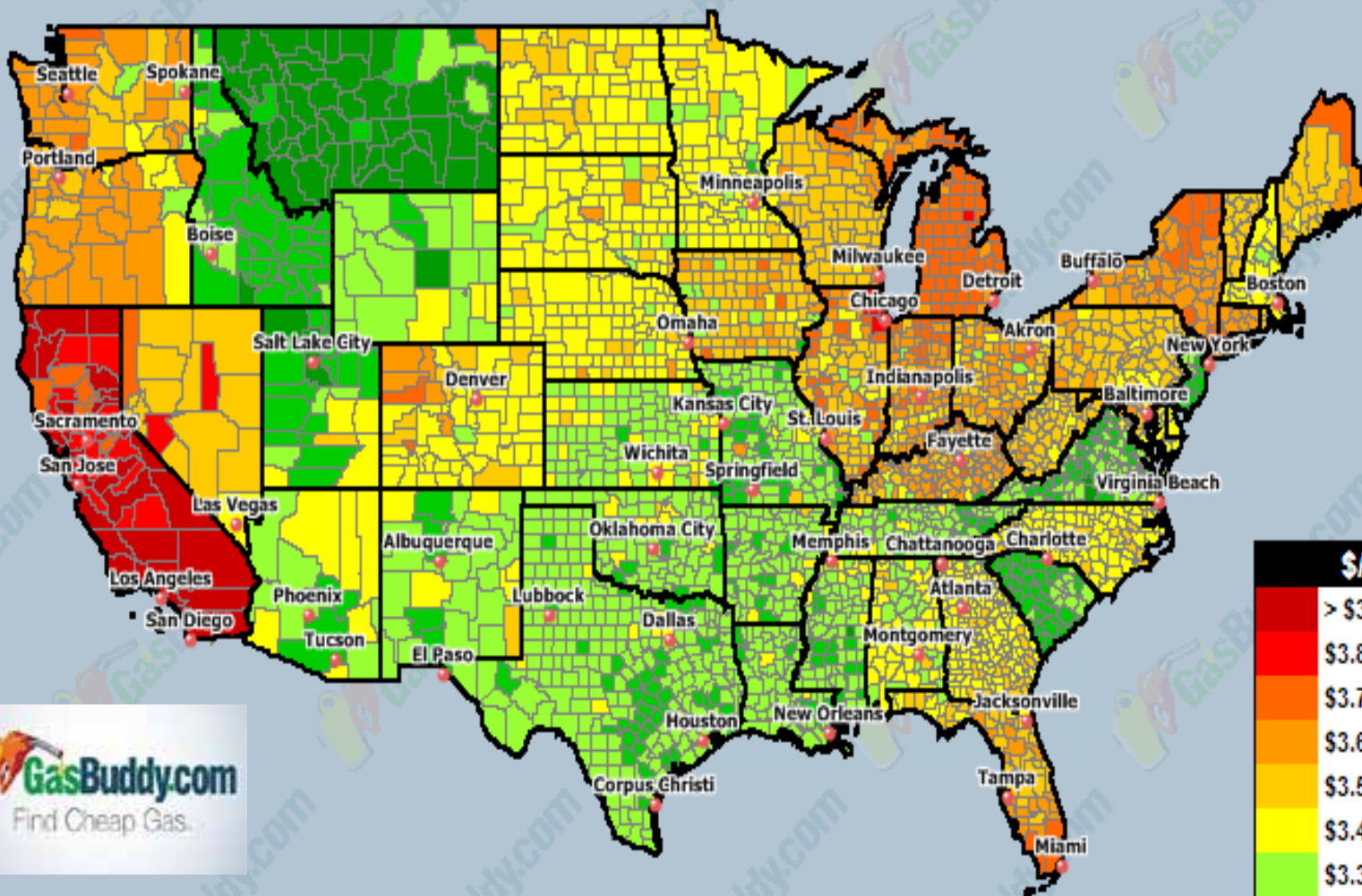
Zoom Out



Zoom In



Prices by County



\$/G	
Dark Red	> \$3.97
Red	\$3.87 - \$3.97
Orange	\$3.77 - \$3.87
Light Orange	\$3.68 - \$3.77
Yellow	\$3.58 - \$3.68
Light Green	\$3.48 - \$3.58
Green	\$3.39 - \$3.48
Dark Green	\$3.29 - \$3.39
Very Dark Green	< \$3.19



200mi

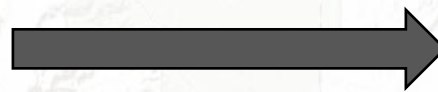
500km



How It All Began

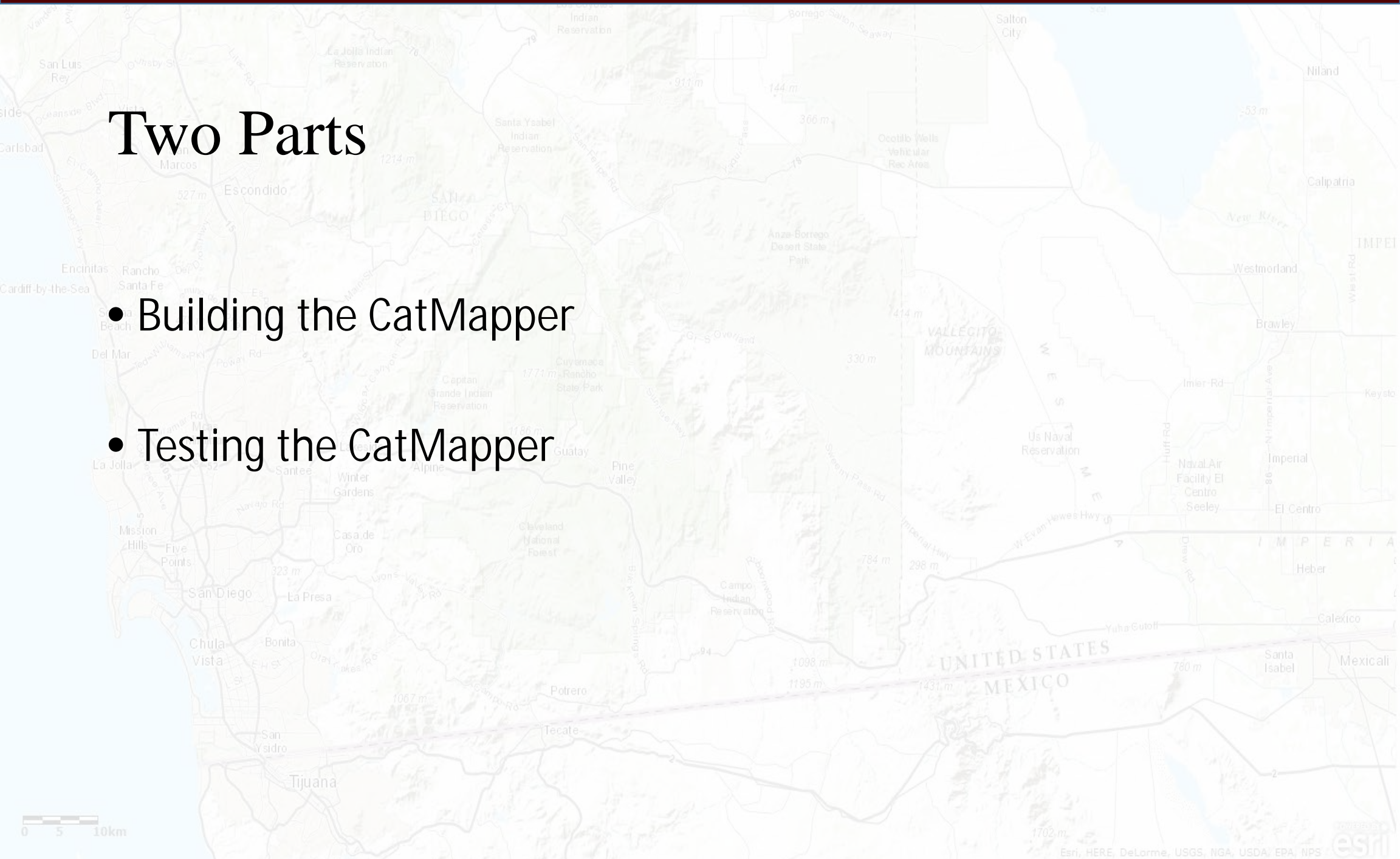


Audubon



Two Parts

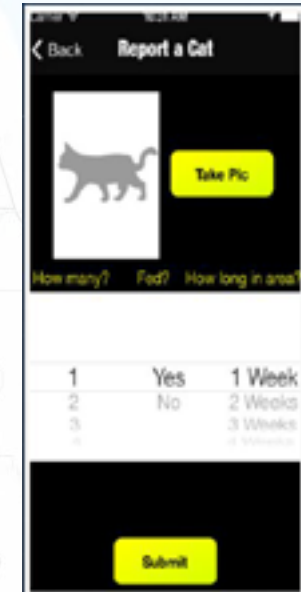
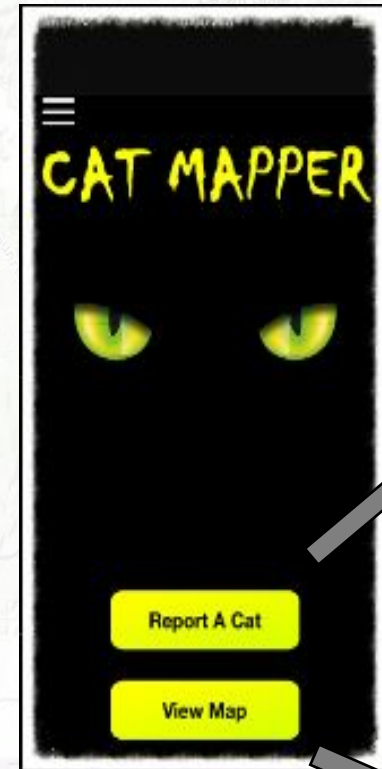
- Building the CatMapper
- Testing the CatMapper



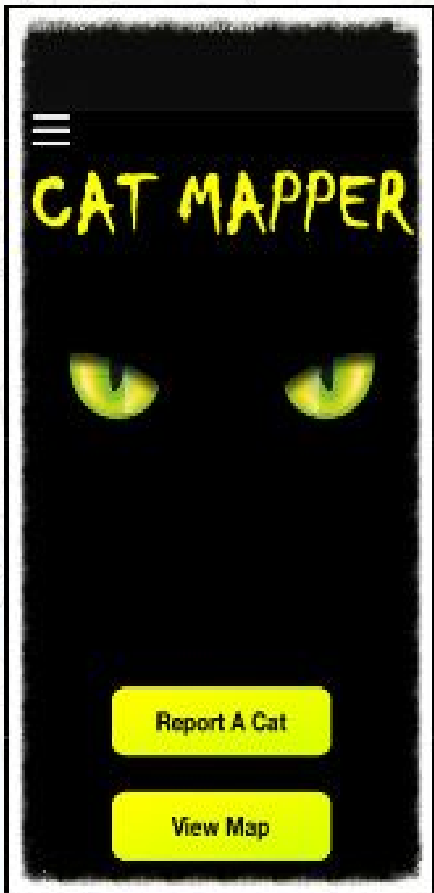
The CatMapper

iOS and Android Mobile Application

- *Utilizes Esri SDK*
- *Android – Java*
- *iOS – Objective C*



How It Works



Testing the VGI Produced by the CatMapper

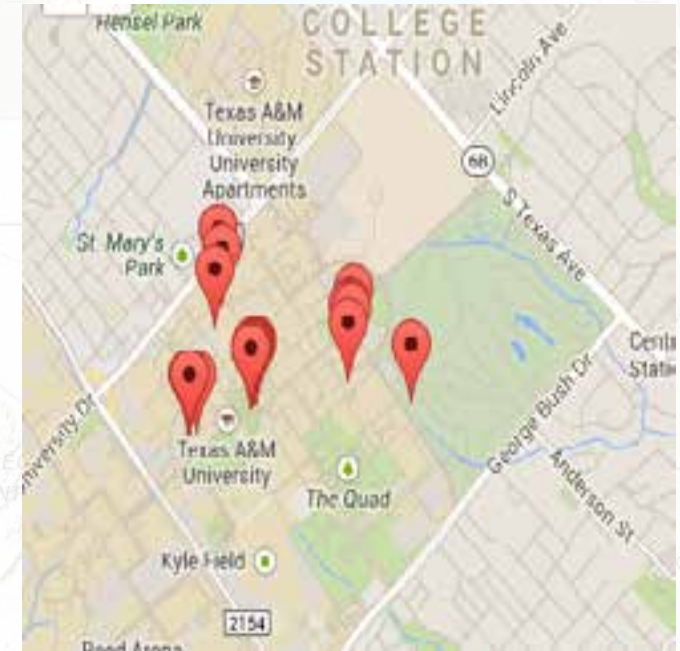
- Disseminate the application to users
- Monitor the website
- Send out surveys
- Test the location service of the mobile phone

Sharing the Application

- Android- email a link
- iOS- Apple App Store, Ad Hoc Sharing



Monitoring the website



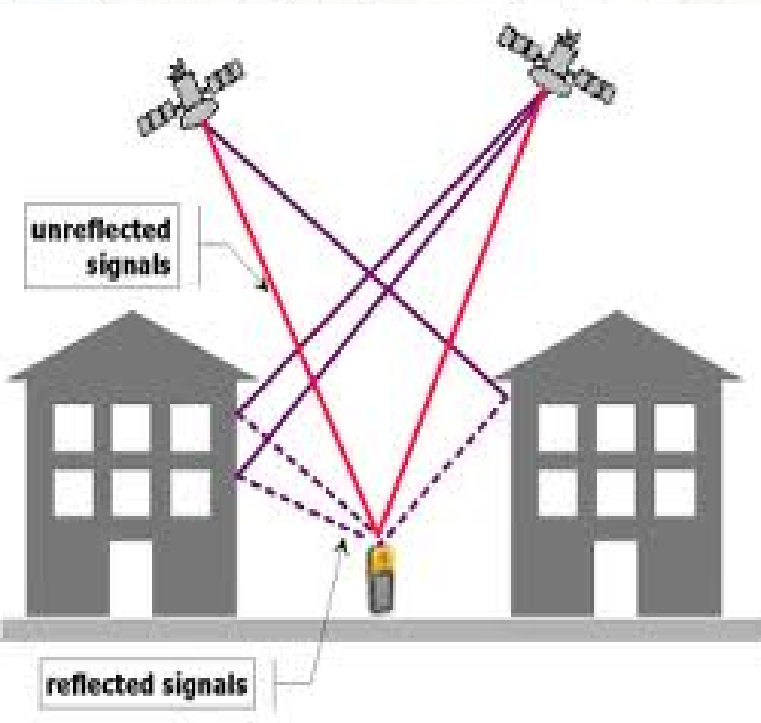
I had a good experience using the CatMapper.	I found this mobile phone application convenient and user-friendly once downloaded.	I have prior VGI/ GIS/ geospatial training.	I used the CatMapper often. (2+ times a week)	I provided accurate and honest results.	I would be willing to download and use applications such as the CatMapper to provide data for scientific research.	I would be willing to help collect VGI data for research and provide truthful results if some sort of incentive was involved.	Comments/ Concerns
Disagree	Strongly Agree	Agree	Strongly Disagree	Agree	Agree	Agree	photos have trouble showing up on iPhones. Interface is simple but fine, gets the job done.
Agree	Undecided	Agree	Disagree	Agree	Strongly Agree	Strongly Agree	The points that post to the map are very small. It is difficult to select them.
Strongly Agree	Strongly Agree	Strongly Agree	Disagree	Undecided	Agree	Agree	Instead of dot density, consider graduated symbol map. Number of cats in a single point can be more than one so graduated symbol would more accurately represent the true densities.
Agree	Strongly Agree	Disagree	Agree	Strongly Agree	Agree	Strongly Agree	

Testing the Location Service

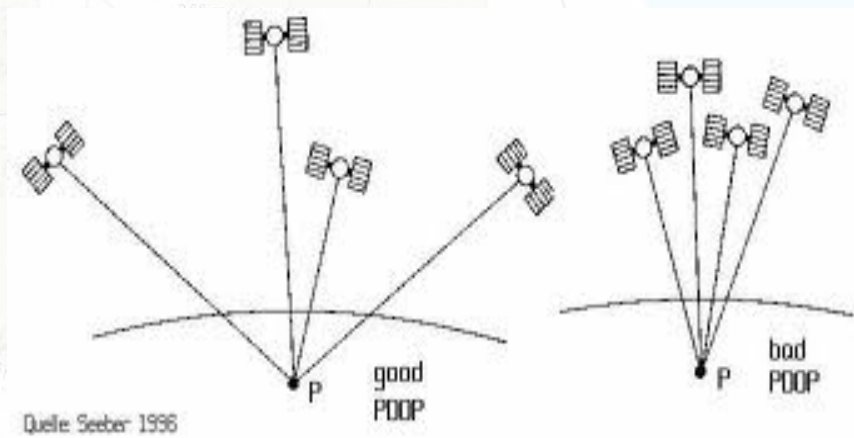
- **Locate a benchmark in the proper environment**
 - Benchmark provides a known location from which to measure
- **Take numerous points at that benchmark**
- **Average the points and measure the distance**

Introducing Error

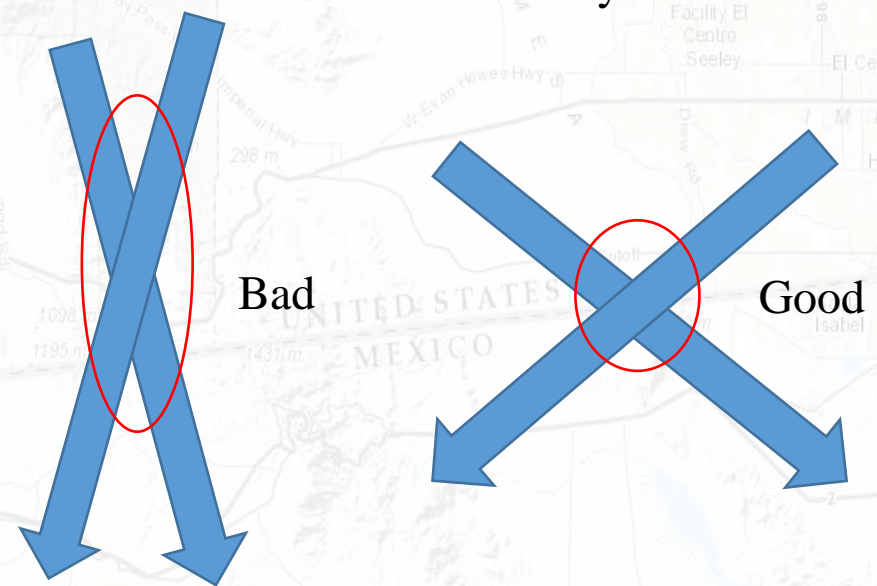
Multipath



PDOP Variability

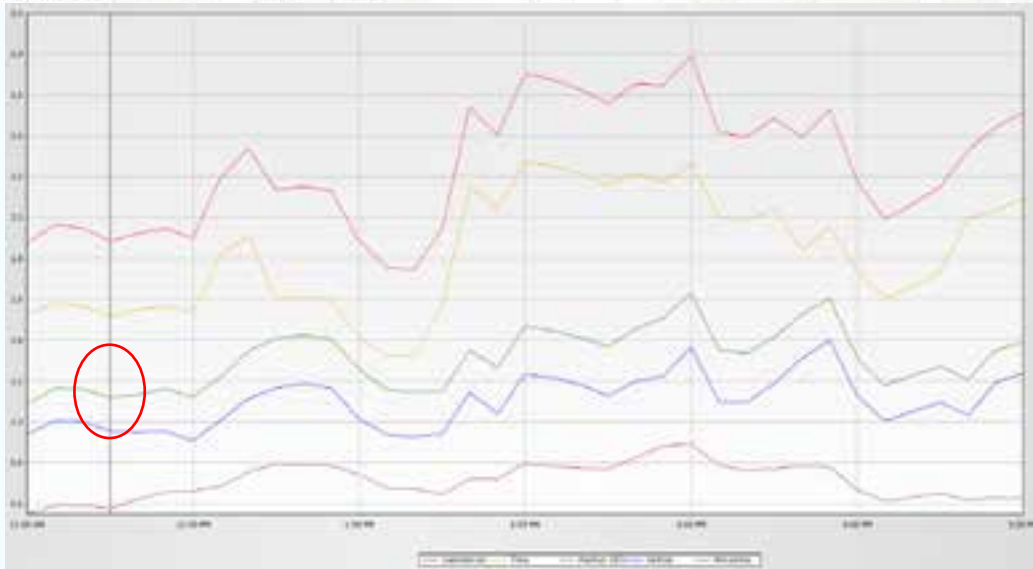


Area of Uncertainty



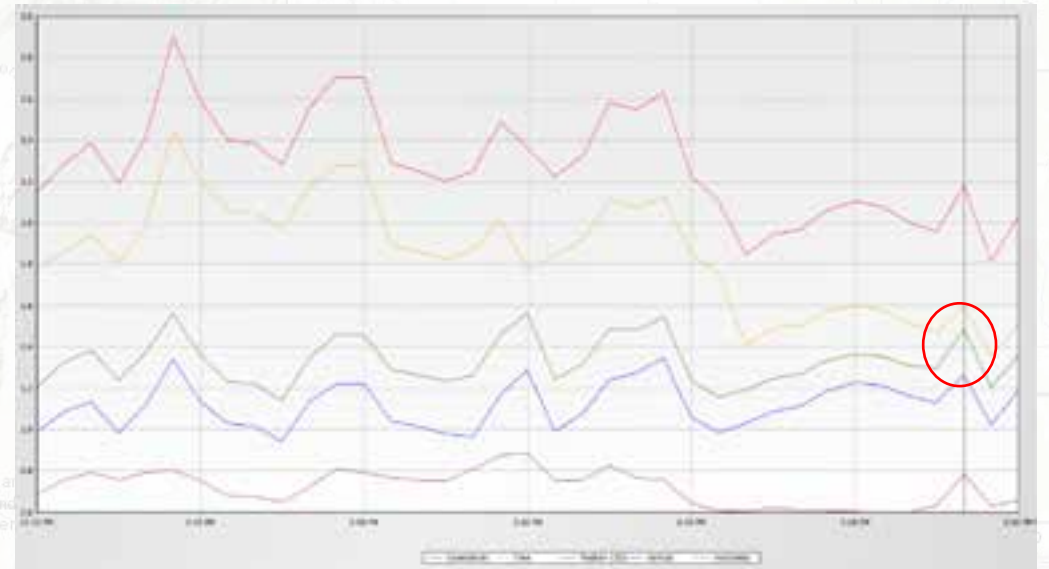
Positional Dilution of Precision (PDOP)

Day 1



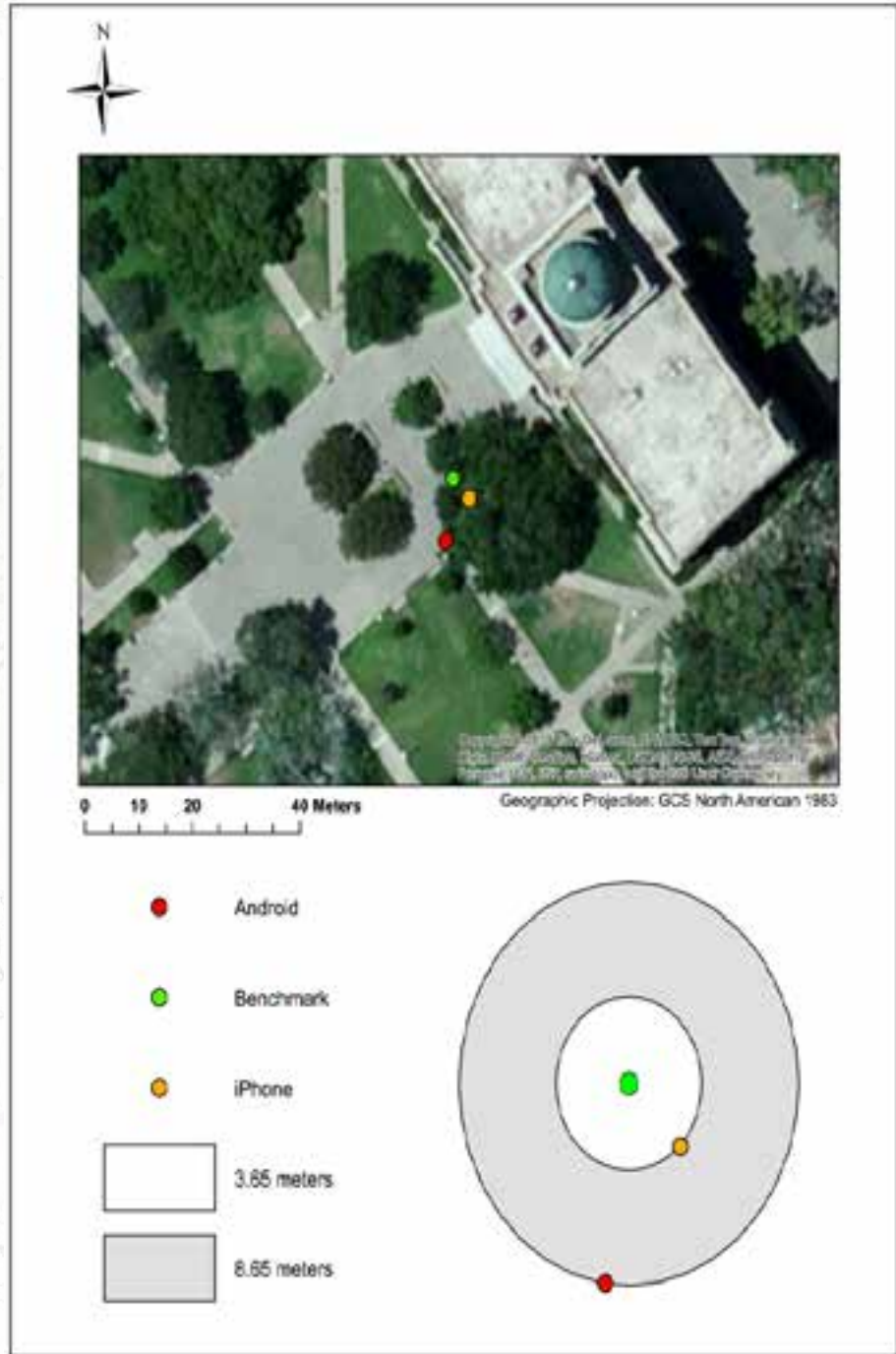
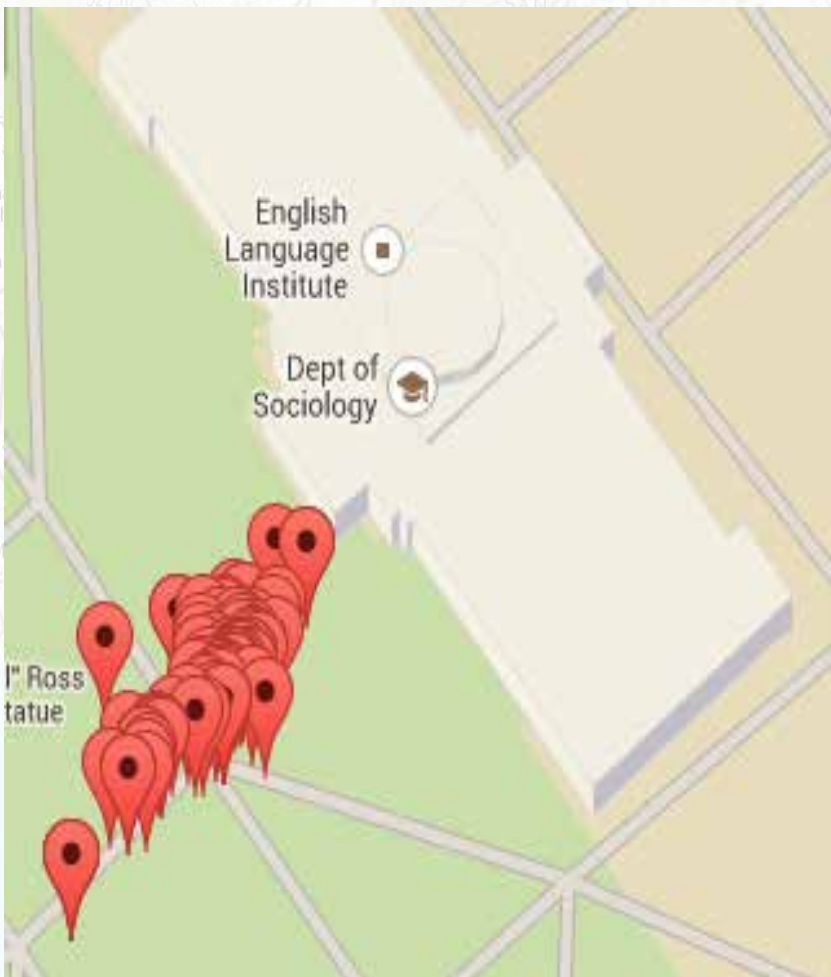
PDOP = 1.16

Day 2



PDOP = 1.49

Testing the Location Service



Results

- Functional mobile application
- A larger user group is needed
- Accuracy of locational service is of good quality for our scale of research



Thank you
Are there any questions?

