**INTRODUCTION**

- Apple recently introduced their iBeacon technology
- Allows for mobile applications that communicate with small, inexpensive beacons using Bluetooth Low Energy protocol
- Widespread applications in in-store product advertising and indoor localization
- Low cost and portability allows dense wireless networks to be setup with relative ease

**GOALS OF PROJECT**

- Develop iOS application to collect data that could form the basis of an indoor localization system
- Analyze Bluetooth signal strength (RSSI) data as a user moves through an indoor environment
- Reconstruct the walking path of a user using iPhone's inertial sensors

**IMPLEMENTATION**

- Five Gimbal Series 10 iBeacons were placed throughout a lab and a corridor of the Engineering 2 building at UCSC

**RESULTS (CONTINUED)**

- A direct correlation exists between the recorded signal strengths and the user’s distance from the beacon
- Walking path reconstruction was intended to test whether relative changes in users' positions can be calculated
- Heading information was represented as degrees of rotation from the user’s initial reference frame
- Due to software limitations, step count data was not updated for every reading
- Linear interpolation was used – this eliminated “jumps” in the step count data

**RESULTS**

- The measured signal strength of a beacon decreases as the distance from the beacon increases. While the relationship is almost linear, it is not perfect, as the signal strength readings are often inaccurate due to environmental factors

**CONCLUSION**

- The beacons’ experimentally recorded RSSI values demonstrated the relationship between distance and signal strength
- The iPhone’s inertial sensors were able to successfully reconstruct users’ walking paths
- Future work could use experimental data to construct fully-functioning indoor localization system

**ACKNOWLEDGEMENTS**

- Mobile application image found at http://www.thedailyvation.com/2014/7/31/596845/san-francisco-airport-testing-beacon-system-for-blind-travelers
- Floor plan found at https://facilities.soe.ucsc.edu/floor-plans