REU/REV Update

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Project Description

- Android based acoustic ranging application

- Current Work
  - Paul: 2 device ranging using android devices + calculations in MATLAB
  - Vitor: Device to device communication

- Future Work
  - Expand to multiple devices for triangulation and sensor network algorithms
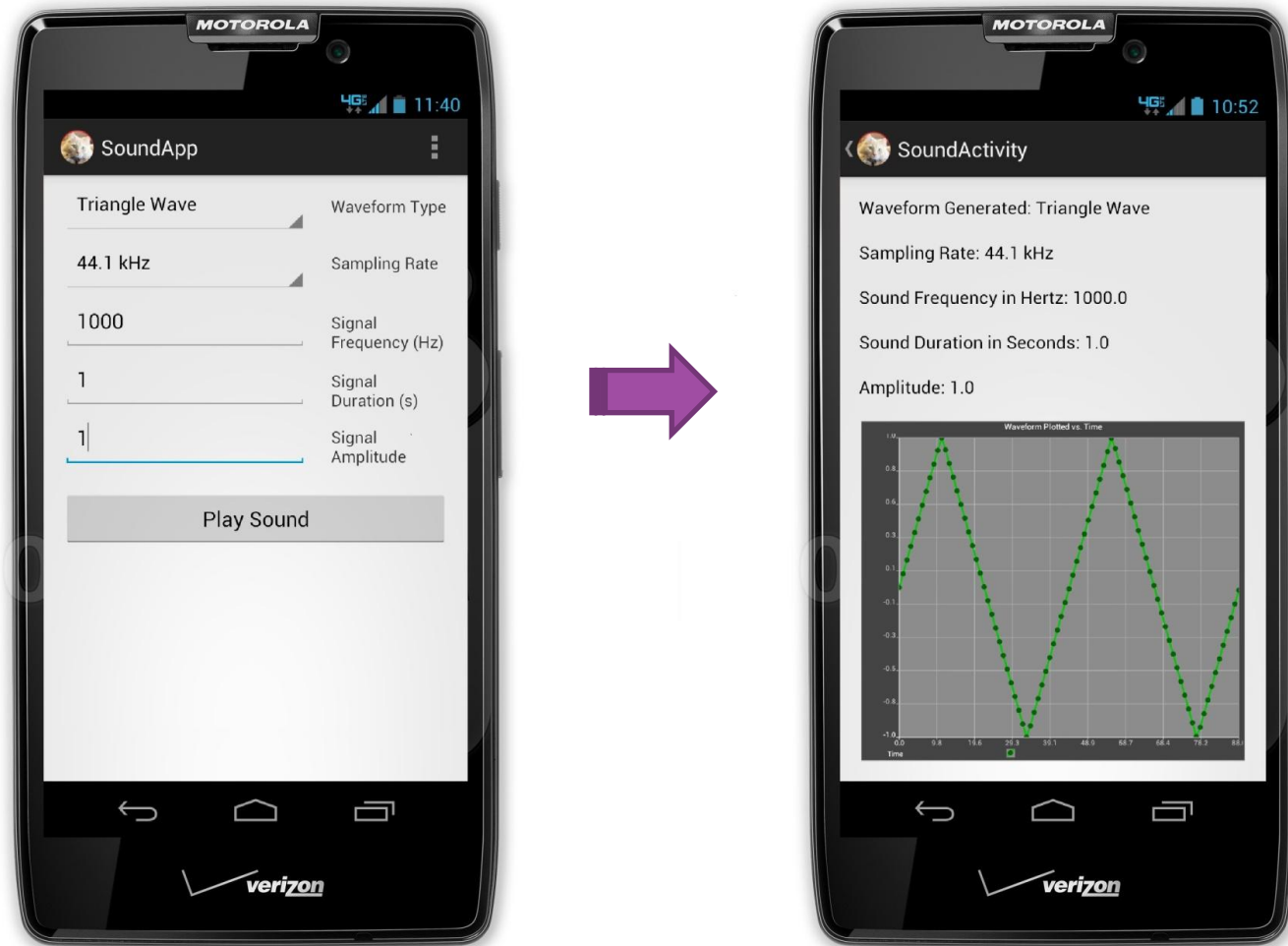
Getting Familiar With Android

Figure 1. Simple waveform generator app
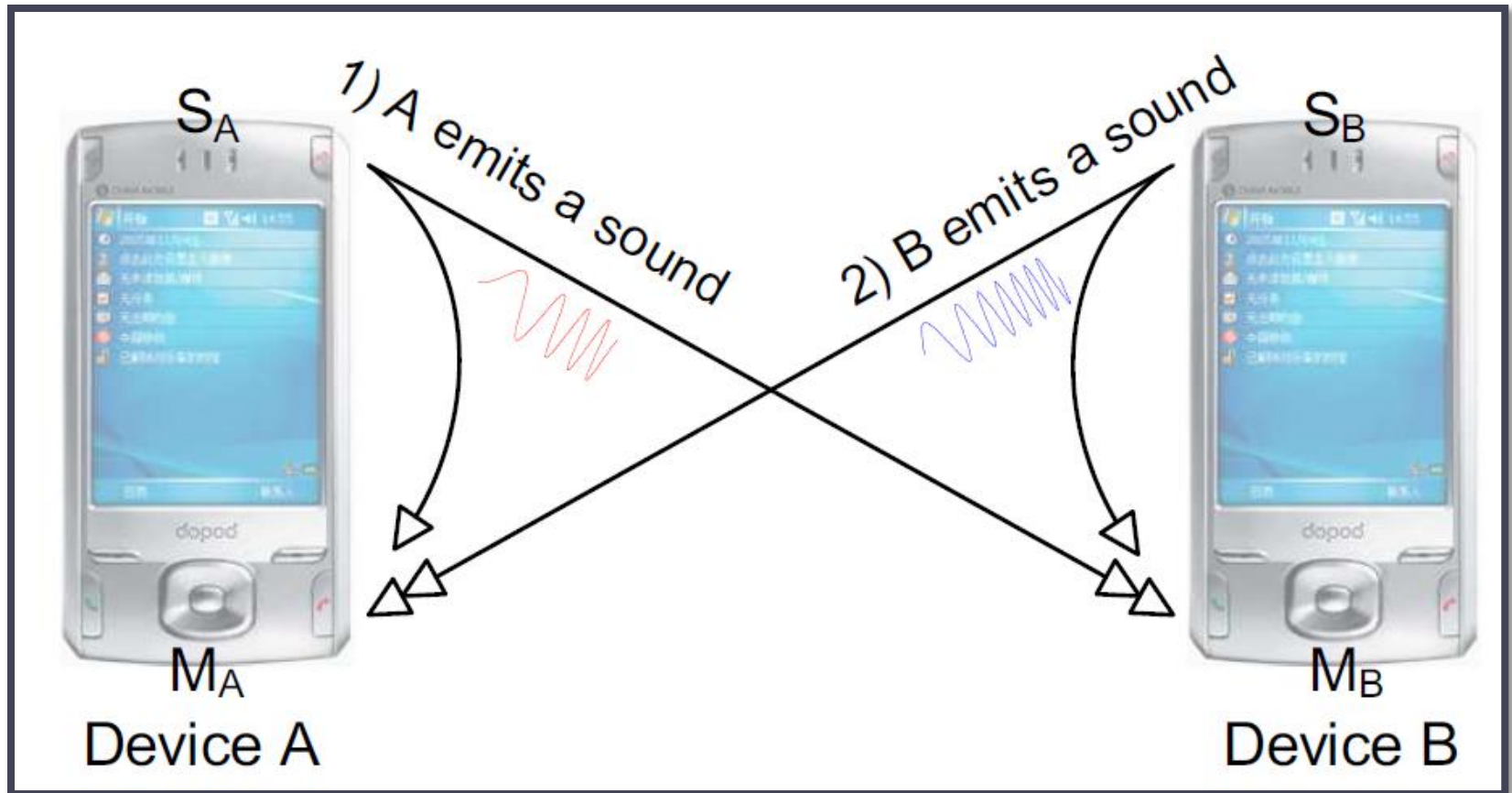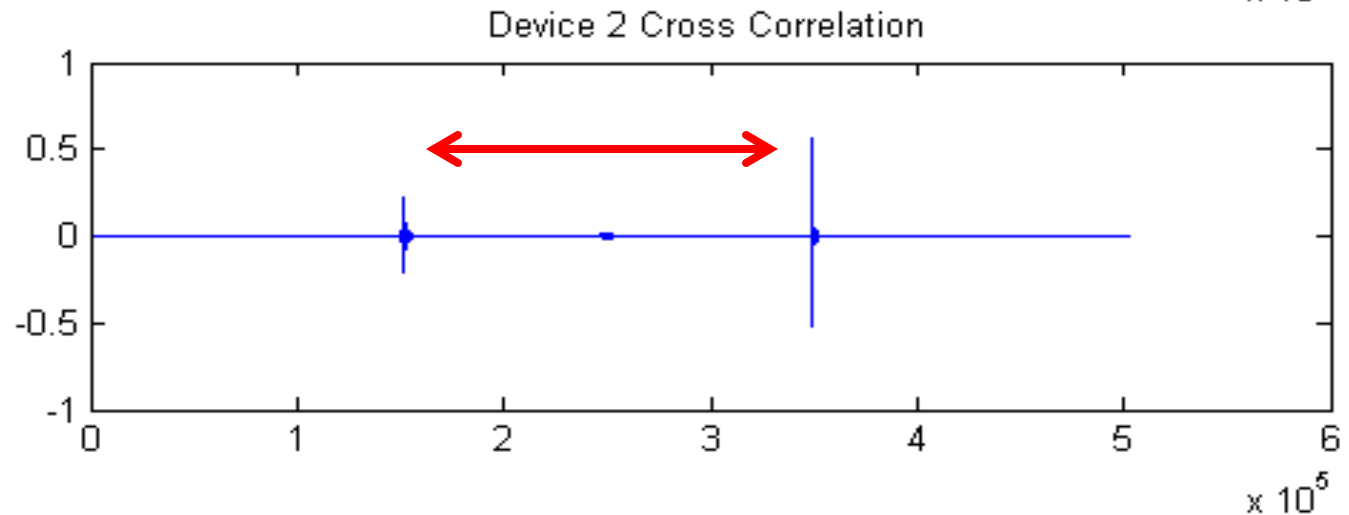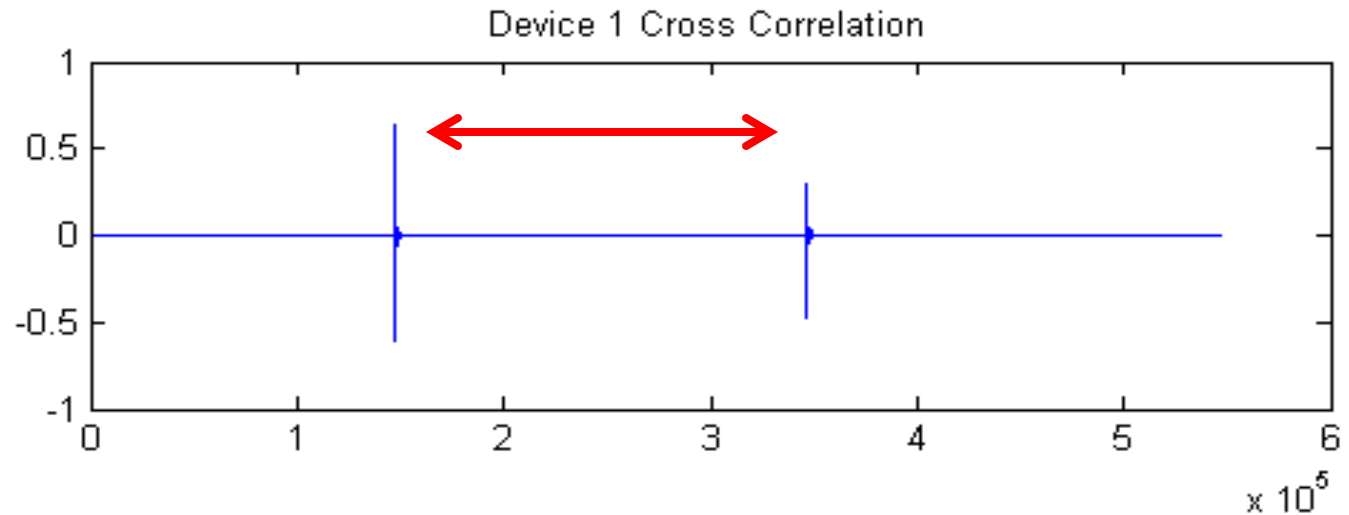
Ranging Strategy

Figure 2. Illustration of the two-way sensing stage in the BeepBeep ranging procedure.

[1] Peng, Chunyi, Guobin Shen, and Yongguang Zhang.

MATLAB Results

Device 1 Cross Correlation

Device 2 Cross Correlation

$D=(c/2*fs)*[(nA2-nA1)-(nB2-nB1)]+K$

MATLAB Results Cont.

- July 17th, 2013

    ◦ 24 ranging tests from .6 meters up to 2.75 meters

    ◦ MSE = 2.912 cm

Present and Near Future

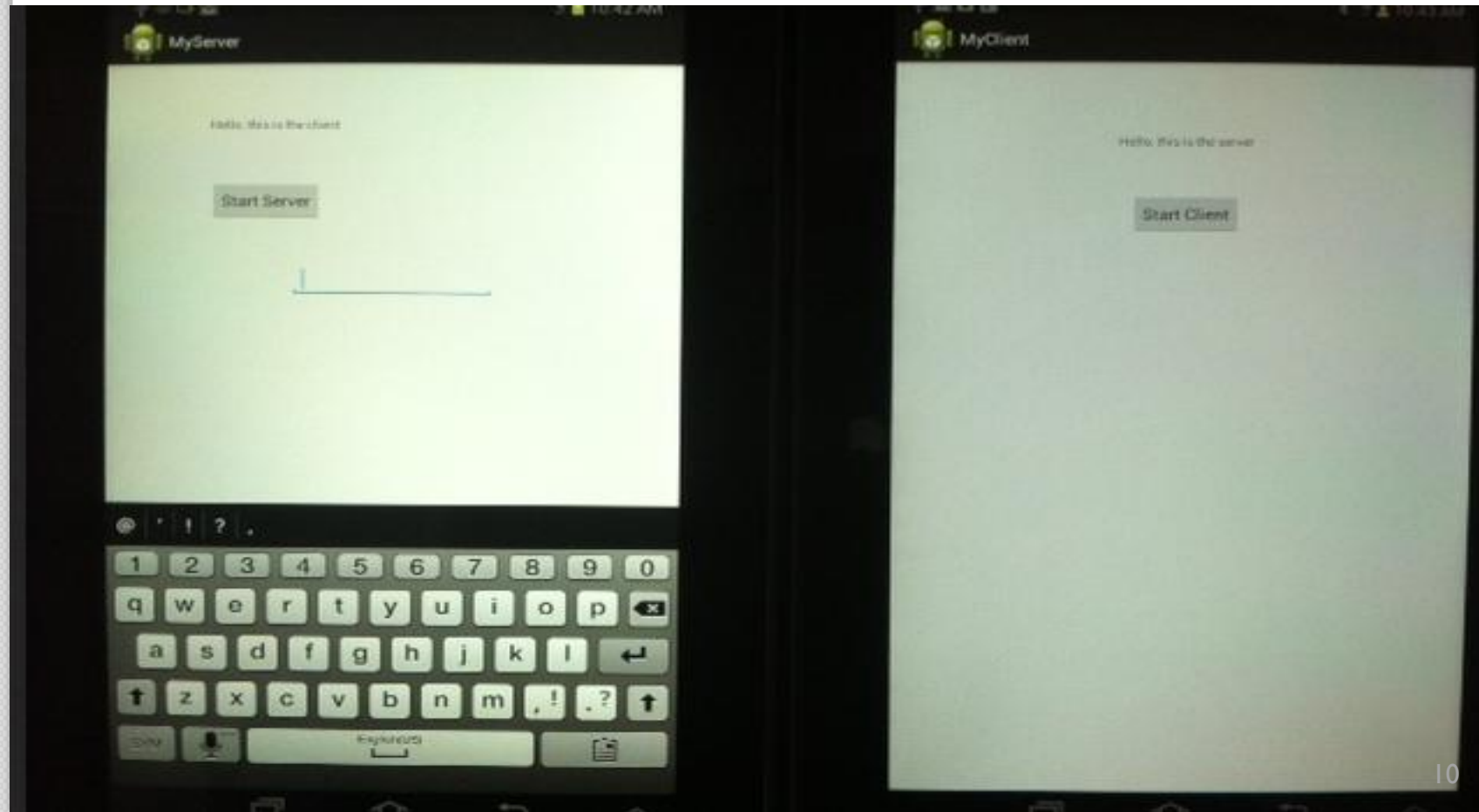- ## Current Challenges
  - Multipath effects

- ## Next Steps
  - Move calculations from MATLAB to Android device
  - Integrate with Vitor's Work
  - Look further into ultrasonic possibilities

Server/Client App

- The app will enable android devices to send and receive ranging data

- After ranging data is acquired by each device, all data will be sent to one device

- The Server/Client app java code used was found in an Android tutorial

Server/Client App

- The Server/Client apps are capable to communicate between two devices

Server/Client App Current Challenges

- Allow multiple clients to communicate with server

- Server must be able to identify which client is sending data via time stamp and/or device ID

Server/Client App Future Steps

- Determine what data will be passed from ranging app and what calculations will be done at server

- Possibility of each tablet be a server/client instead of one centralized server

Works Cited

- [1] Peng, Chunyi, Guobin Shen, and Yongguang Zhang. "BeepBeep: A high-accuracy acoustic-based system for ranging and localization using COTS devices." *ACM Transactions on Embedded Computing Systems (TECS)* 11.1 (2012): 4.

- [2]The KTS Infotech family of sites. Network Programming in Android, 2010. Web. 2 July 2013.