

**To:** Dr. Hynek Boril

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**RE:** EE4320; Final Design Proposal

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### **Summary**

Develop a system that can track the direction of speech, with the use of a microphone array. To accomplish this the system will use cross correlation to determine the time difference of the signals received by each microphone in the array. The second part would take those time delays and calculate the distance and the direction of the signal.

### **Proposed Solution:**

This project will have four main components: sensor setup and data collection, windowing, cross-correlation, and finally the direction/distance calculations. In the first part an Arduino Due will be used to sample four microphones at a minimum rate of 48kHz. The second part will simply grab a window of each signal that will be passed to a cross-correlation function. The cross-correlation function will return three time delays that correspond to the time difference of each microphone. The final part/function will take the time delay and the systems physical measurements to determine the direction and angle. To increase the time delay between sensor the distance between them can be manipulated. This would allow lower sampling while still being able to see time delay.