Homework #3: Accelerometer, Gyroscope, Compass and GPS

Design a Windows Phone to fulfill the following specifications. The specifications are presented in a series of phases, however it is not necessary for you to complete each phase and submit them separately. Only the final phase must be submitted, this separation into phases is to provide stepping stones toward the final product.

Phase 1: Develop a Windows Phone application that reads in audio from all sensors discussed in class so far, and presents the relevant information to the user. The bare minimum would be TextBoxes with Accelerometer readings, Compass headings, Gyroscope angular velocities, and GPS coordinates. Feel free to be imaginative in your presentation of the data.

Phase 2: Incorporate WASAPI into this project by generating a sin wave and outputting it onto the speaker. The frequency of this sin wave should depend on one of the parameters of the other sensors. Feel free to experiment with this as well, having multiple sinusoids, each controlled by a different sensor, etc. The bare minimum implementation of this would be a single sinusoid whose frequency is controlled by the AccelerationX property of the Accelerometer. Note that you should still be outputting the sensor data to the user in addition to this new functionality.

Phase 3: Use the LineGraph object shown in class to provide a graphical output of both a time-domain signal and frequency-domain magnitude of an input signal. The bare minimum implementation would display a time-domain plot of audio input, and a frequency-domain plot of the magnitude of the frequency spectrum of audio input. Feel free to be creative in the design of the information presented to the user.

You should use the phone hardware for testing as much as possible, as parameters such as the length of audio being passed in, etc. will vary between the emulator and the actual device. Additionally, the emulator on the remote server will not be useful for audio input/output as the audio does not survive the RemoteApp transformation. The emulator additionally seems to have trouble with the Gyroscope, it does not return NULL as stated in the Documentation, but rather throws a FileNotFound exception.