**Proposal**

***Team***

This letter is to propose the build and production of a portable in-home motion sensor to serve as the backbone for both residential and commercial security systems. The name of the project is known as: Motus (i.e. latin translation of “movement”) and its team consists of the following members: Anthony Pacitto, Dariusz Kulpinski, and Winson Voung.

***Introduction***

As stated above, Motus will be branded as a portable motion sensor that can be used to detect both physical motion and local vibrations (i.e. tampering or movement of the device) in a targeted zone. In addition, the hardware will support a fully featured mobile application that will provide full control over the device’s settings and detectable readings. With respect to the overall size of the product, the device will contain dimensions that will be small enough for a user to easily mount to any given door, wall, and/or window ledge that they see fit. Currently, there are small in-home sensors; however, not all are portable from one environment to another while maintain mobile compatibility – making Motus somewhat unique versus other makes and models.

***Courses and Topics***

After much thought, it is important to note that the listed courses and topics that will be relatable to this project are as follows:

* CENG150 - Electronic Circuits:
  + Interpretation of sensor datasheets and electrical circuit design
* CENG153 - Programming in C:
  + Fundamentals of standard input/output and device coding
* CENG252 - Embedded Systems:
  + Implementation of Raspberry Pi with other motion sensors
* CENG322 – Software Project:
  + Java programming for android platform with working database source.

As a team, we plan to use a three-way communication processes between: i) the mobile application; ii) remote cloud/database (i.e. Firebase); and, iii) hardware device. The mobile device will be responsible as rendering the detected any data output via the hardware, in addition to providing a system control interface for the user. The remote cloud will be used to store motion and user data based on the devices input (i.e. HC-SR501 PIR - infrared motion sensor; ADXL 345 – accelerometer; Raspberry Pi 3). It is important to note that this will be the primary way we retrieve digital data and information.

***Application and Scheduling***

We predict that over the course of the next 13 weeks, we will breakdown the project into 3 phases: 1) design (i.e. mobile application GUI; device designs and layouts), 2) build and develop (i.e. programming of the application, hardware construction/ soldering), and 3) implementation and Testing/Debugging (i.e. testing application on various platforms; testing synchronization between database, app and device; test device in various motion-based environments). Each phase will be completed over an estimated 3.25 weeks accordingly and the workload per team member will be distributed evenly between both hardware and software portions; however, many tasks will be appointed based on comfort level and experience (e.g. greater focus on hardware vs. software).

As for the application, we plan to incorporate, but will not limit to the following activities (screens):

* Splash screen
* Log in and registration
* Motion detection records
* Settings
* Placeholder menus
* Help

The application will contain a hierarchical level system for its activities in order to assure a smooth navigational experience throughout the application. As stated before, we intend to complete this bug-free application over a 13 week period on time. If we do run into any time restraints or complications within the middle, we will negotiate tasks and workload and call for group meetings in order to get back on track; thus, altering our critical path accordingly.

***Conclusion***

In conclusion, our team feels confident that we can provide a new portable security system that will make it easier for people to portably move there security zone. Not only do we intend to have a working hardware device, but also a fully incorporated Firebase system which communicate over android application platform.