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***Proposal for the development of IoT for SensorsEffectors***

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**Executive Summary**

As students in the Computer Engineering Technology program, we will be integrating the knowledge and skills we have learned from our program into this Internet of Things themed capstone project. This proposal requests the approval to build the hardware portion that will connect to a database as well as to a mobile device application. The internet connected hardware will include a custom PCB with the following sensors and actuators,

* MAG3110 3 axis magnetometer
* MS5611 barometric pressure sensor
* MMA8451 3 axis accelerometer

The database will store user's information, height from the barometric pressure sensor and GPS location with combination of magnetometer and accelerometer. The mobile device functionality will include measuring the Height/elevation and the GPS location of the Device using multiple sensors which are connected to Raspberry Pi using a PCB. The measured data is then sent to the database for storage purposes. And will be further detailed in the mobile application proposal. I will be collaborating with the Prototype lab and Prof's for power management. The hardware will be completed in CENG 317 Hardware Production Techniques independently and the application will be completed in CENG 319 Software Project. These will be integrated together in the subsequent term in CENG 355 Computer Systems Project as a member of a 2 or 3 student group.

**Background**

The project that we are working on uses the height of the device attached to it to measure the altitude and record it to the database. This data is then used by user using an android application to modify their flight course and gives a sense of security to the user. The mobile devices such as a drone tends to get lost easily. The moderately priced product usually have a GPS built in to find it still they face some connectivity issues due to different factors such as trees or buildings . The built in GPS tracker in our project does not uses satellite to get GPS signals thus gives the user full access to its position and elevation.

A barometric sensor senses the height of device attached to it and can even tell what the altitude of the device is. The barometric pressure sensor is paired with a GPS Receiver (it can be made using Accelerometer and Magnetometer). It will give the position and height of the device the product is attached to.

Existing products on the market include Maboshi. (2018, November 07). Arduino GPS Drone RC Boat. Retrieved from <https://www.hackster.io/maboshi/arduino-gps-drone-rc-boat-45d6f4> . I have searched for prior art via Humber’s IEEE subscription selecting Barometric sensor project and have found and read “Sung-Hyun and Han-Bai, "A study on the fabrication and electrical characteristics of barometric sensors for USN” which provides insight into similar efforts.

In the Computer Engineering Technology program we have learned about the following topics from the respective relevant courses:

* Java Docs from CENG 212 Programming Techniques In Java,
* Construction of circuits from CENG 215 Digital And Interfacing Systems,
* Rapid application development and Gantt charts from CENG 216 Intro to Software Engineering,
* Micro computing from CENG 252 Embedded Systems,
* SQL from CENG 254 Database With Java,
* Web access of databases from CENG 256 Internet Scripting; and,
* Wireless protocols such as 802.11 from TECH152 Telecom Networks.

This knowledge and skill set will enable me to build the subsystems and integrate them together as my capstone project.

**Methodology**

This proposal is assigned in the first week of class and is due at the beginning of class in the second week of the fall semester. My coursework will focus on the first two of the 3 phases of this project:  
 Phase 1 Hardware build.  
 Phase 2 System integration.  
 Phase 3 Demonstration to future employers.

*Phase 1 Hardware build*

The hardware build is completed in the fall term. It fits within the CENG Project maximum dimensions of 12 13/16" x 6" x 2 7/8" (32.5cm x 15.25cm x 7.25cm) which represents the space below the tray in the parts kit. The highest AC voltage that will be used is 16Vrms from a wall adaptor from which +/- 15V or as high as 45 VDC can be obtained. Maximum power consumption will be 20 Watts.

*Phase 2 System integration*

The system integration will be completed in the fall term.

*Phase 3 Demonstration to future employers*

This project will showcase the knowledge and skills that I have learned to potential employers.

The brief description below provides rough effort and non-labor estimates respectively for each phase. A Gantt chart will be added by week 3 to provide more project schedule details and a more complete budget will be added by week 4. It is important to start tasks as soon as possible to be able to meet deadlines.

**Concluding remarks**

This proposal presents a plan for providing an IoT solution for Drone\_DOF. This is an opportunity to integrate the knowledge and skills developed in our program to create a collaborative IoT capstone project demonstrating our ability to learn how to support projects such as the initiatives described. I request approval of this project.

**Citation:**

1. Maboshi. (2018, November 07). Arduino GPS Drone RC Boat. Retrieved from <https://www.hackster.io/maboshi/arduino-gps-drone-rc-boat-45d6f4>
2. Autonomous High Altitude Glider. (n.d.). Retrieved from <https://create.arduino.cc/projecthub/53982/autonomous-high-altitude-glider-055aa3?ref=tag&ref_id=drones&offset=9>
3. Vignesh. (2018, December 17). Intelligence Monitoring Drone System. Retrieved from <https://www.hackster.io/enigma-plasma-8/intelligence-monitoring-drone-system-727470>
4. Velani, A. (n.d.). November 27th, 2018 (Week 13). Retrieved from <https://armanvelani.github.io/3-AxisAccelerometer/>