THE LONG-RANGE ASSET TRACKER PROJECT

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Project Summary

This project is aimed at large industries that require their asset to be transferred from one area to the next in varying conditions. The device will not require users to have extensive technology knowledge other than understanding how to use a computer. At the end of the year, the device is to be able to periodically read data from its sensors and relay information back to headquarters wirelessly over long ranges with low power consumption and an extended up-time of around 1 month. Throughout the project, we’ve used technologies such as modern BUS protocols largely used with arrays of sensors with a main processor and touching on how to design a PCB with commonly used software in the industry while being able to meet deadlines.

Problem and Need

The problem that we are trying to solve is that companies that operate in rural, large worksites such as oil fields may find it difficult and expensive to track their equipment, especially when no cellular signal is available. An inexpensive device is needed to help the aforementioned companies track its assets to ensure a safe environment for the workers and minimize accidents or faults in the equipment.

Significance

Oil companies, coal companies, and park rangers are examples of who may want to implement this device to their process in order to enhance the safety of the workers and cut down on labor costs.

Goal

The goal of this project is to lower the cost of tracking assets and enhancing workers’ safety for companies that operate in large worksites.

Customer/User Analysis

Our product is focused in industries that require assets to be transferred in large worksites. Industries such as oil and gas will be a large part of the customer base. Users are expected to range from the average person and experienced engineers. Products used out in the field would only require users to know how to turn the device on/off. Other users will be those that are based in the offices being notified of different data logs being sent back and forth from the field and should be able to interpret them.

Deliverables

The final deliverable is for the device to periodically take temperature, accelerations, and GPS readings whilst being able to send alerts that certain thresholds have been exceeded and that action must be taken. Whilst performing all of these readings, the device will be able to keep an up-time of around 1 month on a single battery. Power consumption is at a minimal due to its ability to enter a low current sleep mode, as with its sensors.

Terminal Objective

Our terminal objective is to learn about the industry standards in device communications such as I2C and SPI. Other industry standards that we learn are how to design PCBs with commonly used programs such
as eagle. This project also gives us the opportunity to get an understanding on how to approach project deadlines and objectives.

**Overview Diagram**

Fig. 1. Overview diagram of the project, showing that the Multitech mDot takes measurements using three digital sensors (GPS, temperature, and acceleration) and send it to a gateway, which connects the headquarters or dispatcher from the company.