ICOM 4217 Pre-Proposal

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Team Members

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Insulin Temperature Warning System

The design I have in mind uses a micro-controller to verify if stored insulin meets the normal and emergency guidelines for insulin storage. This design would be useful in regions where the power infrastructure is unreliable and post disaster conditions are frequent. The end goal of this design is to create a prototype using a micro-controller, detect the current temperature using a temperature probe and log to a removable storage the recorded temperatures the at specific time intervals. If the micro-controller detects there is AC power being supplied from the electrical grid it verifies if the insulin meets the normal guidelines for insulin storage, i.e that the insulin is less than 2 months in storage and has been kept consistently between 2 and 8 Celsius. When AC power has been lost, the micro-controller switches to the emergency guidelines for insulin storage, i.e 15 to 30 Celsius for less than 4 weeks. The time sensitive nature of this problem necessitates a low power solution, that can make decisions on the fly while maintaining an accurate real-time clock. Some of the features include An uninterruptible power supply in order switch from AC to battery power when AC power is lost, micro SD port to log the temperatures registered by the sensor and a display to show the remaining time of the insulin still meeting the guidelines and a buzzer to alert the user if insulin has been possibly frozen and/or exposed to high temperatures.

The end goal for this proposal will be a design that uses a micro-controller, a temperature sensor, a segmented display and removable micro SD storage to log, monitor and inform the user if the insulin has been possibly outside the safety guidelines.

Insulin Temperature Warning System Client

Kali Villegas (Temperature sensitive medication patient) 787-669-1130.

Cardiac Monitoring Warning System

The design I have in mind uses a micro-controller to verify that there is nothing unusual with the cardiac system of a patient. This design would be useful in situations were patients need a constant monitoring of their heartbeats. The end goal of this design is to create a prototype using a micro-controller, detect if there's an anomality with the heartbeats of the patient using a heartbeat sensor. The patient will be able to carry this micro-controller at any time to keep monitoring their heartbeats at all times. It will have a display for the patient to see the results of the current heartbeats test and a log in a removable storage for previous tests that the design will be able to run in time intervals. If the micro-controller detects an anomality of the heartbeats it will notify the user by an alarm / warning letting know that something is not right. For example, if the heartbeats are too fast a beep will sound rapidly 3 times. If the opposite occurs, then the alarm will be a slow beep 3 times. This problem will need an economic design with low power consumption to facilitate the patient its use. Some features of this design are, a real time clock for keeping the logs and to measure the heartbeats, a small display for the user to be able to know their heartbeats levels, a compact battery for the energy consumption, a micro USB port to retrieve the logs of the patient, a heartbeats sensor and a buzz alarm for the warnings. The end goal for this

proposal will be a design that uses a micro-controller, a heartbeat sensor, a small display, and a removable micro SD storage to log, monitor and inform the patient any issues related to their heartbeats.

Who is your Client? Guillermo

Client: Pedro Bernardi Ortiz

Position: Heart operated patient

Contact Information: (787) 735-4584

Client: José G. Colón Colón

Position: Pacient with high blood preasure

Contact Information: (787) 566-2820

Humidity and Temperature sensor

The proposal in mind is a integrated humidity and temperature sensor that provides high accuracy measurments for humidity levels like the amount of water vapor in the air. The humidity in industrial and home environments is critical to the long-term health and well-being of people or the up keep of the equipment of the industry involved. Humidity sensing and control is also important for the safety of equipment and employees. The need that creates the problem is that in there's a high humidity in Puerto Rico since its a tropical island thus this system would be very beneficial in health benefits and cost reduction by alerting the user and resolving the problem at the same time manually by an interactive system. The problem addressed is the humidity problem in warehouses and retail locations that damage documents around the place. The solution scope is the water vapor passes into a conductive electrode that water molecules in the air permeate the humidity sensing dielectric and this changes by the concentration of water and the integrated sensor measures the capacitance and coverts into digital data and also measures the temperature and outputs the information in I^2C inter-integrated controller and this runs on a battery bank that also has a USB-C port to do maintenance on the software.

Who is your client? (contact information)

Rubén M. Melendez (787-447-0633) Coordinator First Bank/Project Coordinator for First

Bank

Potential Project Description Enrique

The potential project revolves around the sport airsoft. In airsoft, there are a few modes mainly played, being team deathmatch, capture the flag and king of the hill, with a few others. While these modes are fun, the mayority of matches is team deathmatch with one life, which can become boresome after a while. Because the majority of games are like this, most people who play wouldn't think different ways to play, since it's mostly take out the enemy team. There isn't really a good sense of needing to make a stratgey to defend a zone, where the other team may come from, or how to stop them. Not only this, but these require others to become referees in order to keep count of scores. For this, a new mode can be done called "Domination", which will be achieved with the help of micro-controllers. One micro-controller will be on the arm of the user, which we'll call a player, with a screen and sensor to determine if the player is capturing a point or if the point has been captured, while another will be set in a point, with a sensor, to let the other micro-controller determine if they are close enough to the point to capture it or let know the user the point has been captured by their team. With the same setup, an easier mode can done called "Capture the headquarters", where a team must defend a point while another team tries to capture it, but the attacking team cannot start to capture as long as there is a member of the defending

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team at the point. With these two modes, a better way to collect points can be made, and since the players will have screens on their wrists, they can see how much points their team is holding and let them determine what would be the next best course of action. This should be majorly used when there are airsoft events, so there are more interesting and challenging modes where players can change the way they play, how they think at the moment and also form a new plan depending on the situation.

Who is your client? Enrique

Name: Brian Medina Number: 787-402-9217

1. Insulin Temperature Warning System

    - Feasibility: It is very feasible given 4 month development cycle.

    - Has it hardware and software opportunities?: It both utilizes the hardware elements within a micro-controller and the flexability and decision making capabilities of a micro-controller to a large extent whilst needing to be low cost.

    - Dependencies: The delivery of materials from component vendors.

    - Required technologies: Micro-controller, temperature sensor, memory controller, segment display, rechargeable LIPO batteries, BMS and uninterruptible power supply.

    - Cost: A rough estimate of the necessary components yielded a cost of $35.

2. Cardiac Monitoring Warning System

    - Feasibility: A combination of understanding and analyzing heartbeats and using expensive and a poorly documented sensor (i.e heartbeat sensor) makes meeting the project deadline exceedingly difficult.

    - Has it hardware and software opportunities?: It definitely uses both external sensors and real-time data analysis to justify the need for a micro-controller based design.

    - Dependencies: The delivery of materials from component vendors.

    - Required technologies: Micro-controller with a real-time clock, memory controller, small display, battery, BMS, USB port, buzzer, heartbeat sensor.

    - Cost: A rough estimate of the necessary components yielded a cost of $28.34.

- Feasibility: The feasibility of this design is moderately high, although the design needs special attention to maintainability and upgradability.

- Has it hardware and software opportunities?: It utilizes hardware to be able to detect its environment and software to make decisions and notify the user.

- Dependencies: The delivery of materials from component vendors.

- Required technologies: micro-controller, humidity sensor, battery, BMS, USB-C port, LED display, LED display driver, LED, temperature sensor.

- Cost: A rough estimate of the necessary components yielded a cost of $40.28.