**ECEN 403 Potential Projects**

**Team Focuses**

Blade Roybal - Electrophysics

Matthan Myers - Programming

Lotanna Agbasi - Power

Cameron Chollett - Biomedical

**Electrical Impedance Tomography (EIT) Mobile Device with Wireless Alert System**

(Possible additional support from Dr. Han)

EIT is a reliable way for testing the resistance of certain tissues and organs within the body. Its main application is to monitor the growth of malignant tumors.

A current is induced into the body focused on a certain point and receivers on the other side measure the voltage after processing through the body. Cancerous tissue will typically impede more current than healthy tissue.

The goal is to create a EIT device combined with a smart device to be more accessible to the every day cancer patient.

As EIT technology progresses, the device will be used for diagnosis as well as logging the results of different cancer therapies.

The main design concept behind the EIT mobile device is that it will translate the analog signals taken from the voltage measure and convert it to digital data that will be processed and sent back to the mobile device for a tomographic display.

NOTE: After reading this over again, we may need to make minor changes to the design. Doesn’t cancer take a little while to develop? Would it be better to make the “mobile device” version of this to focus on stuff that can occur quicker? Like what we were talking about with sudden leaking in the brain. Something someone would have to wear like for 2-3 weeks after a major surgery in case something goes wrong that no one can spot without imaging equipment.

ADDED Section: The Wireless Alert System will connect directly with the EIT mobile device to send an alert with location coordinates should the system detect a life threatening anomaly.

**NEW Portable Long Range Acoustic Device (LRAD) Riot Shield**

To reduce the amount of injuries from physical projectiles, the LRAD Riot Shield can be quickly deployed to police forces in need of it to control large crowds without physical means. The portable capabilities will allow police to maneuver without needing the LRAD to be locked down to a specific location.

Potentially synced to a main frame to be activated in unison from a command post.

**NEW Ecofriendly High Frequency emitters for Pest Control in commercial farming**

A small biodegradable device will be researched and built to emit high frequencies.

<http://en.wikipedia.org/wiki/Electronic_pest_control>

This can cause a shift from using chemical pesticides with potential damaging effects to the human body to a more cost effective and cleaner method of protecting plants that is both ecofriendly and healthier.

The emitter will be low power since it does not need to receive any signals with a lifespan of the average food crop.

CHALLENGES: Biodegradable casing and wiring. Power - solar or batteries(generally not disposable let alone biodegradable). Life Span. Ruggedness for varying temperature conditions.

**Solar Panel That Locates and Adjusts to the Sun’s Positioning**

The panel will have four sensors that will monitor the amount of sun

rays that each region is attracting.

The sensors will relay data to the processing unit for evaluation.

The CPU will calculate linear adjustments to attract more sun rays to

the solar panel.

The microcontroller unit will move up and down along the roof

depending on the time of the day, as well as left or right depending on

the sensors.

**Microcontroller Mirrors that Adjust According to The Level of the Driver’s Eyes**

The laser sensor will either detect the level of the driver’s retina, or

calculate a reasonable positioning of the eyes based on the average

circumference of the head.

The sensor will wirelessly connect to the CPU and the data will be

translated.

The CPU will calculate the proper angles of the rearview and side

mirrors.

From the CPU, the microcontroller circuit will linearly move the

mirrors up or down, left or right.

**Autonomous Sensing and Data collection with the use of Quadrotors**

Per Dr. Chamberland’s advising a potential project

To be used for surveying pipelines prior to failure? By Placing Wireless transceivers at predetermined locations down the pipeline