Optimum Use of Multi-Beam Antennas in Mesh Network

The project involves integrating multi-beam directional antennas (developed by Virtual EM) into a Zigbee mesh network, and developing an algorithm for switching antenna beams using Arduino microcontrollers. The objective of the algorithm is to optimize the RSSI Received Signal Strength Indicator (RSSI) in each RF links.

Course: EECS 430  |  Course Instructor/Faculty Advisor: Anthony Grbic  |  Project Sponsor: Virtual EM Inc.

Team Members:
Josh Kirschenheiter  |  Matt Doyle  |  Mitch Overbeck  |  Fred Schaible  |  Emily Wong

Frequency Controlled Wireless Power Transmission

Utilizing a controller and reflection coefficient from a loop antenna to adjust the frequency to more efficiently transfer power without wires.

Course: EECS 430  |  Course Instructor/Faculty Advisor: Anthony Grbic  |  Project Sponsor: Anthony Grbic

Team Members:
Jake Wood  |  Yu Ho  |  Zach Cammenga  |  Sammit Nene

Planar Antennas for Small Satellite Applications

We have researched and developed UHF planar antenna designs for RAX and other University of Michigan nanosatellite missions and high altitude balloons.

Course: EECS 430  |  Course Instructor/Faculty Advisor: Anthony Grbic  |  Project Sponsor: Northrop Grumman

Team Members:
Jiangfeng Wu  |  Rebekah Bartlett  |  Aravind Venkitasubramony  |  Emre Alan  |  Nan Zheng
**RAX Antenna Analysis**

In this project, the student team has characterized a four element, UHF antenna system for satellites and high altitude balloons. This work builds on a previous antenna analysis efforts on two spacecraft. The antenna, however, has an unexpected pattern with a null when receiving linearly polarized signals. We have been charged with finding an explanation for the null.

**Course:** EECS 430  |  **Course Instructor/Faculty Advisor:** Anthony Grbic  |  **Project Sponsor:** James Cutler

**Team Members:**

Vikram Ivatury  |  Michael Munoz  |  Alyssa Francken  |  Turner Noel  |  Trevor Glick

**Computer Vision with Linear Light**

Our goal is to build a navigation structure based on a composite vision system that detects obstacles using a linear structured light array to guide a mobile robot.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** N/A

**Team Members:**

Chris Acosta  |  Rinachi Garg  |  Rahul Ramachandran  |  Cindy Wan

**Soundless Music**

Our product will allow the hearing impaired to enjoy music-driven aural sensations through the use of a wearable sleeve which transmits tactile vibrations with minimal delay.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** UM EECS Department

**Team Members:**

Taylor Milligan  |  MaryPat Beaufait  |  Ben Dennis  |  Anirudh Nath  |  Wes Smith
**Shape DJ**

We will be demonstrating a DJ which uses shapes as a controller. A camera tracks these shapes and based on their location and orientation we will add an electronic music effect to an audio track.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** UM EECS Department

**Team Members:**

Irene Zhu  |  Eric Beisrock  |  Jinkyu Lee  |  Daniel Cheng

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**SynTech**

This project is a proof of concept for a touchscreen synthesizer. The project will consist of implementing basic synthesizer functions, interfacing with a touchscreen, and outputting various graphical user interface pages to a display. At a bare minimum there should be a single graphical user interface page for the synthesizer controls and the synthesizer keyboard.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** UM EECS Department

**Team Members:**

Frank Laritz II  |  Arun Dutta  |  Maxim Markov  |  Muneet Parhar  |  Tyler Tremper

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**Audio Steganography**

Audio Steganography is the science of hiding data in audio clips. The core philosophy of Audio Steganography is to hide information such that the changes to any sound file cannot be noticeably heard by human beings.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** UM EECS Department

**Team Members:**

Adam Hug  |  Roy Blankman  |  Zhihao Liu  |  Paul Rigge
**Verax Speech Enhancer**

We will be creating a device which will intercept audio from a DVD player or similar device and modify the audio to enhance the intelligibility of speech and reduce dynamic range for a more comfortable and non-disruptive listening experience.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** EECS Department

**Team Members:**
Amisha Agarwal  |  Vincent Fasburg  |  Daniel Miller  |  Robert Liu  |  Kathleen Walker

**Voice Controlled Obstacle Avoiding Robot**

The goal of our project is to create a robot that responds in real time to voice commands while also avoiding obstacles when traversing. The robot will act upon the voice instructions taking into account the readings of an obstacle avoidance system.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** UM EECS Department

**Team Members:**
Sudeep Rohatgi  |  Tyler Axdorff  |  Megan Leininger  |  Joseph Widen  |  Philip Wolf

**Audio Steganography**

This is a second submit containing our formal abstract.

**Course:** EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** EECS Department

**Team Members:**
Adam Hug
**Lie Detector**

Lie Detector

Course: EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** Alfred Hero  

**Team Members:**

Mike Shen  |  Yawei Wang  |  Xiangyu Chen  |  Jingxiang Yuan

**Digital Soloer**

We are developing a system that can extract different instruments from a song with multiple instruments playing simultaneously.

Course: EECS 452  |  **Course Instructor/Faculty Advisor:** Alfred Hero  |  **Project Sponsor:** EECS 452  

**Team Members:**

Arya Bandari  |  Iman Aboutaleb  |  Ahmad Aldabbagh  |  Mohammed Sarraj  |  Giovanni Zhang