Senior Project

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Project Goal

- Develop an IR based GPS enabled laser tag system that can download scoring information, and GPS data to a PC base station in order to graphically replay the game events.

Project Tasks

- Create test harnesses for each module
  - GPS
  - MCU/EVB
  - IR Emitter / Sensor
  - LCD / Display
  - Gun/Station Uplink
  - Game Replay Software

Success Indicators

- We define a list of success indicators to keep us on track.
  - LCD: Shot count increments on LCD screen when trigger is pulled.
  - Transmit an IR message from an emitter to a sensor 50 meters apart.
  - Hit count increments on LCD screen when the IR message hits the sensor.
  - GPS data is transferred from the GPS unit to the MCU and stored in memory

Success Indicators

- Scoring data and GPS data are transferred to the base station.
- Software uses the scoring and GPS data to graphically replay the events.

GPS

- The GPS module will track player's position and movements
  - Test Plans: Write a test harness with our MCU which will decode the information sent to it by the GPS module. Display that information to a terminal. Check for accuracy.

MCU

- Will be the brains of the design
  - Talks to each other module
  - Tests include:
    - Test IR Emitter Communication
      - Create set of outgoing messages – Send those messages to the gun via the input Port designated for the IR Emitter – send the information to a terminal using SCI – check to make sure information was displayed correctly.
    - Test LCD
      - Display test messages – after integration, test gun data
    - Test IR Sensor Communication
      - Create set of incoming messages – send those messages to the MCU port – decode message – output to terminal

MCU

- Will be the brains of the design
  - Talks to each other module
    - Test GPS
      - Create mock GPS output – send to MCU – decode information then send interperatation to terminal – check if correct.
    - Test Uplink
      - Create mock gameplay data including GPS information, hits, shots fired, etc... - send to MCU – decode – output interper-atation to terminal – check for accuracy

IR Emitter Test

- IR Emitter will need to be configuered to send a strong signal to communicate up to 80 meters away.
  - Test Plans: Perform needed calculations to determine power requirments. Start at close distances. Send a signal through the lens to a target. Check target to see if it was hit. Check various ranges up to 80 meters.

IR Sensor

- Should be able to receive information from up to 80 meters away.
  - Test Plans: Send an IR signal to the sensor at close distances. Check to see if it received the message.
  - Once IR Emitter and Sensor have both been tested seperately, use the two modules to test each other.

LCD

- No need to test seperately. All testing can be done in the 'MCU LCD Test'

Game Replay Software

- Will reproduce the gameplay visually on a laptop or desktop including player motions, hits, shots fired, and scores.
  - Create sample gameplay scenario. Reproduce the sample scenario. Check for accuracy.

Integration Plan

Milestones

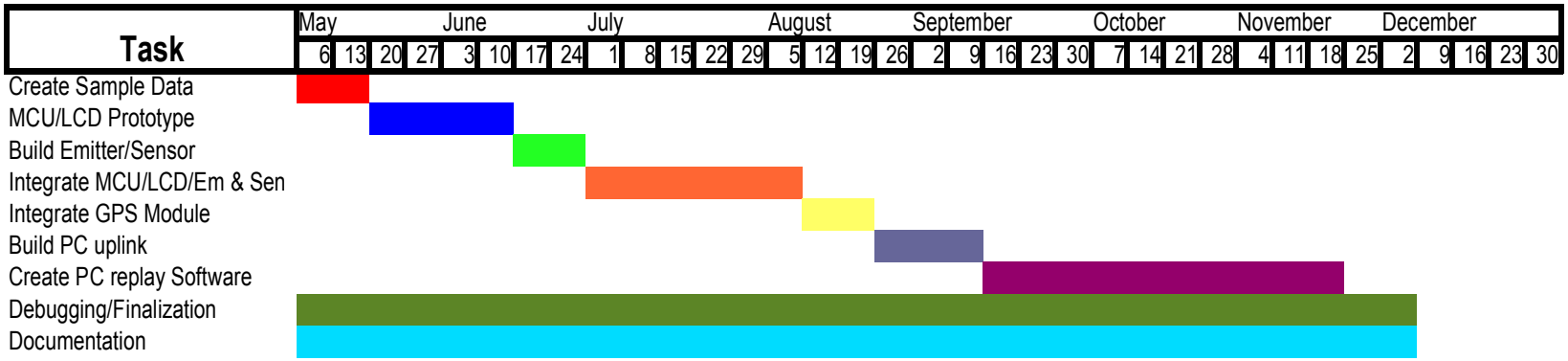
- Create sample data
  - Using spec sheets and reference manuals, create sample data impersonating each module (GPS,Emitter,Sensor,LCD,etc..).
- Build a MCU and LCD prototype
  - Pass all tests mentioned in testing section
  - Use LCD as part of the testing
- Build emitter and sensor
  - Pass the emitter and sensor testing mentioned
- Integrate MCU, LCD, Emitter, and Sensor
  - Build scoring prototype

Milestones

- Integrate GPS module
- Build PC Uplink
- Create graphical replay software

Schedule

- Schedule Flow



Flow Diagram

Bill of Materials

Part:	1st Source	Risk:
GPS:	Synergy Systems	low
IR Emitter:	Mouser	low
IR Sensor:	Mouser	low
LCD:	Mouser	low
MCU:	School	low
Board:	PCB123	low
Eclosure:	Self Made	low
Lens:	Edmund Sci	low

- Various discrete components

Q and A

- Any Questions?