

2012 IEEE Region V Robotics Technical Paper

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Introduction

Aims

The challenge was to harvest energy from three different energy sources and deliver to an electrochemical device (i.e. the flag) to measure the amount of energy transmitted.

Objectives

- Capture energy from at least two of three sources (either wind, light, or electric)
- Transfer stored energy to the flag mechanism

Project Restrictions

- The playing field was a 8 foot by 8 foot medium-density fibreboard (MDF) surface divided into four quadrants. Each quadrant consisted of an energy source in the corner.

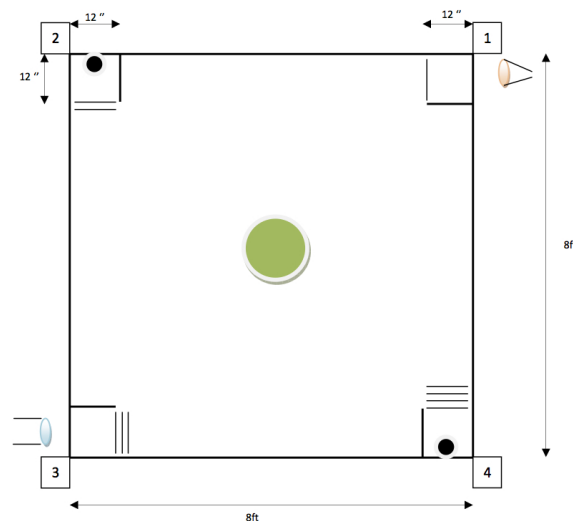


Figure 1: Playing Field Diagram

- Energy Sources

1. Light Source (Quadrant 1): 50 Watt Halogen MR16 GU10 Base Flood Light Bulb powered by 115 V, 60 Hz Outlet. The center of the bulb was 6 inches above the playing field. The circular surface of the bulb was 6 inches away from the inside surface of the perimeter.
 2. Electric Source (Quadrant 2): 5 V Thevenin source with 24 Ohm Thevenin resistance. Source is housed in a 3 inch PVC cap. Electrical contacts were 0.5 inch wide thin-metal strips. The top strip was positive.
 3. Wind Source (Quadrant 3): Style by Revlon 1875 Watt Dryer. Hair Dryer was set on High and Cold Shot permanently depressed. The center of the opening duct was 6 inches above the playing field. The circular surface of the dryer was 6 inches away from the inside surface of the perimeter.
- Delivery Flag (Quadrant 4): Essentially, a gear motor (Part No. 1094, Pololu Robotics) raises and lowers a small block. There will be a zener diode (approx. 6 V) in parallel with the motor to prevent motor damage. TO BE DONE.

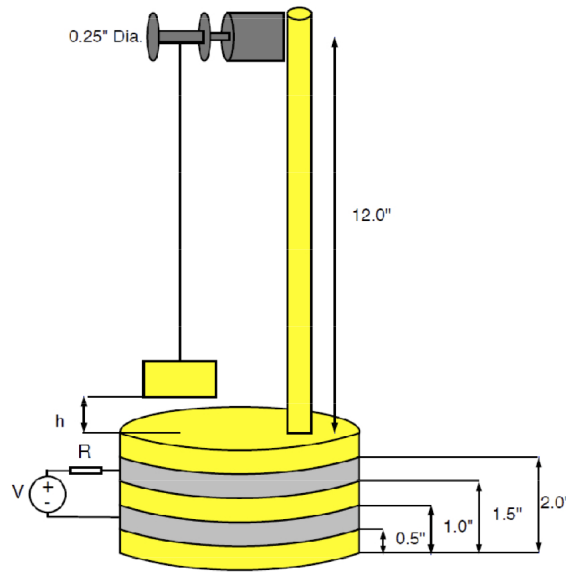


Figure 2: Flag Mechanism

- Starting Tree (Center): The robot will start from the center of the field. In the center is a tree inside a five gallon bucket. Some part of the robot must touch the outside diameter of the bucket as its starting position.
- Source Switching. Sources will be turned on and off throughout the round.
- Robot Limitations
 1. The robot could not cross the perimeter to harvest light energy or wind energy.