Autonomous Light Beacon Robot
Subsystem Requirements

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1) Controller Unit

- Must contain all high-level algorithms related to the control and operation of the robotic platform's various functions
    - Must take input from the sensor/communication board in order to effectively communicate with the beacon towers
    - Shall be capable of storing sensory data and performing basic logical and arithmetic operations on said data
    - Shall be capable of taking feedback from obstacle avoidance sensors and interpreting said feedback in order to control the movement and orientation of the platform
- Must possess some method of analog-to-digital and digital-to-analog conversion of input and output signals in order to interface properly with hardware

2) Sensor/Communication Board

- Must detect the location of beacon towers based on the color and/or intensity of radiating light
- Must receive a 38KHz-modulated infrared signal and communicate with the beacon towers via a Universal Asynchronous Receiver/Transmitter (UART) protocol at a baud rate of 300 symbols per second.
    - Must transmit the capture signal, provided by the controller, in order to claim the beacon
    - Must transmit within a one-second window between outgoing data packets from the tower
- Must detect the presence of obstacles on the playing field and provide relevant feedback to the controller based on location

3) Motor Actuation

- Shall receive control signals from controller and output relevant components as actuation signals
    - Shall either restrict or allow the supply of voltage to the motors (e.g. enabled/disabled)
    - Shall determine the direction of movement for the platform by taking control signals and using them to control the spinning direction of the individual motors (e.g. clockwise/ counterclockwise)
- Shall provide feedback from the motors' quadrature encoders to the controlling unit as input to

movement algorithm

4) Power Management

- Must provide adequate power for all components on the robotic platform to operate safely
    - Must provide a minimum of 5V for operation of the controller and motor actuation subsystems
    - If necessary, should regulate certain voltage and current levels to allow for operation of certain components

Block Diagram