



# ROBOTIC TRASH CART



## Project Background

The Robotic Trash Cart (RTC) will transport both waste containers from the home base to the curb for waste pick up using a controller. The RTC design is focused on senior citizens, the disabled community, and people with limited mobility and strength in their extremities.

## Assumptions

- Largest gradient that will be traversed is 5 degrees of incline (ADA)
- Florida weather: rain, wind, humidity
- Pathway is paved
- RTC will be stored outside of the house
- Waste engineers will return the bins to the RTC after dispensing the waste

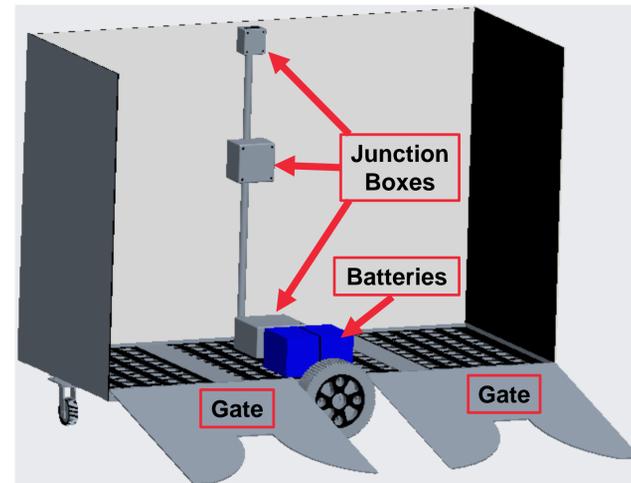
## Robotic Trash Cart



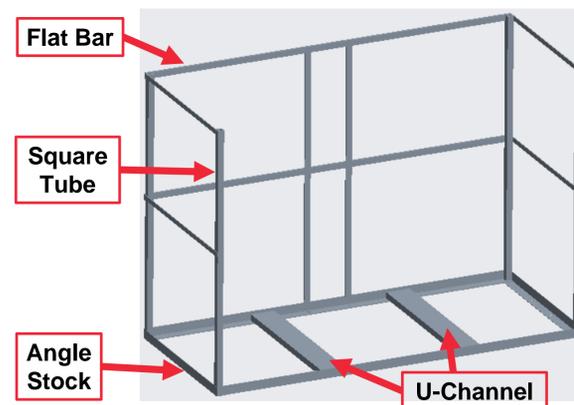
- Rectangular, aluminum frame
- Mid-Wheel drive
- Wireless controller
- Zero point turning
- Gates allow easy access to containers

## Design

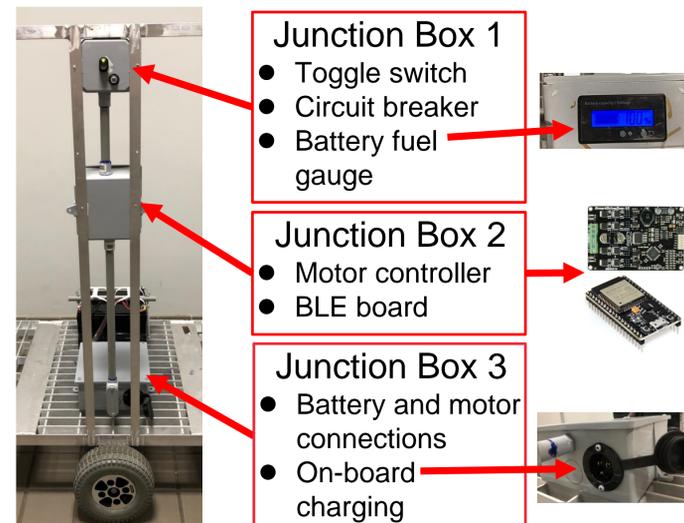
Front View



Model Frame



### Circuit Wiring



- Junction Box 1**
- Toggle switch
  - Circuit breaker
  - Battery fuel gauge

- Junction Box 2**
- Motor controller
  - BLE board

- Junction Box 3**
- Battery and motor connections
  - On-board charging

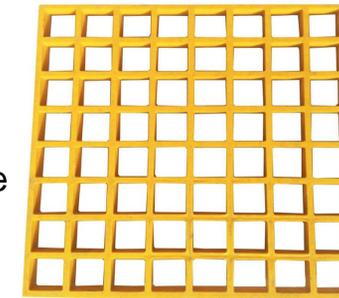
## Frame

### Aluminum Frame

- Anti-corrosive
- High strength-to-weight ratio

### Base Material

- Fiberglass square grating
- Lightweight
- Durable
- Prevents any issues with pooling water



## Control System

The motors will be controlled using pulse width modulation and a free mobile application (RemoteXY).



### Cytron Smart Drive Duo

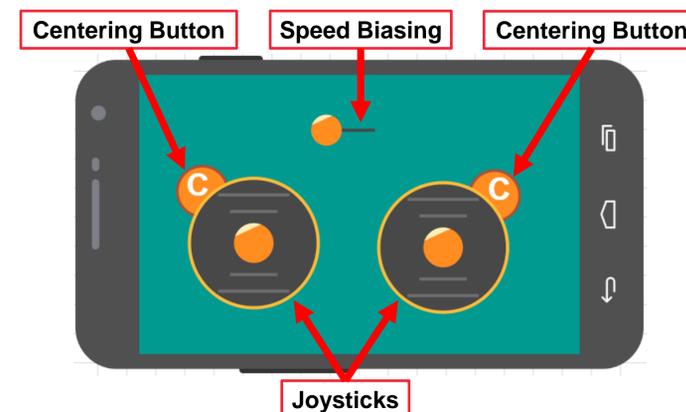
- Brushed motor controller
- Dual channel
- PWM capabilities

### ESP32 Wi-Fi/BT SOC

- Wi-Fi and BLE capabilities
- Arduino compatible



### RemoteXY Mobile App



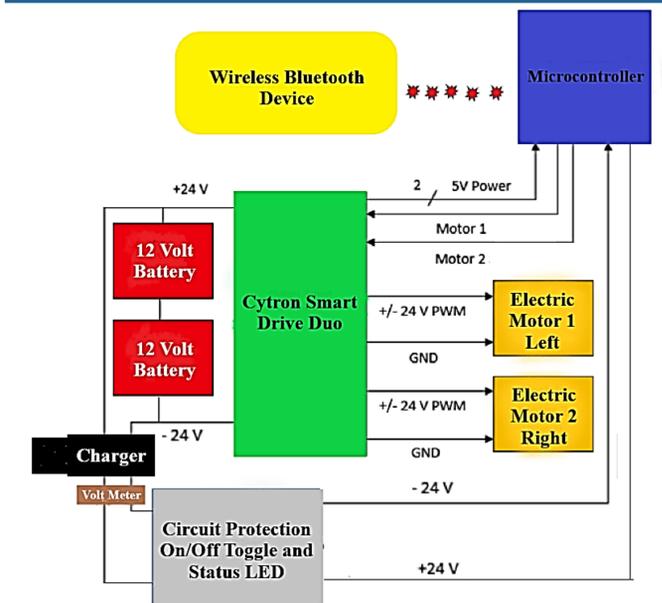
## Drive System

### CIM 24V DC Motors

- Brushed Motors
- Torque: 115.3 N-m
- Capable of moving a 200 lb load up a 5 degree incline



## Power System



## Future Applications

### STRETCH GOALS: Self Aware

- Object Detection
- Navigation
- Autonomous

We are working on implementing autonomous functionalities.

- Scheduling capabilities
- Synchronization with garage doors
- Future Applications
  - Single unit autonomous trash bins