

## **Robotic Trash Cart**

The robotic trash cart is a fully autonomous device that carries the recycling and waste bins to the curb for pick up and returns home. The elderly, disabled community, and people with limited strength and mobility in their extremities struggle to push or pull heavy objects, such as waste bins. This problem is magnified if their driveways are sloped, uneven, or become slick due to rain. The robotic trash cart consists of an aluminum frame with an HDPE plastic base, which will hold the trash and recycling bins, using an array of sensors to autonomously transport the bins from the user's home to the curb for waste removal and back to the user's home. A gate in the frame of the robotic trash cart provides waste engineers easy access to the bins for quick trash removal. The primary markets for the robotic trash cart are waste management companies that can rent out the equipment to homeowners for a monthly fee and individual homeowners. Secondary markets include amusement parks, outdoor shopping centers, and transportation hubs, such as airports, train and bus stations, and waterway entries. These secondary markets have the greatest commercial applications for the robotic trash cart due to their dense foot traffic. Here, an autonomous system of multiple robotic trash carts can be implemented. Once a robotic trash cart senses that it is full of trash, it will autonomously navigate to the central waste site, where it can be emptied and return to its original location.

# Lean Business Model /Business Model Canvas

Organization/Project Name: Robotic Trash Cart

Key Resources (6 )	Key Activities (5)	Value Proposition (1)	Customer Relationships (4)	Customer Segments (2)
<ul style="list-style-type: none"> <li>Storage facilities</li> <li>Distribution network for sales team</li> <li>Manufacturing of RTC</li> <li>Design and development of RTC and autonomous systems</li> <li>Mobile support</li> <li>Component parts (repairs)</li> </ul>	<ul style="list-style-type: none"> <li>Design and develop product</li> <li>Code that enables user control of the RTC and autonomous functions</li> <li>Arrange for a contract manufacturer (or we could assemble ourselves)</li> <li>Technicians to provide maintenance services</li> <li>Telephone and online chat operators to offer technical support</li> </ul>	<ol style="list-style-type: none"> <li>Waste Management Companies               <ol style="list-style-type: none"> <li>No more pick up of trash bins from the backyard</li> <li>Additional revenue stream leasing RTCs to customers.</li> </ol> </li> <li>Home Owners               <ol style="list-style-type: none"> <li>Alleviate stress from pulling/pushing heavy bins</li> <li>Avoids rain/cold/snow when taking trash out (convenience)</li> <li>Automates the trash dispensing to the curb allowing home owners to be away during trash collection weeks</li> </ol> </li> <li>Amusement Parks/Locales with dense foot traffic               <ol style="list-style-type: none"> <li>Trash cart can be strategically placed as foot traffic changes throughout the day</li> <li>Trash carts move to the primary dumpster when they are full</li> </ol> </li> </ol>	<p>Possible Partnership with waste management companies/amusement parks to train technicians on maintenance of the RTC or provide maintenance services (warranty). Client managers familiar with a user's trash dispensing system will provide personal assistance for troubleshooting problems. We will offer customer service support for individual homeowners.</p>	<ol style="list-style-type: none"> <li>Waste Management Companies</li> <li>Home Owners</li> <li>Amusement Parks</li> <li>Local, state, and national parks</li> <li>Locales with dense foot traffic, such as outlet malls, transportation hubs, sporting events/stadiums</li> </ol>
<p>Key Partners (7 )</p>			<p>Channels (3)</p>	
<ul style="list-style-type: none"> <li>Waste Management Companies</li> <li>Retirement communities</li> <li>Amusement Parks</li> <li>Outlet malls</li> <li>AARP</li> <li>Homeowners Association</li> </ul>			<ul style="list-style-type: none"> <li>Direct sales to waste management companies/home owners/amusement parks</li> <li>Online sales to the home owners</li> </ul>	
<p>Expenditures (8) (Cost Structure) →</p>	<ul style="list-style-type: none"> <li>Manufacturing costs of the RTC (wholesale price if using contract manufacturer)</li> <li>Distribution costs for deliveries of RTC</li> <li>Design and development</li> <li>Storage costs</li> <li>Company operating costs</li> </ul>	<p>Revenues (9) →</p>	<ul style="list-style-type: none"> <li>Selling or leasing of the RTC</li> <li>Consulting services for customization of RTC and/or autonomous system for trash dispensing</li> <li>Mobile support for mechanical failures</li> <li>Maintenance agreements</li> <li>Replacement Parts</li> </ul>	