

Customer Needs

This section covers the customer interviews that were conducted to develop the customer needs and requirements. The interviews were conducted over the phone. The customer interviews helped to narrow down the focus of this project and the tasks that the RTC needs to accomplish. The interviewees were Shirley P., Salwa Soliman, and Becky Hall. The home base in this section refers to the location where the RTC is stored when it is not in use. Table 2 lists the specific questions we asked our interviewees.

Table 1 *Interview Questions*

Number	Question
1	What Problems make it difficult to take your refuse to the designated pick up area?
2	Do you or any of your friends have trouble moving around and taking out the trash?
3	What is your biggest problem when taking out the trash?
4	Would you say most of your friends leave their trash can inside or outside their garage?
5	In general, would you say that most of your friends have concrete driveways or some have driveways of other materials, such as gravel or stone?
6	What is the easiest method for you to deal with the battery life of a trash cart?
7	Do you have problems placing your trash can, so it doesn't tip over?

Table 3 lists the interviewee responses to our questions and the need we became aware of from their response.

Table 2 *Customer Responses*

Question Number	Customer Statement	Interpreted Need
1	Shirley P: The containers are heavy to begin with. When they are full there is the possibility of the container tipping over on you when you either pull or push it. The edge of the carport to the pick-up area isn't far but for me it is hard when garbage is full.	The city of Tallahassee has a program in which they will get the waste containers for an elderly or handicapped person, but they need to fill out a questionnaire. A solution for this problem is any device that will help take the containers to the designated pick up area without tipping over.
1	Salwa Soliman: It's so heavy sometimes I can't bend it towards me to pull it to the pick-up location. Also, it's too far to walk to the pick-up area.	Salwa has a similar problem to Shirley and a device that takes the containers to the designated pick up area without

		tipping over would help resolve this problem.
2	Becky Hall: A couple of friends come to mind. One of my friends isn't very mobile at all and in a wheelchair; so, one thing that could help is to have the trash cans as low as possible to make it more accessible to people in wheelchairs.	People with disabilities have difficulty grabbing and moving things that are high off the ground or very low to the ground. We need a product that is well within reach of people with limited mobility.
3	Becky Hall: The distance of having a long driveway is my biggest problem I'd say. Some of my friends will put it in a certain spot to make it a shorter trip next time, even if it's not the best location for a trash can. One of my friends had such a long driveway that they paid their neighbor to just come take out the trash for them. So, distance I'd say is the biggest problem for myself and most of my friends.	Carrying or pushing the heavy trash containers is difficult for the elderly, disabled, and anyone with limited mobility or strength. Reducing the distance they have to travel to take out the trash is vital.
4	Becky Hall: Most of my friends actually have their trash cans inside their garage due to their communities demanding that the trash cans cannot be seen from the street. Some of my friends also hide their trash cans behind their fences or gates just in case the trash smells and they don't want to leave it in their own garage.	The RTC needs to prevent the trash containers from being an eyesore.
5	Becky Hall: Most of my friends including myself have concrete driveways, because we're in a more residential area. However, I do have a couple friends further away that have a gravel and/or dirt driveway.	The terrain the RTC traverses is important to know in order to use an appropriate transportation system, which can involve wheels, tracks, etc.
6	Becky Hall: A rechargeable battery I believe would be the easiest and best idea; like a rumba that does its job then goes and plugs itself back in.	A docking station can be built that recharges the batteries of the RTC when it is not transporting the trash to the pick-up location. Solar panels on the trash cart can help to supplement its power needs.
7	Becky Hall: I usually have trouble deciding where to place my trash can, whether it should be on the street or the driveway. I also usually think about if it's going to rain because there's almost a river running down my driveway to the shoulder of the street then to the storm drain. If I know it's about to	A locking mechanism is needed to keep the RTC in place when it is at the designated pick up location or at the home base. Something needs to be done to prevent the RTC from hydroplaning in the rain.

	rain, I'll place it on the flat part on the road so the river doesn't take my trash can.	
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The customer needs were established based on the interviews with customers. Table 4 lists the customer needs for the RTC.

Table 3 *Customer Needs*

Need Number	Customer Needs
1	Alleviate the stress for customers when transporting the trash containers from where they are stored to the curb for pick up. When the trash is full, the weight makes it difficult to move.
2	Minimizing the distance that the customers have to carry a heavy load of garbage to the curb for pick up or automate the process.
3	Allow for easy access for people to dispose of their trash into the trash containers. People in wheelchairs, people with limited mobility, or those with limited strength have difficulty reaching the trash bins to dispose of their trash. This also makes it difficult to transport the trash containers to the curb.
4	The RTC can cover the trash bins to prevent them from being seen from the street. This is required in certain communities. However, this is not a priority for this project.
5	The RTC needs to be held in place when at the curb or stored at home.
6	The RTC needs to allow for easy charging of the batteries and user-friendly interface.
7	The RTC needs to be able to withstand rain and other types of weather.
8	The RTC needs to withstand accidental impact from environment and when the Waste Engineers dispose of the trash from the bins.
9	The RTC needs to be stable when stationary and moving. It cannot tip over.

Table 5 lists the project requirements that were developed from the interviewee responses and our interpreted needs.

Table 4 *Project Requirements*

Requirement Number	Need number	Requirement
1	3	Easy access to waste containers: Waste containers can be taken out of the RTC in under 10 seconds. This is needed to make the waste disposal process time efficient and allows the user easy access to the bins if needed.
2	7	Weatherproof: water resistant, corrosion resistant and wind tolerant The RTC needs to be water resistant. This prevents any damage due to rain, humidity, sprinklers, or accidental spills. The RTC needs to be corrosion resistant, especially in coastal areas with high concentration of salt.
3	8	Impact proof. The RTC needs to be able to withstand impacts from debris caught up by the wind or possible collisions with obstacles in its path. It needs to withstand the impact and abuse when the Waste Engineers dispose of the garbage.
4	6	The process of charging the batteries of the RTC needs to be simple and efficient. The user interface of the overall product needs to be user friendly.
5	1, 2, 9	Perform consistent transportation of waste bins from the home base to the curb and back home during scheduled trash removal without tipping over
6	4, 5, 8	Holds the waste bins securely
7	1, 2	The RTC needs to be able to go up a gradient of at least 5 degrees of incline. The Americans with Disabilities Act requires that most businesses, schools, and churches have a wheelchair ramp of at most 5 degrees of incline. The RTC should be able to handle the same gradient as an automated wheelchair.

Table 6 lists our project constraints. Initially, every entrepreneurship project was granted \$1,000.00 budget; however, more funds could be requested. We were granted an additional \$900.00 giving us a total budget of \$1,900.00.

Table 5 *Project Constraints*

Number	Constraints
1	Our original budget was \$1,000.00. Our final budget is \$1900.00
2	Project must be completed within the 8-month school year window. Deadline by April 26, 2019.

Extra notes from the interviews:

1. What if weather causes some of the trash to fall on the side of the trash cart or out of the bins because it is overflowing with trash?
2. Would the trash cart be durable enough for someone to wash off and not damage the electronic devices? This goes in line with it being weatherproof.
3. We may also want to look into the average dip/gradients of driveways to get an idea of how steep some driveways are.
4. The RTC will have to be resistant to corrosion from salt when in coastal areas.