

MILESTONE 3: Customer Needs

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Customer Needs

Customer needs enable design teams to be more informed on the decisions and goals of the product/service in development. The customers for the RoboBoat senior design team are the sponsors/advisors that are providing the means for the team to compete. The customer needs were formulated using the 2020 RoboBoat competition guidelines and from additional expectations given by the team's advisor, Dr. Damion Dunlap.

The customer needs consist of the following:

1. It cannot exceed 140 pounds, and would ideally be less than 70 pounds.
2. The vehicle cannot exceed six feet, by three feet, by three feet "box".
3. The competition takes place at a freshwater pond, but you will most likely be testing in saltwater conditions.
4. It is recommended the electrical components are covered.
5. Final demos are within the last two weeks of the summer semester, or if going to a competition plan to finish ideally a week before the competition.
6. It will be transported in a pickup truck with a covered cab.
7. Focus on the areas of the competition that will net the most points with the least amount of complexity.
8. The vehicle needs to be battery powered.
9. The vehicle must be fully autonomous, and all decisions can be made onboard the ASV.
10. Any propulsion system is fine (thruster, paddle, etc.), but moving parts must have a shroud.
11. All sharp, pointy, moving, or sensitive parts must be covered and marked.

Interpreted Needs

The interpreted need is the engineering interpretation of the customer need statements.

The interpreted needs consist of the following:

1. The overall weight of the ASV and UAV will be less than 140 pounds.
2. The boat will fit into a six feet, by three feet, by three feet "box".
3. The boat will function as intended in both freshwater and saltwater.
4. Electrical components will be covered in case of inopportune weather conditions.
5. The team will decide whether the boat is planned to go to the competition or not.
6. The boat will be able to fit and be secured in the bed of the truck.
7. Focus on the categories of the competition that accumulates the most points.
8. The watercraft will be provided power by a cordless energy source.
9. The boat will be capable of making decisions and functioning independently.
10. The propulsion system will be determined by team preference, with a covering in case of moving parts.
11. The boat will have appropriate safety measures befitting of the RoboBoat standards.

Explanation of Results

1. The data found in the RoboBoat competition guidelines contains the ideal total weight and maximum total weight for the ASV and UAV.
2. The data found in the RoboBoat competition guidelines contains the UAV size constraint.
3. The buoyancy of the boat may be different in freshwater vs saltwater. The competition will be conducted in freshwater (lower buoyancy), therefore we need to make the boat with fresh water as the primary water.
4. While it is not required that the electrical components be covered, it is highly recommended so that electrical components will not have water damage from rain.
5. If the team competes in the Roboboat competition, then the project has to be completed significantly sooner.
6. The boat can be damaged if it falls out of the truck while driving down the highway. To avoid this we will strap down the boat using ratchet straps.
7. Directing all focus to one aspect of the project can cause problems in other areas and ultimately compromise the design.
8. The best solution for a cordless energy source is a battery.
9. The boat will be controlled by a wireless controller.
10. The propulsion system that will be used needs to contain some drag to allow the boat to decelerate.
11. All necessary precautions will be taken, to assure that no problems will arise during the competition/showcase.

Raw Customer Feedback

Question: Would weight be an issue for this project?

Answer: It cannot exceed 140 pounds, and would ideally be less than 70 pounds.

Interpreted Need: The overall weight of the ASV and UAV will be less than 140 pounds.

Explanation of Result: The data found in the RoboBoat competition guidelines contains the ideal total weight and maximum total weight for the ASV and UAV.

Question: Would size be an issue for this project?

Answer: The vehicle cannot exceed six feet, by three feet, by three feet "box".

Interpreted Need: The boat will be smaller than the size constraint given.

Explanation of Results: The data found in the RoboBoat competition guidelines contains the UAV size constraint.

Question: What type of water will the boat be operating in?

Answer: The competition takes place at a freshwater pond, but you will most likely be testing in saltwater conditions.

Interpreted Need: The boat will need to function similarly in both freshwater and saltwater.

Explanation of Results: The buoyancy of the boat may be different in freshwater vs saltwater.

Question: Do the electrical components of the boat have to be enclosed?

Answer: It is recommended to have electrical components enclosed.

Interpreted Need: Electrical components will be covered in case of inopportune weather conditions.

Explanation of Result: While it is not required that the electrical components be covered, it is highly recommended so that electrical components will not have water damage from rain.

Question: When should the final product be completed?

Answer: Final demos are within the last two weeks of the summer semester, or if going to a competition plan to finish ideally a week before the competition.

Interpreted Need: The team needs to decide whether the boat is planned to go to the competition.

Explanation of Result: If the team competes, then the project has to be completed significantly sooner.

Question: What will be the planned transportation for the boat to the competition?

Answer: It will be transported in a pickup truck with a covered cab.

Interpreted Need: The boat needs to be able to fit and be secured in the bed of the truck.

Explanation of Result: The boat can be damaged if it somehow fell out of the truck while driving down the highway.

Question: What aspect of the competition should we prioritize?

Answer: Focus on the areas of the competition that will net the most points with the least amount of complexity.

Interpreted Need: Focus on the categories of the competition that accumulates the most points.

Explanation of Result: Directing all focus to one aspect of the project can cause problems in other areas and ultimately compromise the design.

Question: Can the boat utilize any type of energy source?

Answer: The vehicle needs to be battery powered.

Interpreted Need: The watercraft will have power supplied by a cordless energy source.

Explanation of Result: The best solution for a cordless energy source is a battery.

Question: How much autonomy should our boat have?

Answer: The vehicle must be fully autonomous, and all decisions must be taken onboard the ASV.

Interpreted Need: The boat will be capable of making decisions and functioning independently.

Explanation of Result: The boat will be controlled by a wireless controller.

Question: What propulsion systems are available for use?

Answer: Any propulsion system is fine (thruster, paddle, etc.), but moving parts must have a shroud.

Interpreted Need: The propulsion system will be determined by team preference, with a covering in case of moving parts.

Explanation of Result: The propulsion system that will be used needs to contain some drag to allow the boat to stop quicker.

Question: What safety precautions should be taken?

Answer: All sharp, pointy, moving, or sensitive parts must be covered and marked.

Interpreted Need: Boat will have appropriate safety measures befitting of the RoboBoat standards.

Explanation of Result: All necessary precautions will be taken to assure that no problems will arise during the competition/showcase.

Appendix

Question	Answer	Interpreted Need	Explanation of Results
Would weight be an issue for this project?	It cannot exceed 140 pounds, and would ideally be less than 70 pounds.	The overall weight of the ASV and UAV will be less than 140 pounds.	The data found in the RoboBoat competition guidelines contains the ideal total weight and maximum total weight for the ASV and UAV.
Would size be an issue for this project?	The vehicle cannot exceed six feet, by three feet, by three feet "box".	The boat will be smaller than the size constraint given	The data found in the RoboBoat competition guidelines contains the UAV size constraint.
What type of water will the boat be operating in?	The competition takes place at a freshwater pond, but you will most likely be testing in saltwater conditions.	The boat will be smaller than the size constraint given.	The buoyancy of the boat may be different in freshwater vs saltwater.
Do the electrical components of the boat have to be enclosed?	It is recommended the electrical components are covered.	Electrical components will be covered in case of inopportune weather conditions.	While it is not required that the electrical components be covered, it is highly recommended so that electrical components will not have water damage from rain.
When should the final product be completed?	Final demos are within the last two weeks of the summer semester, or if going to a competition plan to finish ideally a week before the competition.	The team needs to decide whether the boat is planned to go to the competition.	If the team competes, then the project has to be completed significantly sooner.
What will be the planned transportation for the boat to the competition?	It will be transported in a pickup truck with a covered cab.	The boat needs to be able to fit and be secured in the bed of the truck.	The boat can be damaged if it somehow fell out of the truck while driving down the highway.
What aspect of the competition should we prioritize?	Focus on the areas of the competition that will net the most points with the least amount of complexity	Try not to perfect one specific characteristic of the project.	Directing all focus to one aspect of the project can cause problems in other areas and ultimately compromise the design.

Can the boat utilize any type of energy source?	The vehicle needs to be battery powered.	The watercraft will have power supplied by a cordless energy source.	The best solution for a cordless energy source is a battery.
How much autonomy should our boat have?	The vehicle must be fully autonomous, and all decisions can be made onboard the ASV.	The boat will be capable of making decisions and functioning independently.	The boat will be controlled by a wireless controller.
What propulsion systems are available for use?	Any propulsion system is fine (thruster, paddle, etc.), but moving parts must have a shroud.	The propulsion system will be determined by team preference, with a covering in case of moving parts.	The propulsion system that will be used needs to contain some drag to allow the boat to stop quicker.
What safety precautions should be taken?	All sharp, pointy, moving, or sensitive parts must be covered and marked.	The boat will have appropriate safety measures befitting of the RoboBoat standards.	All necessary precautions will be taken to assure that no problems will arise during the competition/showcase.

References

RoboNation (2020). *RoboBoat Rules and Task Description*. (version 1). Daytona, FL: Retrieved from roboboat.org