



Customer Needs

Nicholas Grant, Andrew Lois, SirDarius Lomack, Nicholas Haynes, Jacob Ray, Christian Perez

FAMU-FSU College of Engineering

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Jerris Hooker & Shayne McConomy

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Customer Needs

1.1 Customer Needs

To determine the needs for our design, Team 304 developed a set of questions to interview the project's advisors, Kyle Bush, Rodney Roberts, Teodoro Gonzales, Olugbenga Anubi Fang Peng, and Doreen Ayafor. These questions were designed based on the project scope and what the team agreed to be important characteristics to how the product should function. The questions and their respective answers were communicated via email. Table 1 below shows the questions asked to the advisors as well as their answers and interpreted needs.

. By asking questions about what the issues are with the current device that is used and what features it has that are beneficial, we were able to focus on the problem that needs to be solved. Rather than focusing on making the old device better, we can keep our minds open to a new design that could be completely different.

Table 1: Interpreted Customer Needs

Question/Prompt	Customer Statement	Interpreted Need
How high does the product need to reach?	The barrel fuse is located between 30 and 40 feet depending on the pole.	The product needs to be able to extend to very high distances and accurately be controlled to attach to the barrel fuse
Does the product have to be portable?		The vehicle can be recovered in under 85 seconds.
Will the Product have to be put through harsh conditions?	Yes the finished product should be able robust enough to go through muddy water and harsh conditions in the event of a hurricane, or if a utility pole is in a non accessible area	The product is highly durable and robust, capable of functioning effectively even when exposed to challenging conditions, including muddy water and harsh weather conditions.

Question/Prompt	Customer Statement	Interpreted Need
Will the product need to open and close switches?	The process for opening live switches is not involved with this project, only closing/reclosing.	The device gives the user enough leverage to apply the upward force necessary to close the switch
Can the switches themselves be redesigned to implement automated closing?	The switches can be redesigned but ideally, the device can interact with industry standard switches.	The end of the device is capable of latching on to industry standard switches.
Does the product need to be retractable to fit in places for transport?	Because it needs to fit into the FPL work truck it has to be as efficient as possible with space.	The device is space efficient and can fit into a standard 8 foot long truck bed
Can we innovate the previous prototypes used at other colleges for this design?	Yes, we highly encourage you to be as creative as possible to add on to the design that Auburn University created.	The existing prototypes can be expanded on to create a more effective version that puts less strain on the lineman using it.
Can the product be attached to the fuse switch and manually?	Yes, we are open to this but there are products on the market that do this already. However, if you can find a way to make it more efficient then explore that option.	Research current products on the market and consider the positives and negatives of having a remote switch attached to the pole.
Do we have to worry about phase clearances between power lines?	Yes, safety is the number one priority, but the power lines are a good distance away from the switch.	Be cautious of prototypes that can interfere with the high-voltage power lines.
Will the product have to be used for both opening and closing the fuse switch?	No, we will only be using this device for closing the fuse.	The design will not have to hook or grab the fuse, but just push it into the catch.

1.2 Explanation of Results

After posing our questions during the meeting with the FPL representatives, we were able to understand the needs of the device thoroughly. There were some features that were non-negotiable, like the height that it must reach and the size limits. The device needs to fit into the

truck bed that the workers take to the sites, and it needs to reach the height where the fuse switches are located. The idea of the switches being redesigned to have the closing be automated is not something that's off the table, however it would require new switches be implemented in all areas where there are overhead lines. This would mean the issue with the current design would persist until the company has the ability to replace all their switches that are in the field with the new design. From this, we determined that the solution will be designed to interact with the industry standard switches.

This project is one that has been posed to other capstone groups at other universities in the past, so there are previous students' solutions that FPL has given our group access to. Exploring other prototypes from the previous groups and building on them to create a more robust and efficient final design is a path that is very realistic for our group as well. One of the biggest takeaways from speaking with Kyle Bush was him mentioning to avoid adding weight to the end of the current design because of the inability to have control over it.