PROTOTYPE DELIVERY PLAN
HANDIBRELLA
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We plan to have the following components in our prototype:

- Waterproof Umbrella Material
- 2 Large Metal Springs
- 1 Logic Board (Brand/Type TBD)
- 3 Rope System
- 3 Support Rods
- 1 Bluetooth Receiver
- Wiring Harness
- 1 Remote
- 1 Arduino
- Waterproof Housing
- 1 motor
- Support legs

The Arduino will contain a Bluetooth receiver that will connect to an already developed app in the Apple App Store and Google Play Store. This allows the umbrella to be engaged whenever the button on the remote is pressed or whenever the user clicks the button on their phone to engage the umbrella to extend or retract. This Arduino will then be connected to a motor that will be allowed to access power whenever the Arduino is engaged. The power cable is connected between the engine and the motor by the Arduino. That means that the motor only has power whenever the Arduino gives the signal to engage. In other words, the Arduino is a wireless switch.

Connected to the motor is the track system which will be connected by a chain that moves forward and backward in order to extend and retract the umbrella. On this track system is the umbrella itself which is made up of three different components. The first component is the support rods. It's a three-rod system which allows the umbrella to be pulled taunt while still being durable in order to stand the weather conditions it will be put through. Attached to these rods is the waterproof material which is the same material found on your everyday umbrella. At the end of the umbrella is large springs that cause the umbrella to expand easier. The motor system and umbrella will be supported by a rope system which will cause the umbrella to be opened as it is pulled out of the box. Speaking of the box, it will cover the entire system in order to protect the device while driving down the road. The entire box is attached by metal supports that are attached to the roof in order to hold the box in place. Going into the next paragraph, you will get a better representation of how the system works as a whole.

We will have different components that are labelled which make up the Handibrella. We will have the motor which will run off of the car battery. This allows the umbrella to be extended and retracted with ease. The logic board is the brains of the product and will be used to trigger the motor whenever the button is hit on the receiver, and we may consider adding Bluetooth connectivity in order to allow the device to be engaged from outside of the car. The prototype will also show the umbrella in a folded-up position as well as shows the support rods which support the tension that is produced on the umbrella. While not able to be fully seen, all of the technology is covered by a slim waterproof housing.

Speaking of slim design, given that it is an umbrella, the housing just has to be as tall as the motor. This means that when mounted to the top of a car, it should have a very slim design as not to take away from the aerodynamics of the car. Two additional parts are required which are the power cord which is attached directly to the battery as well as the car mounts.

The umbrella works by automatically wanting to come open as soon as it exits the housing. The idea is that the umbrella is spring loaded, and the springs will compress as the umbrella is pulled back in. The remote would allow for quick and easy access to this and would save the person from getting wet. That is where the software aspect of the project comes into play. Overall, while this build seems simple, it will take some logic and problem solving to bring it all together. Some criteria that we are basing our idea off of is cost efficiency, product size, usability, helpfulness, and overall design.