What is the problem? Why is the current situation unsatisfactory?

- One of the most common auto accidents in the U.S. are side-impact, merging and rear-end collisions. All these events can be "avoided" with further visual alert systems. Like an LED strip.
- What could be more unsatisfactory than the obtuse amount of unnecessary fatalities, injuries, and thousands if not millions of dollars in damage? If our idea can save even one life with something as a flash of light, it is worth it.

Who is having this problem? Who are the would-be customers for a solution?

- Many drivers are concerned about the risk of accidents caused by the problem.
- Drivers are many times rear ended due to being followed too closely or by someone swerving in their lane. However outside of the driver noticing and beeping their horn there is no way to notify someone that they are too close.
- Our customers will be vehicle owners, manufacturers, and rental companies. Vehicle owners will be able to purchase an installation kit with instructions to install the system on their vehicle. Manufacturers will be able to purchase the system to install on new cars. Finally, fleet companies will be able to decrease the risk of damage to their vehicles from the other vehicles beyond the driver of their vehicle's control.

What basic functions must the design perform?

- The design must be able to detect when another vehicle is in close proximity to the vehicle the system is placed on. It must be able to detect this for the sides and rear end of the vehicle. Additionally this system must be able to raise a flag when another vehicle is too close.

How will the design be used by the customer(s)? Under what circumstances and in what environment? Don't limit your considerations only to those of the end user!

- The customers will be able to utilize the product by attaching the device to the rear bumper, like a rear bumper guard.
- Whenever the vehicle is activated. Whether backing out of a parking lot or driving along the highway, collisions can be found anywhere at any time. This system should work during the day or night, rain or shine.

What is the underlying theory or background that needs to be understood in order to address this problem?

- It is important to understand that many auto accidents are caused by lack of alert systems at the moment and having a visually intuitive alert system can be helpful.

What prior work has been done on this problem?

- In most vehicles manufactured after 2016, proximity sensors are standard. Also vehicles are required to have working turn signals and brake lights. Our project will add to both of these technologies to notify drivers of vehicles without proximity sensors when they are close to a vehicle with proximity sensors.

What products, currently available, were not designed or intended for this particular application but could be used to perform a similar function?

- Blind Spot Monitoring System: This product comes with most new cars today and there are also Blind Spot Detection systems that can be installed to vehicles who do not have this already. This system was designed to let the driver know when there is a vehicle in the blind spot of one of the side mirrors. This could be used to perform a similar function where instead of alerting the driver it could alert the other vehicle that is in the blind spot.