Goal
To assist drivers in seeing more clearly and navigating more safely during the night time using Infrared and Bluetooth technology.

Areas with low visibility, such as suburban neighborhoods and mountainsides that are not readily outfitted with street lights, pose a danger to both pedestrians and drivers. In these situations, using your low-beam headlights might not illuminate the road far enough to avoid dangers. Drivers can choose to use their high beams to see further, but at the cost of blinding oncoming drivers, which is unsafe for anyone on the road.

In another situation, regardless of lighting conditions, the use of GPS devices are common to make one’s commute easier. However, many GPS devices, whether it is already built into the vehicle, or if it’s an external device, requires the user to avert their eyes away from the road to view a map or the upcoming turns. This process of taking one’s eyes off the road to look at the center console or the GPS device, can be distracting and dangerous.

Our project aims to address the problem of (1) low visibility, by emitting and capturing infrared light (IR), light outside the visible spectrum, to better illuminate the road at night, and (2) distracted driving, by allowing the user to view IR capture and their GPS devices in the form of a heads-up display (HUD) that will be directly situated in front of the driver.

Market
Our project was planned and prototyped around the automotive aftermarket. The reason for choosing this market is that the product would be much more affordable and accessible for owners of different vehicles. Since the product only requires a 12V cigarette lighter to be powered, most automobile owners would be able to implement the product into their vehicles.

Although built-in HUD’s in the automotive industry have been conceptualized, they have yet to be physically implemented. Notable examples of proposed HUD concepts are seen in the 2015 Mercedes Benz S600 and 2014 Cadillac AST. Other after-market HUD systems like the Garmin HUD and Navdy have also been recently introduced. These HUD systems are also powered by a 12V cigarette lighter receptacle. However, within both the conceptualized HUD’s and available after-market HUD’s, the systems are limited in what they can display, particularly the speed of the car and the cardinal directions the car is traveling.

Approach
The ideas for this prototype initially begin with the idea of safety, particularly vehicular safety. In order to assist drivers, we sought to help them operate their vehicles in extreme conditions like dark and foggy environments where high beams could be potentially hazardous to both the driver and others around them. By using infrared technology along with a HUD system, we were able to minimize the need of using high beams in such conditions and supply drivers with an accessible alternative. The infrared waves are provided by a built-in emitter that can be mounted in front of a vehicle, which would then be captured by an infrared camera connected to a projector. In addition to the infrared technology of the HUD, the prototype also allows the user to stream information, like maps and weather information, from an Android device over Bluetooth. The combination of both types of functionalities is meant to improve driver safety by providing the driver with more visual information than current automotive technology offers.