1. Blind Spot Detector
   1. Version 1.0
      1. Operating temperature between 85 and -40 degrees Celsius
      2. Weather proof
         1. Rain
         2. Humidity
         3. Snow
         4. Hail
      3. Detect objects within 200miliseconds
      4. Detect objects within the area of 4 feet from the side of the car 7 feet from the side mirror
      5. Alert user with LED when turn signal is on and object in detectable range
      6. Run on vehicles car battery (~12V)
2. Equipment and materials required
   1. Blind Spot Detector
   2. Vehicle
   3. Person
   4. Bicycle
   5. Multimeter
   6. Environmental chamber
   7. Measuring tape
   8. Protractor
   9. Thermometer
   10. Oscilloscope
   11. Mechanic to Install Blind Spot Detector
3. Object Detection
   1. Range of Detection
      1. Maxbotix Ultrasonic Sensor: Max/min distance object can be detected
         1. Various size of object at room temperature in ideal condition
            1. Vehicle
            2. Biker
            3. Person
         2. Various outdoor temperatures
            1. 35 degrees Celsius
            2. -40 degrees Celsius
         3. Various levels of humidity
            1. High humidity
            2. Low humidity
         4. During rain
            1. Light rain
            2. Heavy rain
         5. Snowy conditions
            1. Snowing

With snow on ground

Without snow on ground

* + - * 1. Not snowing with snow on ground
    1. Maxbotix Ultrasonic Sensor: Width of beam width
       1. Various outdoor temperatures
          1. 35 degrees Celsius
          2. -20 degrees Celsius
       2. Various levels of humidity
          1. High humidity
          2. Low humidity
       3. During rain
          1. Light rain
          2. Heavy rain
       4. Snowing
    2. Software (AVR ATtiny85): Determine accuracy of distance measurement with set distance on ATtiny 85)
       1. Various size of object at room temperature in ideal condition
          1. Vehicle
          2. Biker
          3. Person
       2. Various outdoor temperatures
          1. 35 degrees Celsius
          2. -40 degrees Celsius
       3. Various levels of humidity
          1. High humidity
          2. Low humidity
       4. During rain
          1. Light rain
          2. Heavy rain
       5. Snowy conditions
          1. Snowing

With snow on ground

Without snow on ground

* + - * 1. Not snowing with snow on ground
      1. Software (AVR ATtiny85): Stability of detection indication
         1. Object near max detection
         2. Object near min detection
    1. Detection time of Blind Spot Detector (whole system)
       1. When turn signal is on
       2. When turn signal is off

1. Durability
   1. Operating temperature
      1. Max temperature
         1. 85 degrees Celsius
      2. Min temperature
         1. -40 degrees Celsius
      3. Degree of humidity
         1. High humidity
         2. Low humidity
      4. Rain
      5. Snow
      6. Hail
      7. Collisions
         1. Small object projectiles/collisions
         2. Larger object projectiles/collisions
      8. Input voltage variations due to car battery inconsistencies
         1. Test functional range of 14V < Voltage In < 6V
2. System power requirements
   1. Power consumption
      1. Sensor
      2. AVR ATtiny
      3. LED
      4. Voltage regulator
      5. NMOS switch
      6. Resistors
      7. Capacitors
      8. System as a whole
   2. Current consumption
      1. No object detected
      2. Object detected
         1. Outside of set max distance (no user alert)
         2. Within set max distance (user alert)

### Software: Determine accuracy of distance measurement with set distance

#### Various size of objects

##### Vehicle

##### Biker

##### Person

#### Various outdoor temperatures

##### 30 degrees Celsius

##### -20 degrees Celsius

#### Various levels of humidity

##### High humidity

##### Low humidity

#### During rain

##### Light rain

##### Heavy rain

#### Snowy conditions

##### Snowing

###### With snow on ground

###### Without snow on ground

##### Not snowing

###### Snow on ground

### Width of beam width

#### Various outdoor temperatures

##### 50 degrees Celsius

##### -20 degrees Celsius

#### Various levels of humidity

##### High humidity

##### Low humidity

#### During rain

##### Light rain

##### Heavy rain

#### Snowing

## Detection time

### When turn signal is on

### When turn signal is off

## Stability of detection indication

### Object near max detection distance

### Object near min detection distance

### Object repeatedly entering and exiting max detection distance

# Durability

## Operating temperature

### Max temperature

### Min temperature

## Degree of humidity

### High humidity

### Low humidity

## Rain

## Snow

## Hail

## Collisions

### Small object projectiles/collisions

### Larger object projectiles or collision

### Input voltage variations due to car battery

### Test functional range of 14V < Voltage In < 6V

# 3. System power requirements

## Power consumption

### Sensor

### AVR ATtiny

### LED

### Voltage regulator

### NMOS switch

### Resistors

### Capacitors

### System as a whole

## Current consumption

### No object detected

### Object detected

#### Outside of set max distance (no user alert)

#### Within set max distance (user alert)