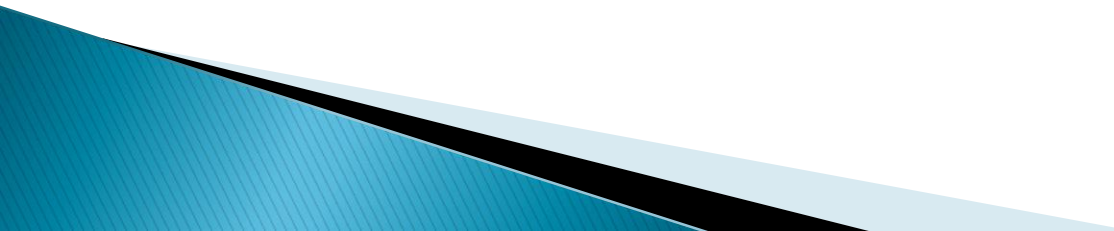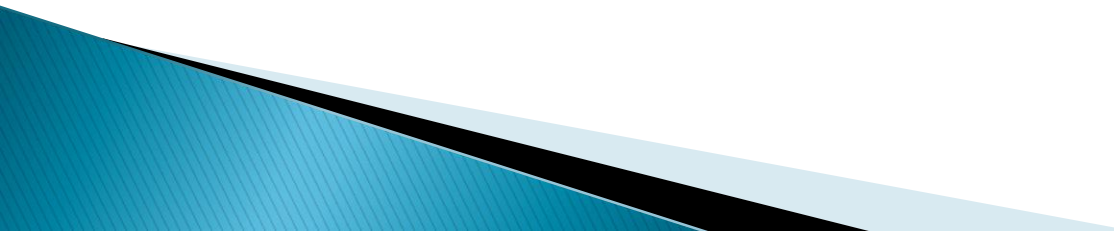# Urban Wheel Blind Spot Detection System

CEO Howard Sun
CFO David LiLi Cao
CTO Emmanuel Yeung
COO David Zhong
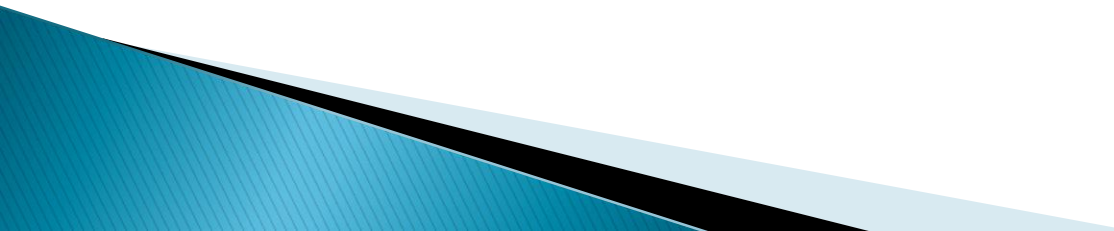
Presentation Outline

- Team Introduction
- Project Objective
- Product Design
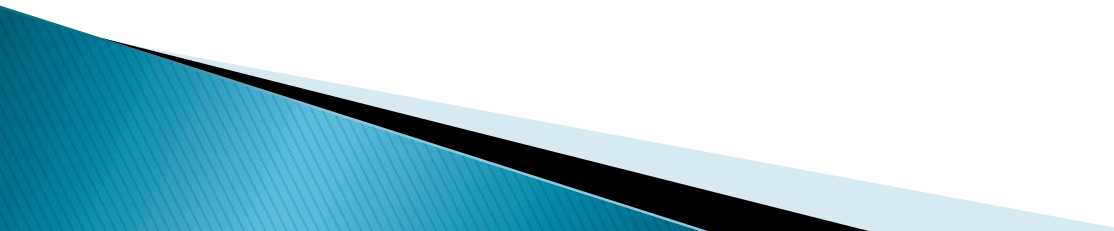- High-Level Project Details
- Future Work
- Conclusion

Team Introduction

- Howard Sun
  - Software, Warning system and User interface
- Emmanuel Yeung
  - Software, Sensor system and Board communication
- David Zhong
  - Advisory, documentation and SolidWorks design
- David Cao
  - Case design, mounting and Circuit analysis

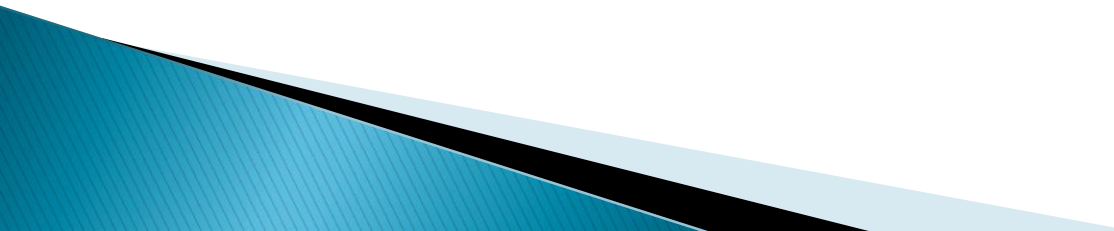# Project Objective

- Motivation
- Current Solution
- Goals
- Our Solution

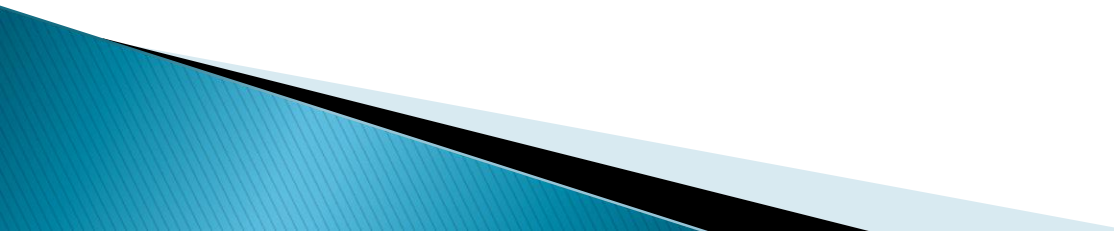# Motivation

- Blind spot related accident
  - 840,000 collisions / year
  - 300 fatalities / year
- High demand
- Enjoying multi-functioning system ourselves

Current Solution

- Manufacture options expensive
  - More than $2000
- Not available to cheap or existing cars
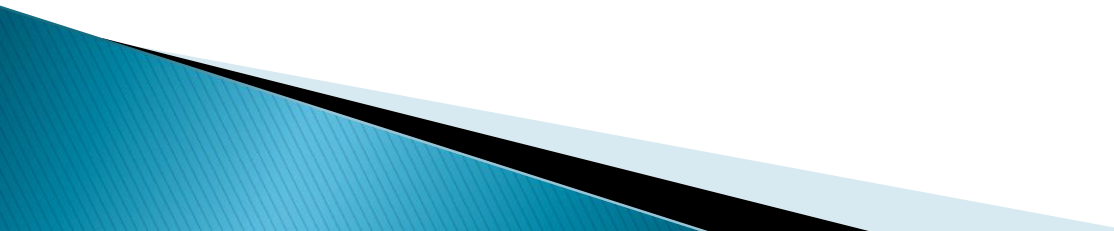- System functionality is limited

Goals

- Universal system
  - Cut down manufacturing cost
  - Easy to modify and integrate
- Low cost
  - Low cost and multi-functioning
  - Benefit non-luxury vehicle owners
- Easy to install system

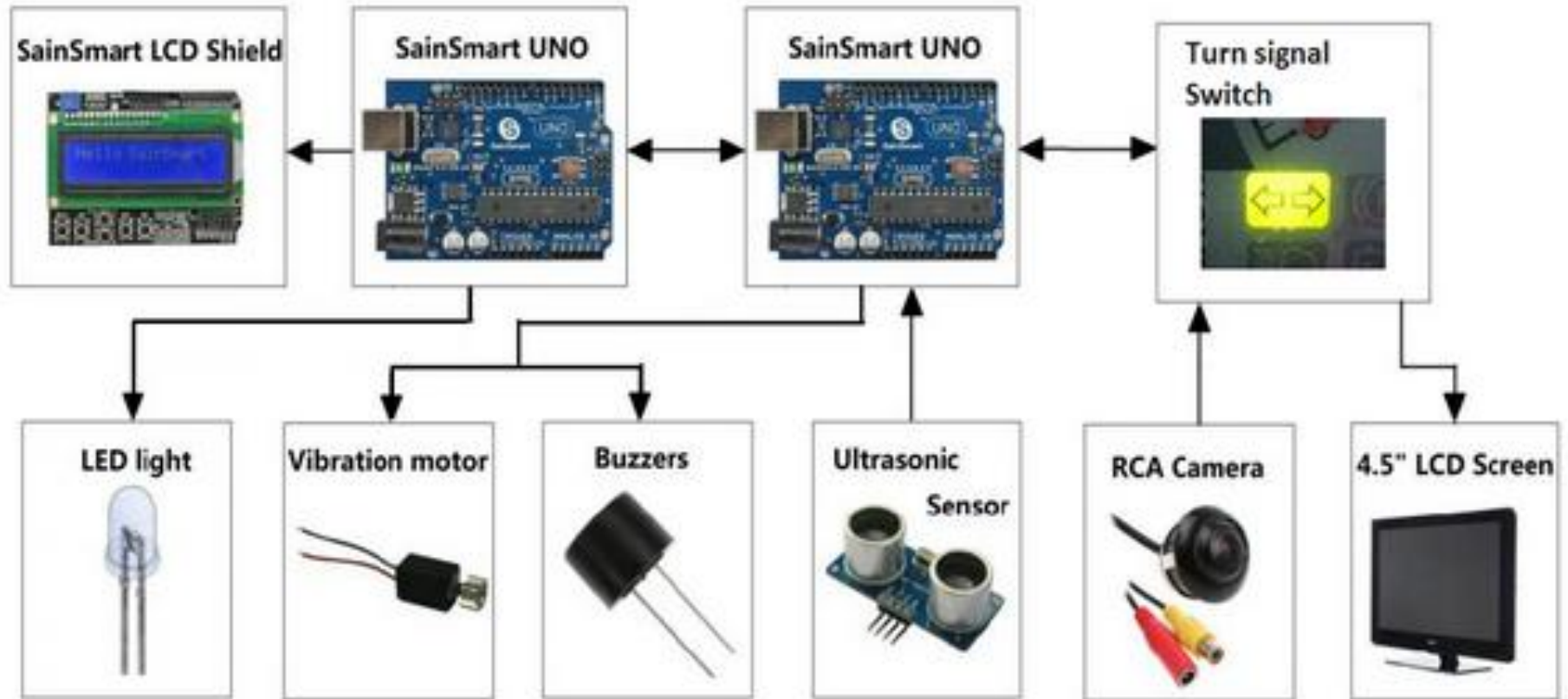# Our Solution
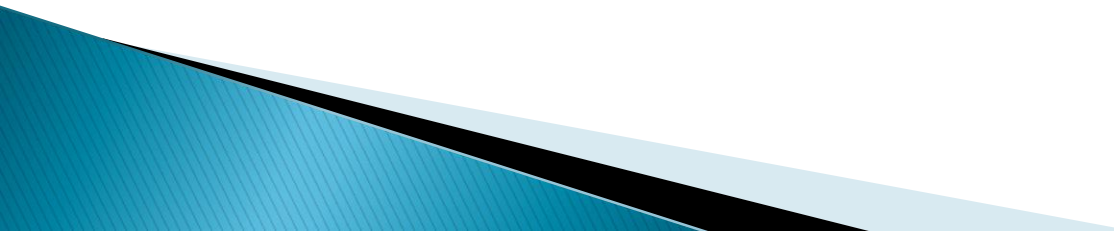
Product Design

- Overview
- System Logic
- Software
- Electronics
- Mounting
- Safety
- Usability
- Sustainability

System Overview

Electronics

- Choosing Arduino over Raspberry Pi
- Ultrasonic sensor over Radar and Infrared
- Miscellaneous

System Logic
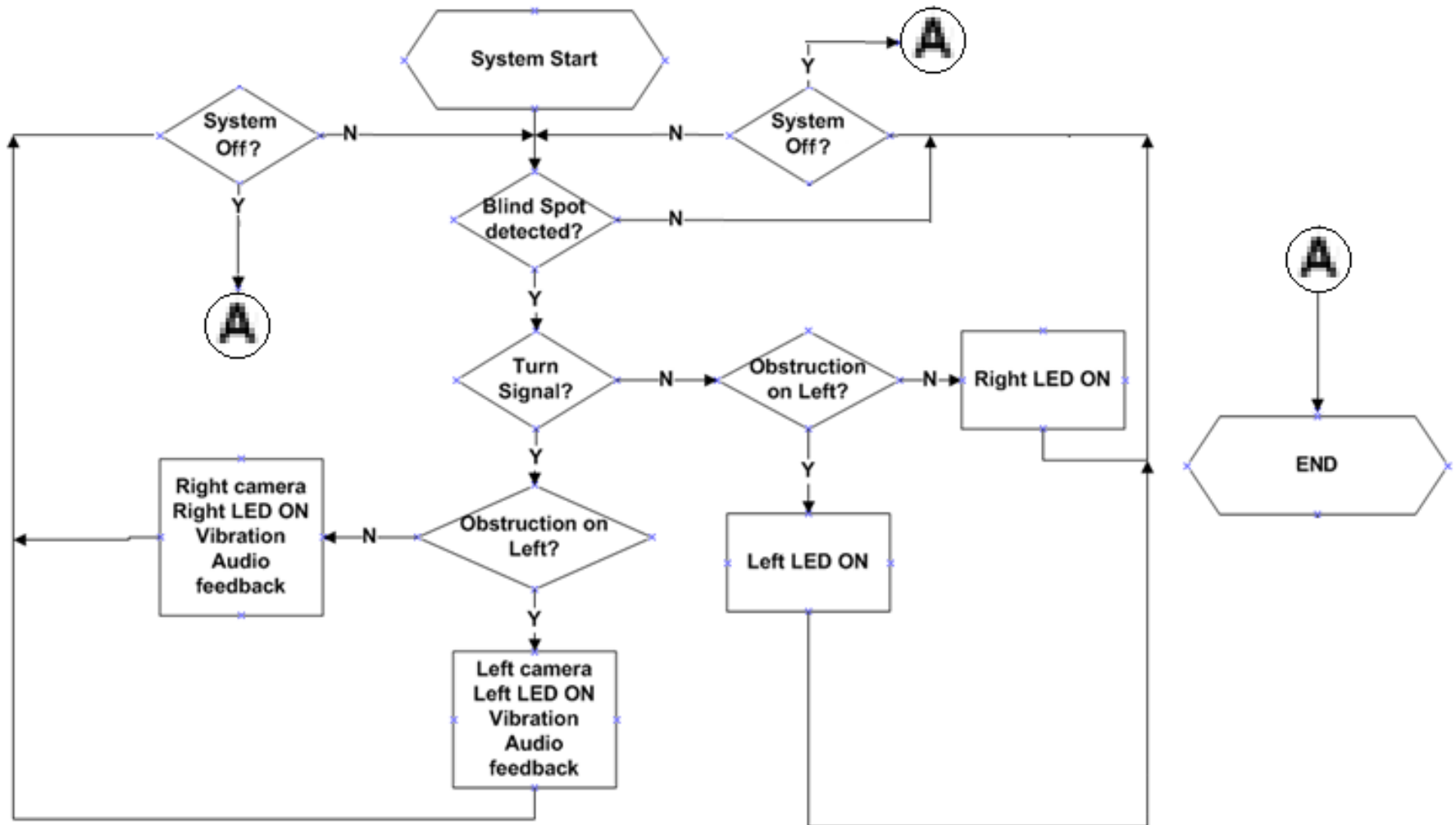
Software

- Arduino programming language
  - Easy to program (C Style)
  - Reprogrammable
- Controlling all of the functions
  - Ultrasonic sensor library
  - Board communication

Mounting

Safety

- Fuse protection
- Can be easily unplugged from power source

Usability

- Warning system easily understood
- Different language settings
- Both Imperial and Metric system

Sustainability

- C2C – Reduce, reuse, recycle
- reduce e-waste (when possible)
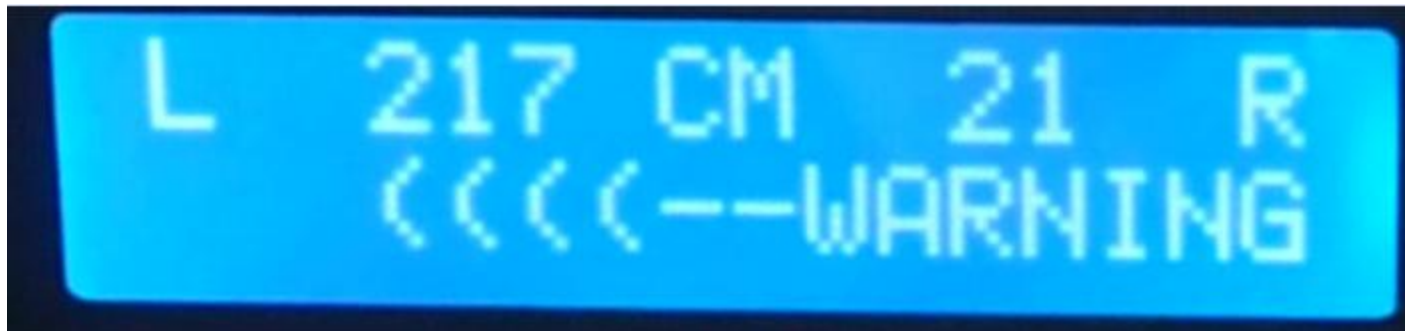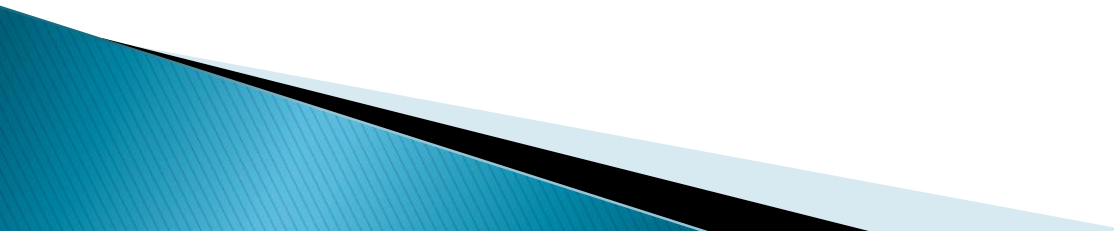
Video

High Level Project Details

- Costs
- Time Management
- Lessons Learned
- Future work

Cost

	Estimate Cost ($)	Actual Cost ($)
Electronic Parts		
SainSmart UNO + LCD package	60	75
OSEPP™ UNO R3 Plus	25	33
Ultrasonic Sensors x6	60	20
Night Vision Camera x3	90	45
Monitor	45	30
Raspberry Pi	55	N/A
Mechanical Parts		
Foam	1	15
Plastic board	2	10
Miscellaneous Parts		
Wire	Free	10
Charger	10	10
Grand total	293	248

Time Management

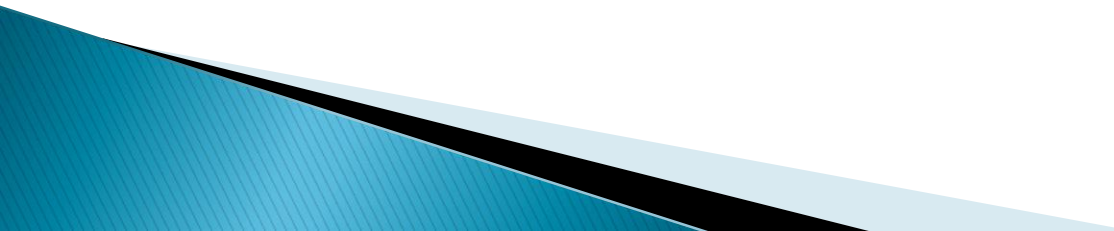|	
Documentation	
Documentation	
Reseach	
Proposal	
Ordering and Delivering	
Proposal Completed	◆ 1/21
Alarm System	
Controlling System	
Detecting System	
Monitoring System	
Functional Specification Completed	◆ 2/11
Design Specification Completed	◆ 3/11
Integration	
Debugging / Testing	
Debugging / Testing	◆ 3/8
Progress Report	
Integration / Debugging Completed	◆ 3/31
Integration / Debugging Completed	◆ 4/10
Progess Report Completed	◆ 4/1
Post-Mortem	

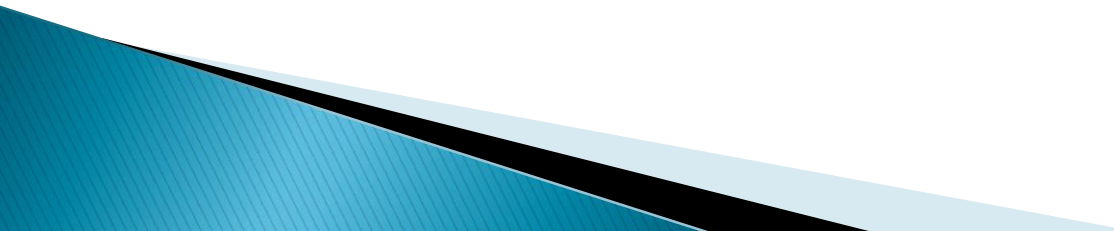# Lessons Learned

- Time management
- Parts choice are essential
- Team communication are essential
- Never park at loading zone for more than 30 minutes ;)

Future Work

- Integrate the circuit into a single PCB (for compact design)
- Combine LCD and Monitor (enhance user interface)
- Use better quality material for casing
- Sensor upgrade
- Flexible wires

Acknowledgement

- Andrew for "A perfectly done easy project is no better than an unfinished project that is worth doing."
- ESSEF for project funding
- Fred Heep for electronic components
- Special thanks to John Jones, Steven Whitmore and all the TAs who attended our presentations and inspired us with their questions and ideas.

Questions ?

Thank you for your listening

"All I want for Christmas is a blind spot monitor" – the internet

Misc