BLIND SPOT MONITORING USING PROXMITY SENSOR

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Professor:
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Course: 508

Why is Blind Spot Monitoring (BSM) important?

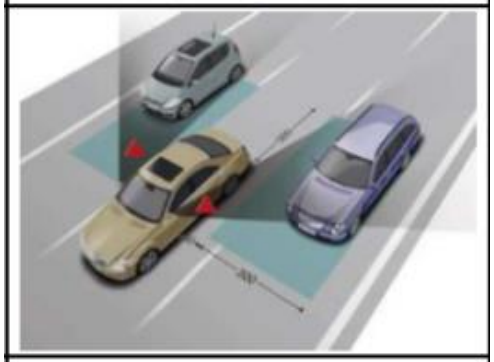
National Highway Traffic Safety Administration,

840,000 /Annually

Table 2.1. Average BSM Market Costs

	Number of Vehicle Models	Price Range w/ BSM	Average Vehicle Price w/ BSM	Average BSM Cost
Standard	22	$47,335 - $213,200	$114,373	$0
Single Option	24	$26,200 - $176,150	$78,273	$806
Trim/Package Upgrade	160	$20,280 - $155,950	$60,120	$4,694

NHTSA Report No. DOT HS 812 045, "Blind Spot Monitoring in Light Vehicles – System Performance", July 2014



Blind Spot Assist

Radar

Two sensors mounted one in each corner of the rear bumper

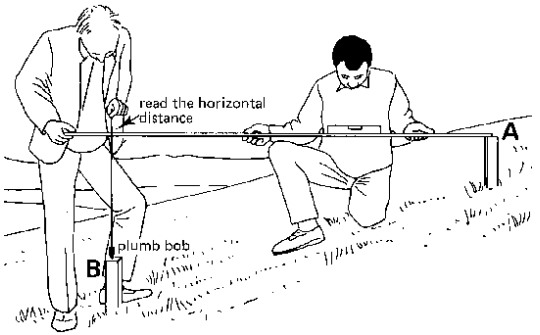
BLOCK DIAGRAM

INDICATOR (led)

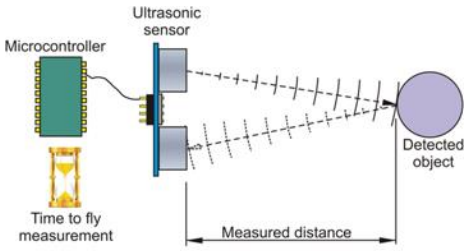
Power supply

Microcontroller

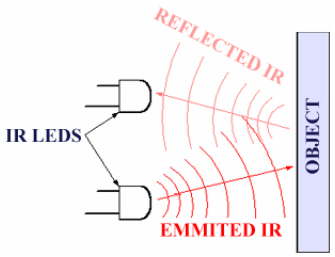
PROXIMITY SENSOR

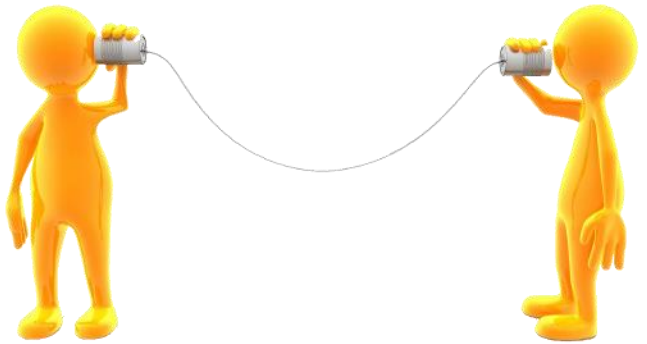


PROXMITY SENSOR



1. Ultra Sonic
2. **Lidar**
3. Infra Red





COMMUNICATION

1. Pwm
2. **I2c**
3. SPI

I2C COMMUNICATION

- ✓ Single-byte Write Sequence:

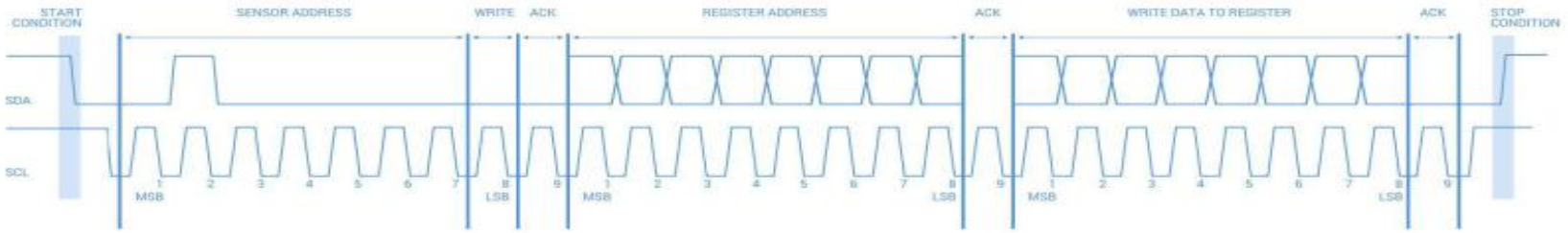
Master	S	AD (7-bit)	W		RA (8-bit)		DATA (8-bit)		P
Slave				ACK		ACK		ACK	

- ✓ Single-byte Read Sequence:

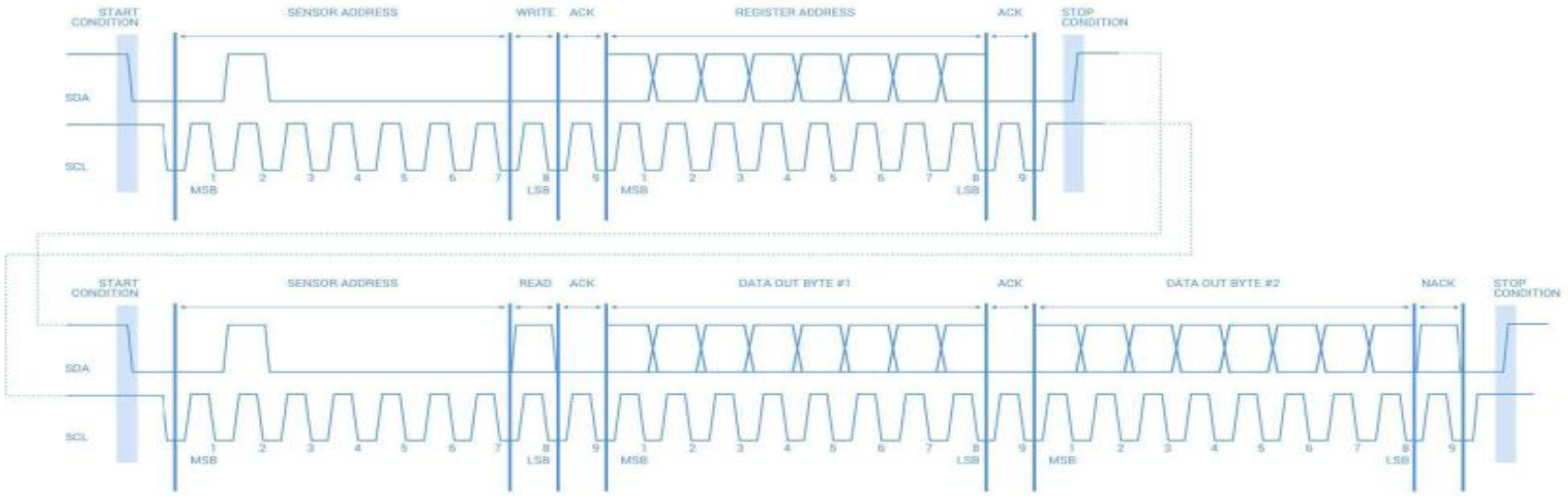
Master	S	AD (7-bit)	W		RA (8-bit)		Sr	AD (7-bit)	R			NACK	P
Slave				ACK		ACK				ACK	DATA (8-bit)		

GARMIN LIDAR v3 I2C

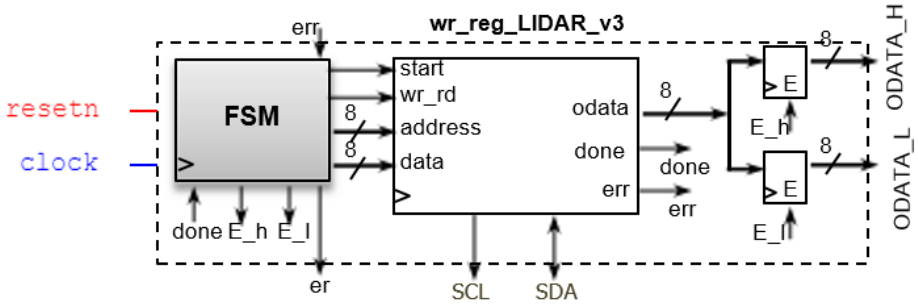
Write

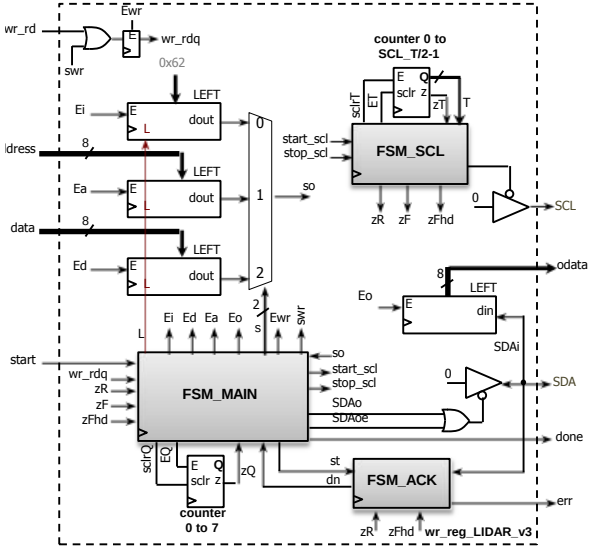


Read



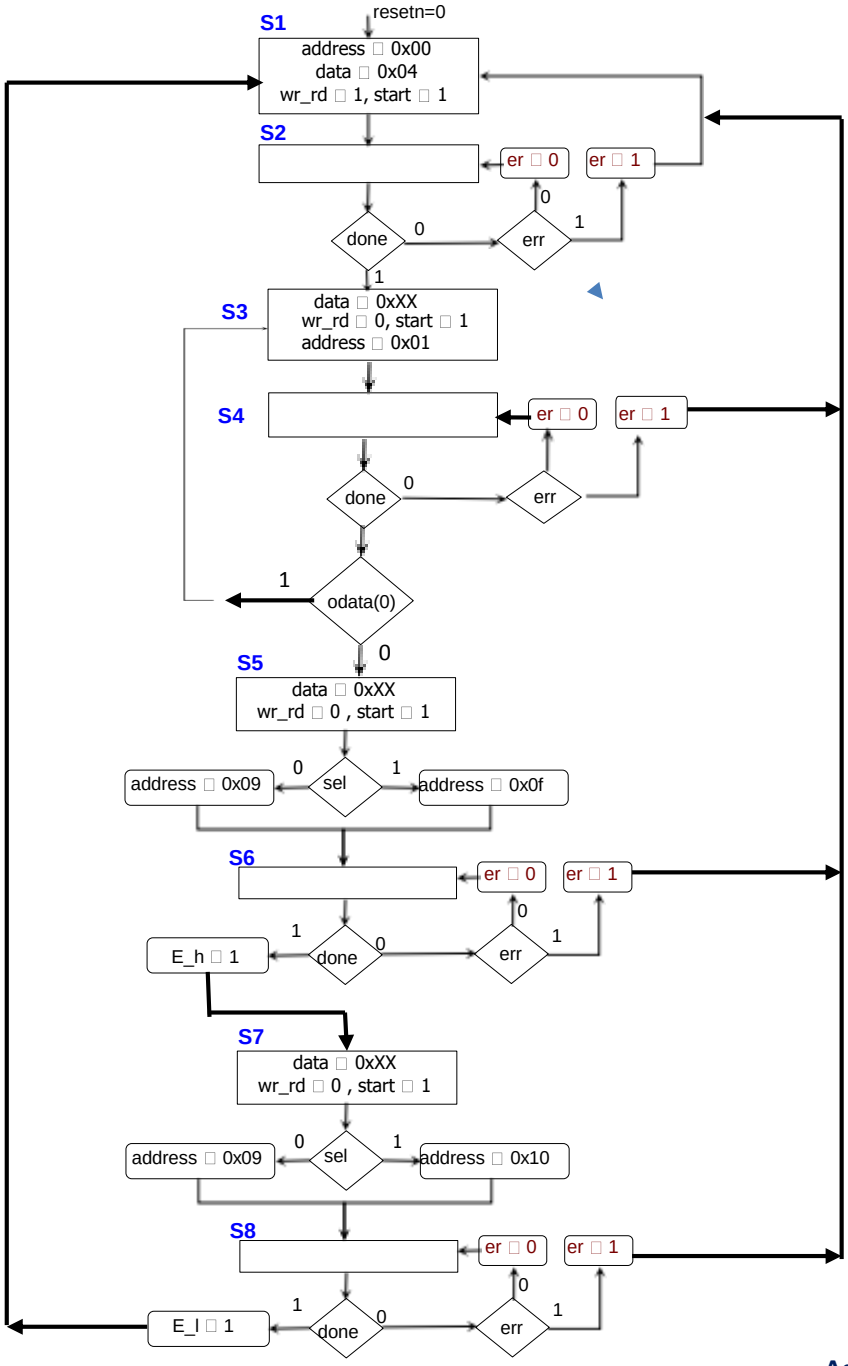
FPGA LIDAR_v3 INTEGRATION





Adapted from – D. Llamocca, OU Class Notes Winter 2017

FSM



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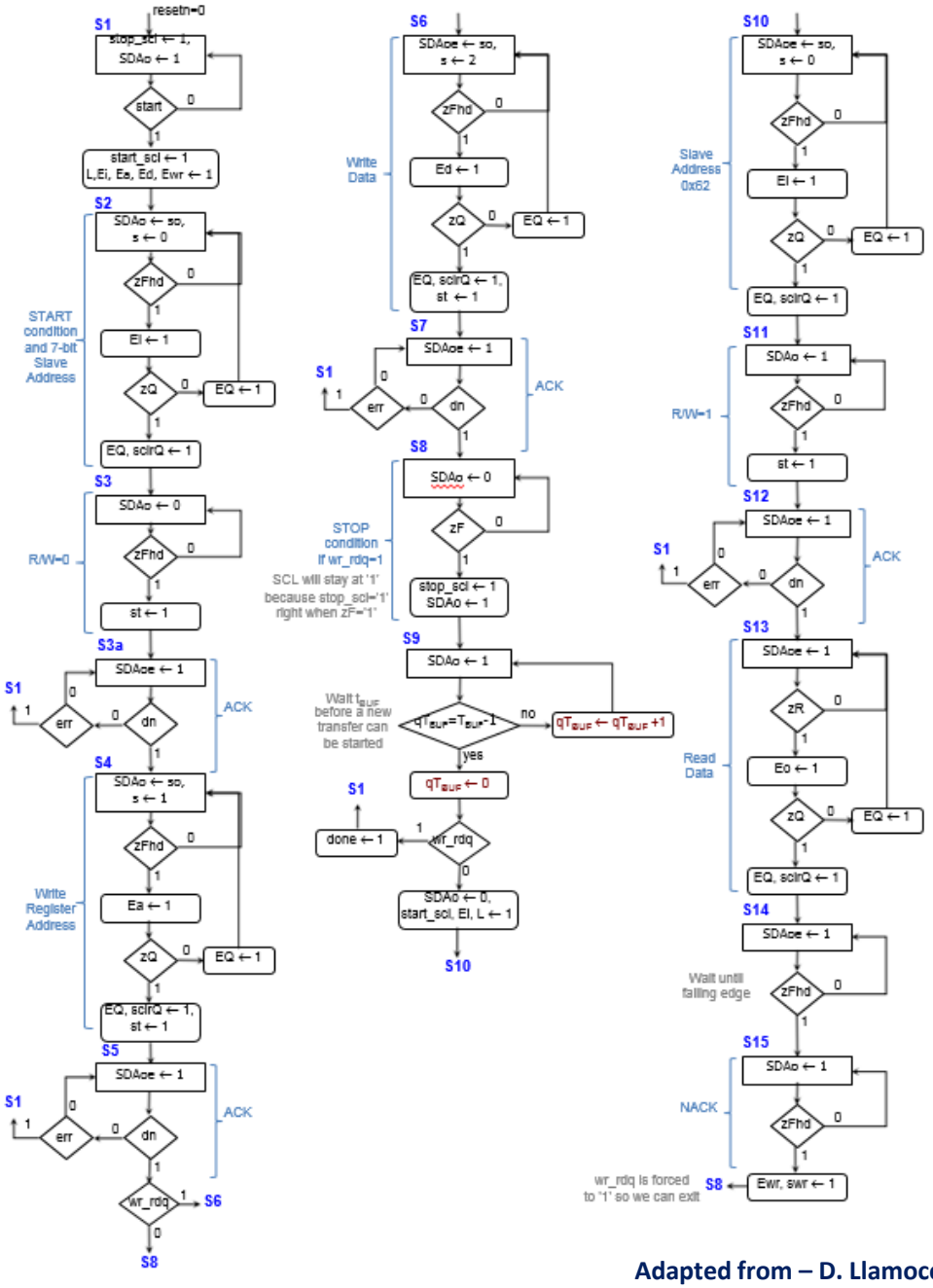
MAIN FSM



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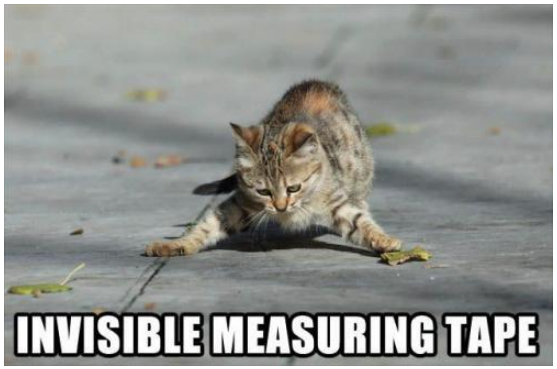
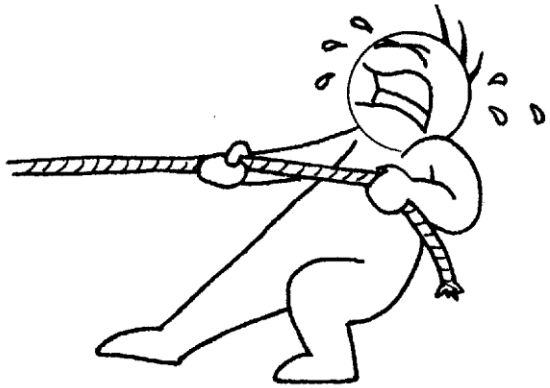
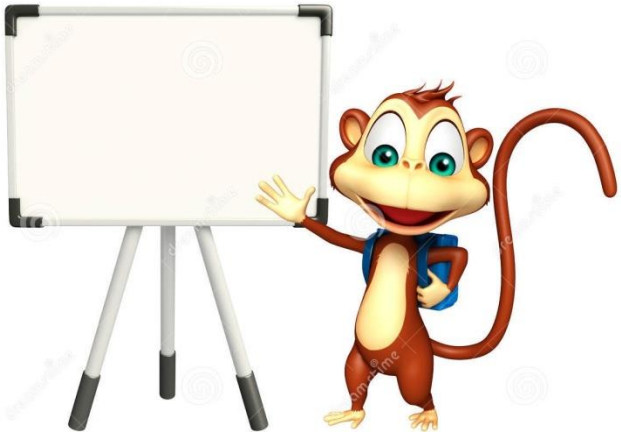
STRATEGY

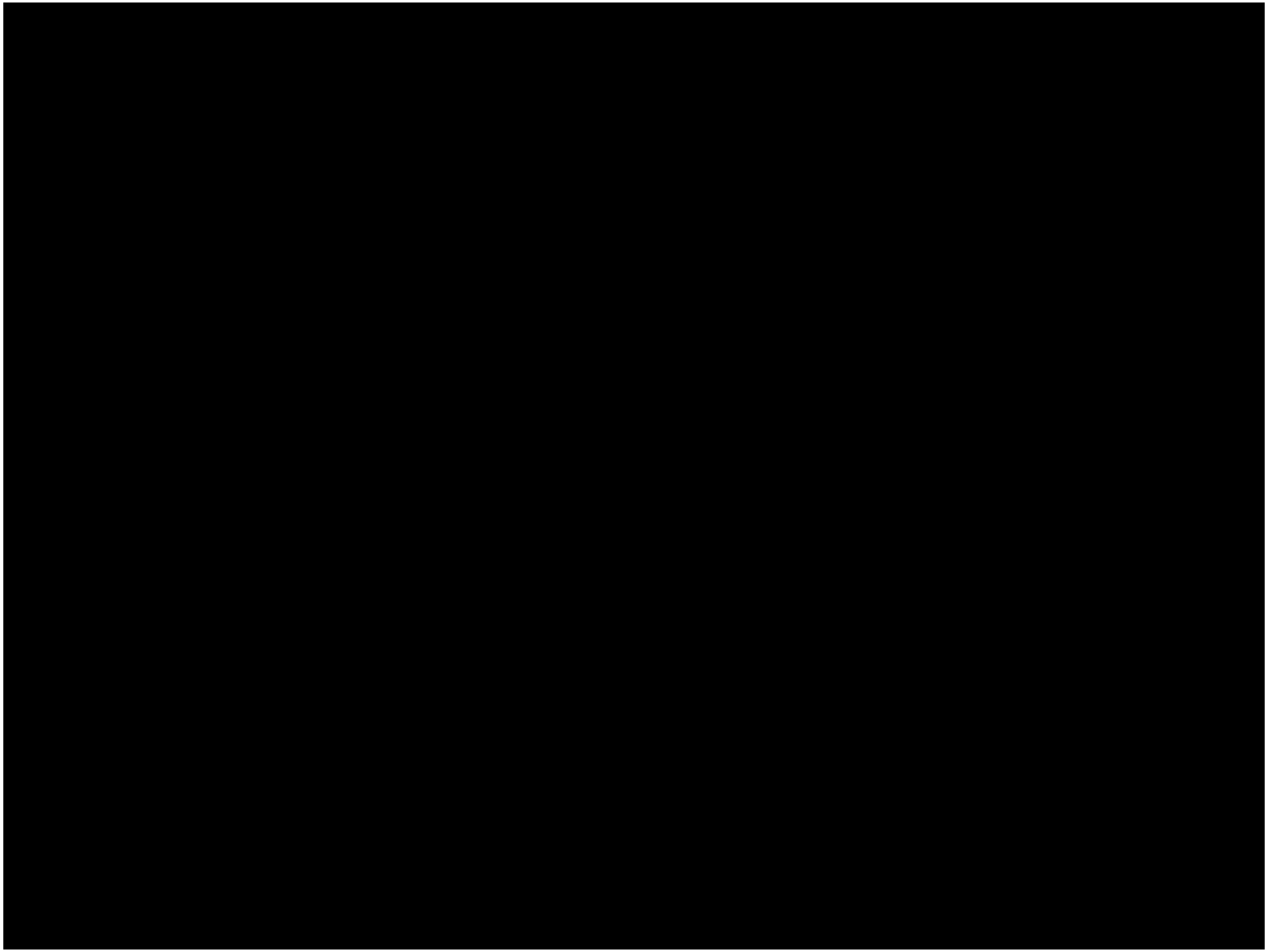


PUSHING LIMITS





VIDEO



CONCLUSION

- Successfully integrated Lidar v3
- The accuracy of distance measurement is 1cm
- An alert is triggered when a object comes within a pre-set distance (representing the BS Zone)
- Affordable and reliable blind spot monitoring system

Future works: Need to be tested in different environmental/lighting conditions

QUESTIONS