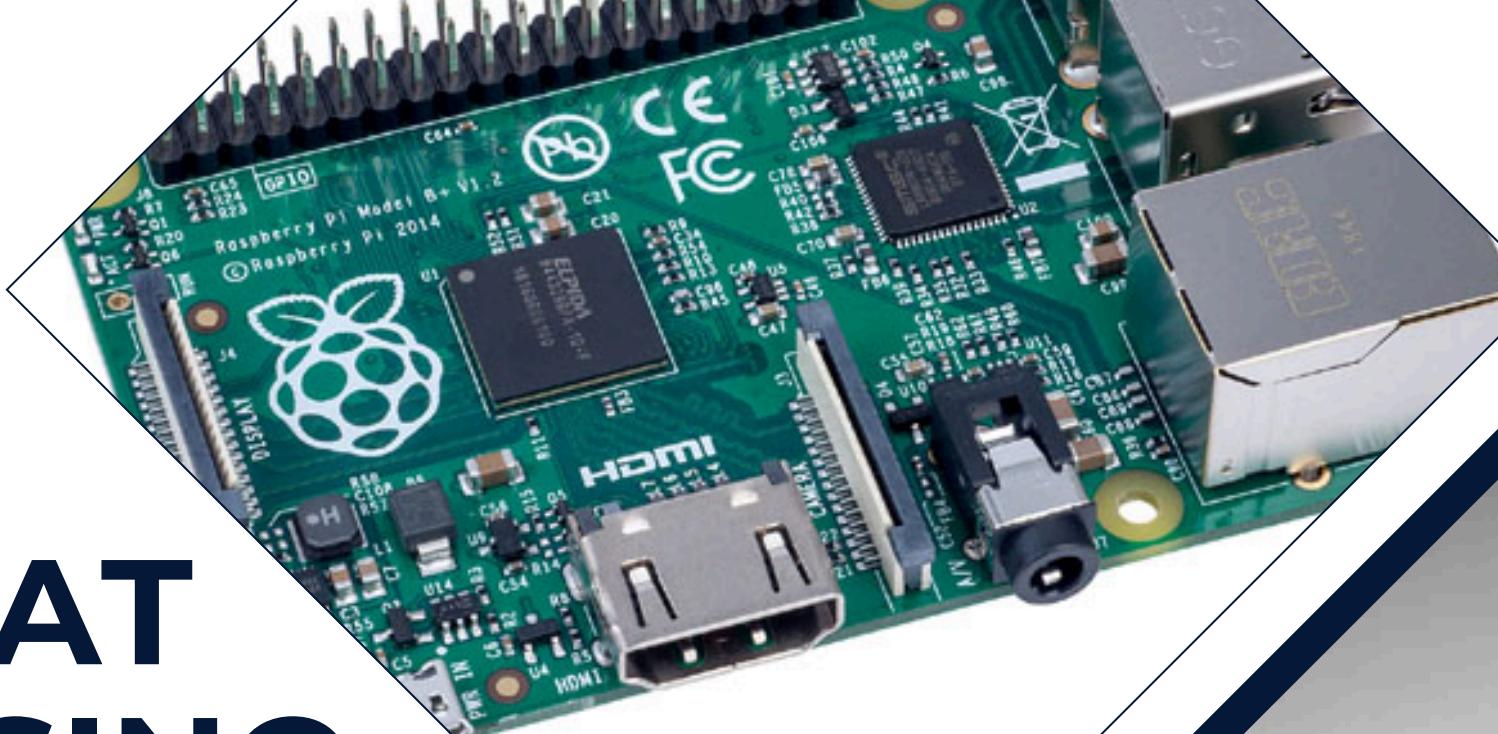


AUTOMATED SEAT ADJUSTMENT USING FACE RECOGNITION

Group : MechaVision
Members : E/20/135
 E/20/140
 E/20/167
 E/20/190
Supervisor : Dr. Lalith N Wickramarathne



PROJECT OBJECTIVES

1. Design a mechanism to control 3 Degrees of Freedom (DOF):
 - Forward/Backward
 - Up/Down
 - Backrest Recline
2. Implement a system for recognizing face and save a profile.
3. Integrate position sensing using automotive-grade potentiometers
4. Enable personalized seat profiles saved and recalled automatically when driver is recognized
5. Develop a test prototype on 1 DOF as proof of concept



PROGRESS



Milestone	Due	Status	remarks
Literature Survey & Concept Finalization	Week 2	100%	Smart car seat ergonomics studied
Design and hardware selection	week 3	100%	selected suitable libraries and hardware
Face recognition setup	Week 6	50%	Low image quality issue. Low ram of esp32
Seat adjustment mechanism design	Week 7	70%	worm wheel mechanism
Position feedback system selection and implement	Week 9	20%	Selected potentiometers for position measurement
Test for 1 DOF and control logic design	Week 10	0%	
Expand for 3 DOF	Week 12	0%	

JUSTIFICATION OF RESULTS

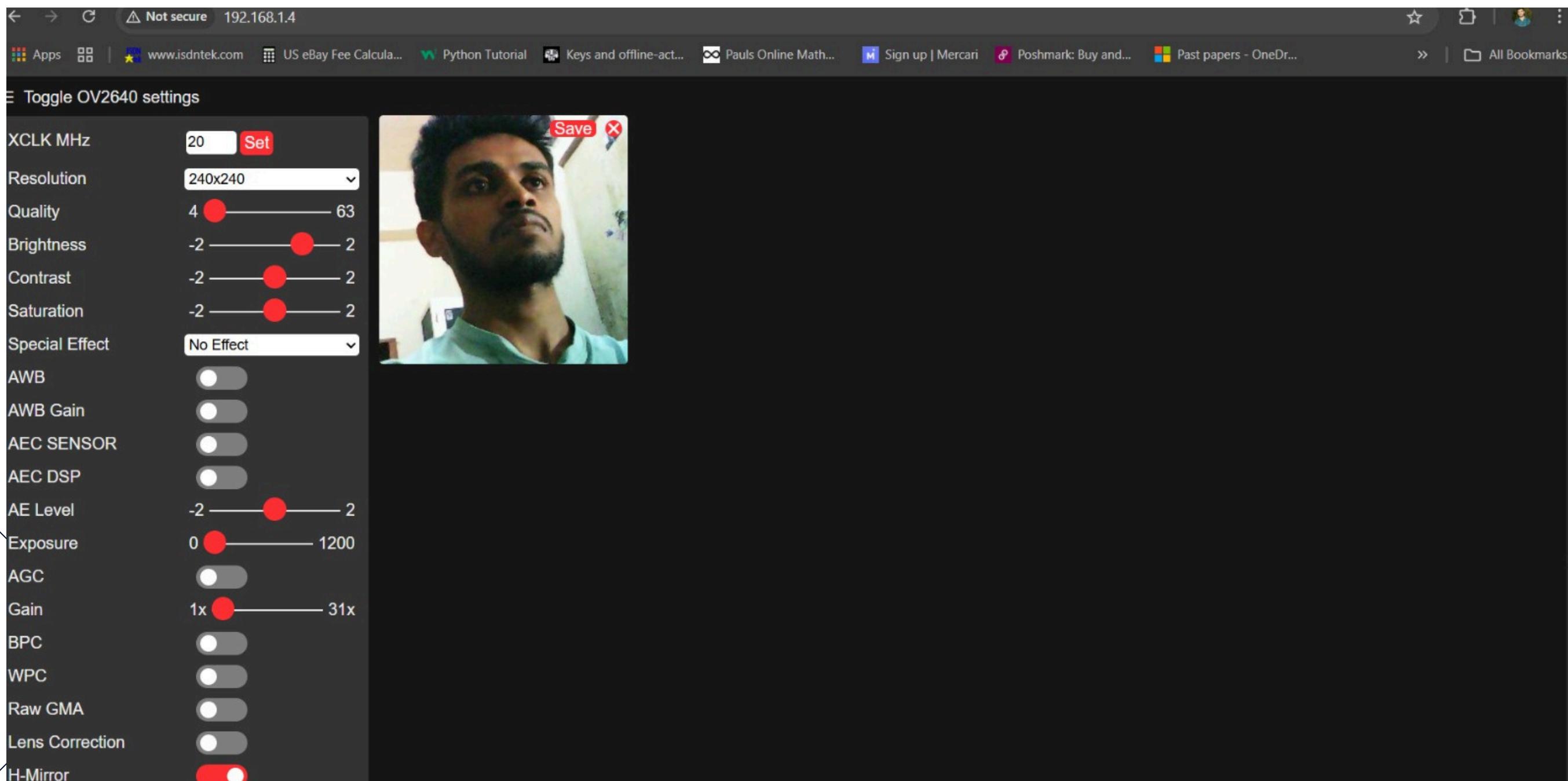
FACE RECOGNITION

- Implemented face detection and recognition using ESP32.
- Stable face recognition performance is hard to achieve because of the low ram.

Have to switch from ESP32-CAM to Raspberry Pi due to limitations in image quality and processing capability for reliable face recognition

JUSTIFICATION OF RESULTS

Image resolution is 240×240



JUSTIFICATION OF RESULTS (SEAT MECHANISM)

Selected worm wheel mechaism

- Self-locking ability (holds position without continuous power)
- Smooth, reliable movement across all 3 DOF

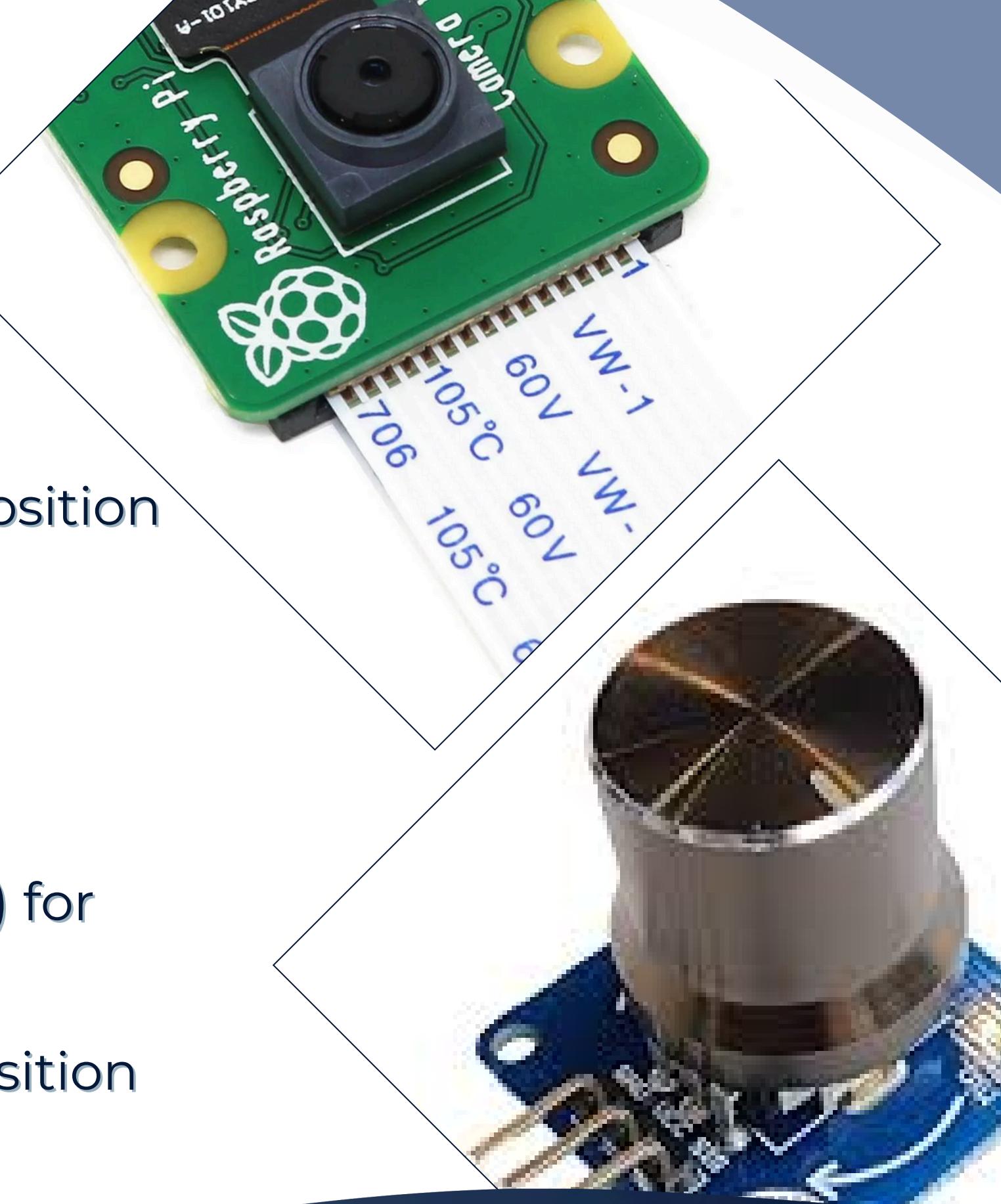
Worm wheels ensure safety-critical holding in automotive environments — a widely accepted standard in automotive seat systems.



ACHIEVED RESULTS (POSITION FEEDBACK SYSTEM)

- Selected automotive potentiometer sensors for position feedback:
 - Rotary potentiometers for backrest angle
 - Linear potentiometers for seat rail (forward/backward) and vertical movement
- Planned integration with ADC module (MCP3008) for Raspberry Pi readouts

Potentiometers offer simple, continuous, low-cost position feedback with automotive-grade durability



**THANK
YOU**