

E1.09 – S.R.N. Robotics

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Sponsor: Mr. Fawzi Behmann



Overview

Our product is a small autonomous battery-powered bot designed to compete in

- ☐ Sumo Match (Block Push for D1)
- ☐ Tug-of-War (Block Pull for D1)

Requirements

☐ Autonomous

2 events:

- ☐ Mass up to 1000 g (1500 g for Block Pull)
- ☐ 15 cm x 17 cm (No height constraint)
- ☐ PCB Component for Chassis
- ☐ Perform Demonstration and Competition **Objectives**

Budget Subtotal Component \$5.33 ESP32-WROOM-32 \$3.52 TCRT5000 (x4) \$3.90 HC-SR04 (x3) \$2.82 BMI-160 \$1.60 DRV8833 \$3.20 LM2596 (x2) \$5.74 TT Motors (x2) 18650 Lithium Batteries (x3) \$17.16 \$17.23 Misc Hardware Total \$60.50 \$90.00 Unit Cost Req.

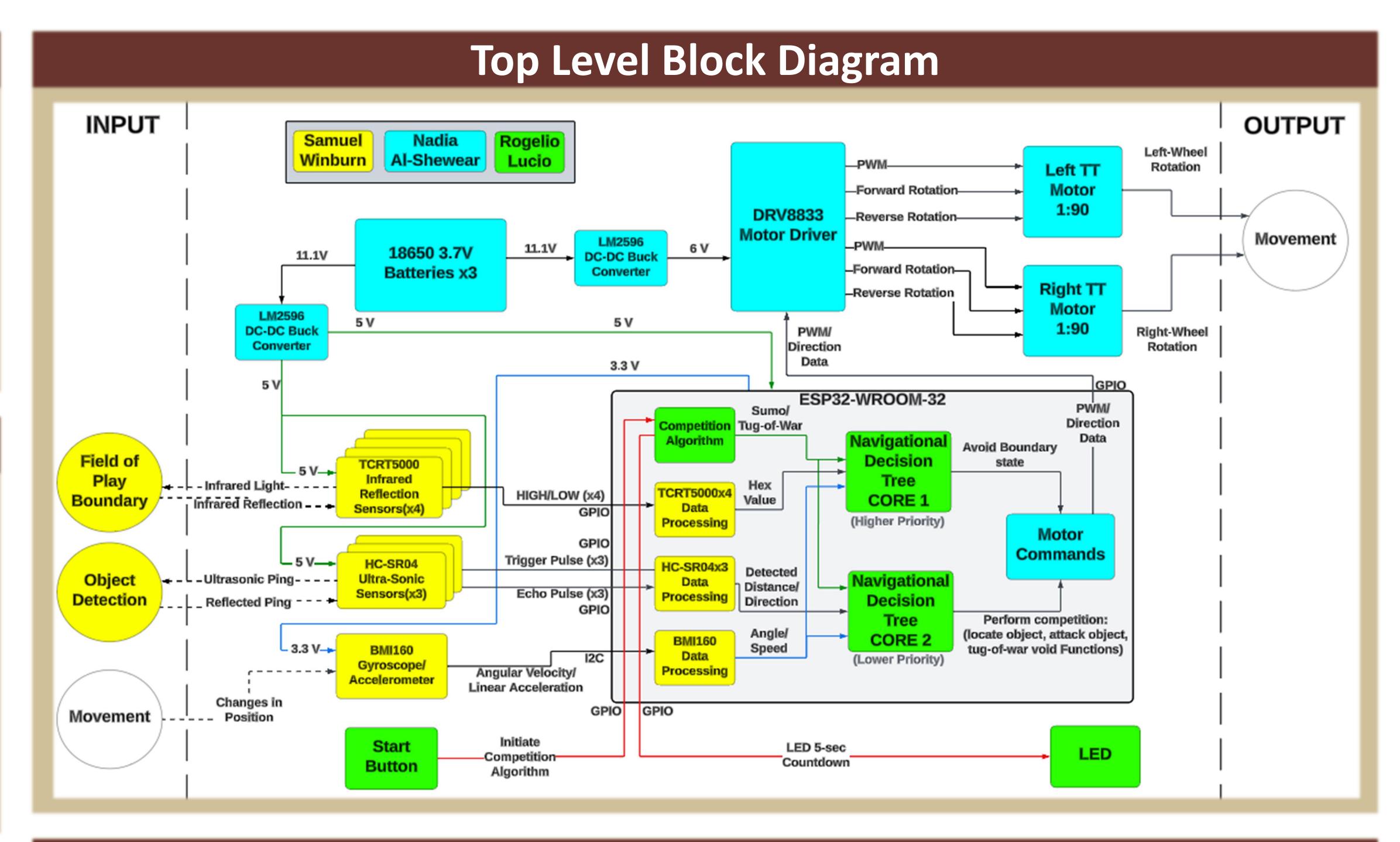
Acknowledgements

Sponsor: Mr. Fawzi Behmann

Faculty Advisor: Mr. Jeffery Stevens

D2 Mentor Team: King Aegeus

Texas State University



Key Design Features Field of View **Power System Design** 18650 Lithium Battery (x3) HC-SR04 5000 mAh | 8.85 hours Field of View **INPUT** OUTPUT DRV8833 **Motor Driver** HC-SR04 Ultra-Sonic Sensors 18650 3.7V Batteries x3 TCRT5000 IR Sensors ESP-WROOM-32 0.2 - 2.7 V >1V P-Controller Design 3-D Chassis Design PCB Design

Team Members







Samuel Winburn

Nadia **Al-Shewear**

Rogelio Lucio

Design 1 Achievements

- ✓ Subsystem Integration and Functionality
- ✓ PCB and Chassis Design
- ✓ Block Push Algorithm
- ✓ Boundary Detection
- ✓ Object Detection
- ✓ ESP32 Dual-Core Processing
- **✓** P-Controller
- ✓ Block Pull Algorithm
- **✓** 3-second Block Pull Termination

Design 2 Goals

- ☐ Implement initial PCB and Chassis Design
- ☐ Address any design flaws, order new PCB
- ☐ Complete Tug-of-War Algorithm (1 week)
- ☐ Optimize Pull Strength
- ☐ Complete Sumo Algorithm (2 weeks)
- ☐ Optimize Push Strength
- ☐ Sumo Movement functions
- ☐ Test and validate design
- ☐ Compete in the Great 2025 Battle with
 - E1.10 in the Sumo/Tug-of-War Match!