



**Overview**

Our product is a small autonomous battery-powered bot designed to compete in 2 events:

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

**Requirements**

- Autonomous
- 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**

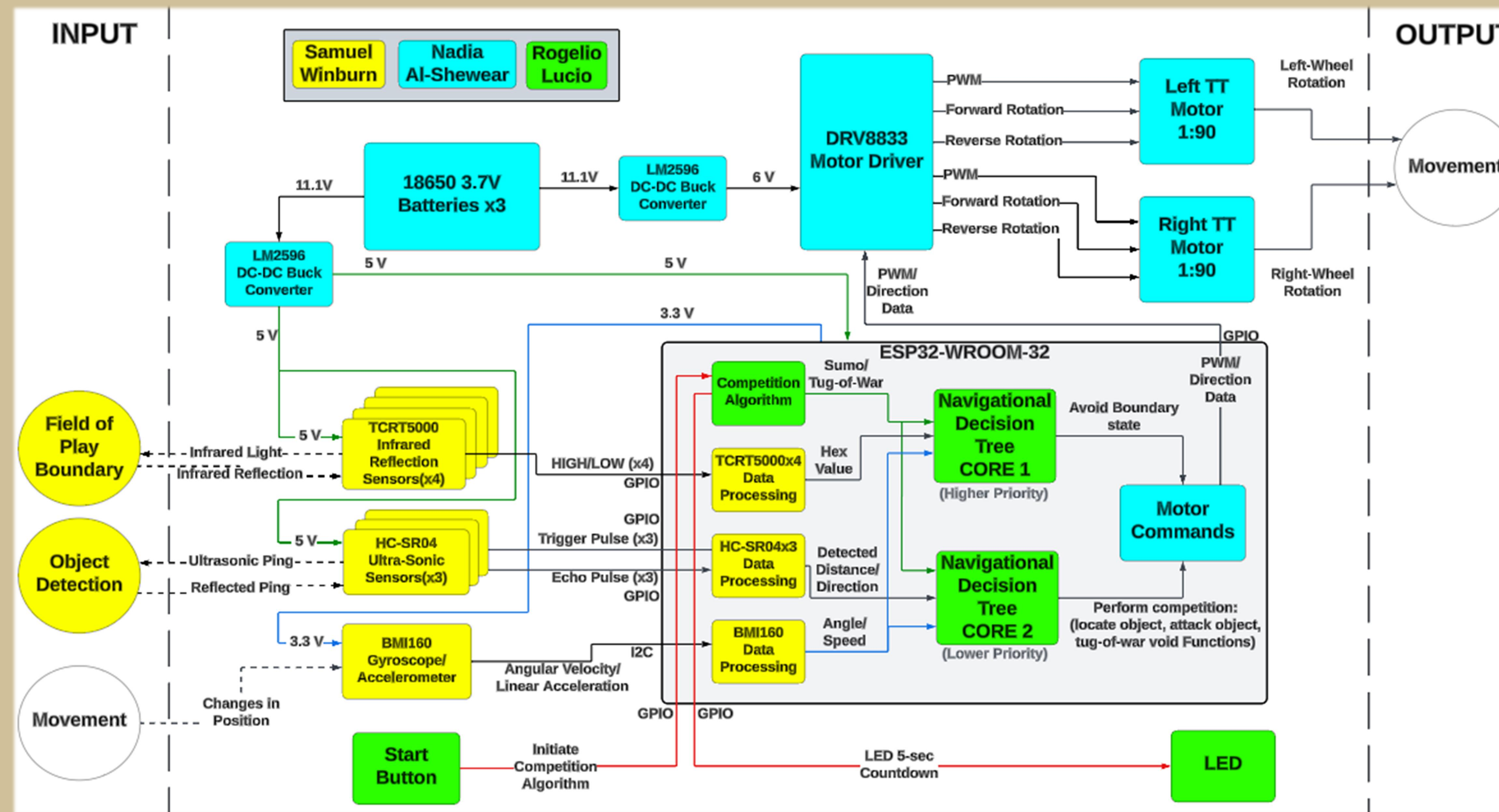
**Budget**

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

**Acknowledgements**

Sponsor: Mr. Fawzi Behmann  
Faculty Advisor: Mr. Jeffery Stevens  
D2 Mentor Team: King Aegeus  
Texas State University

**Top Level Block Diagram**



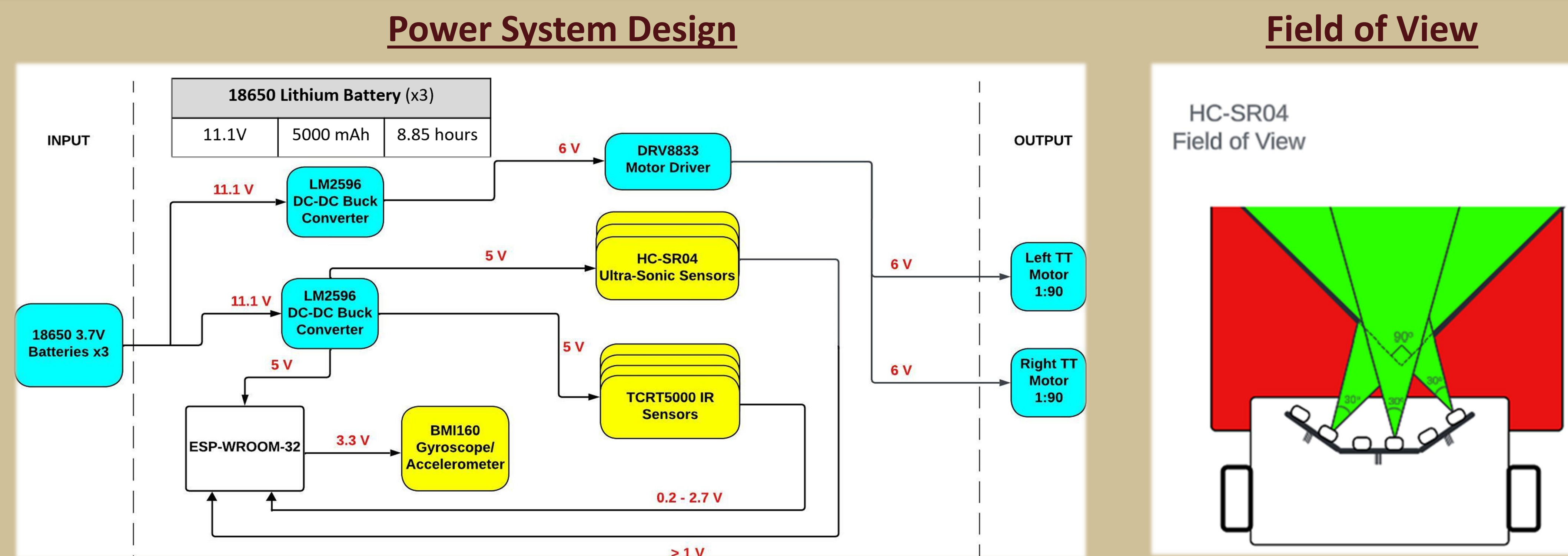
**Team Members**



**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

**Key Design Features**



**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!