Main Project Technical Presentation

ECE 3331-301
Fall 2025
Texas Tech University
Week 5

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Objective & Success Criteria

Objective:

- Develop a remote-controlled battle bot using MSP430
- Implement robust IR communication system (remote → rover)
- Equip the bot with maneuverability + attack mechanisms

Success Criteria:

- • IR send/receive at ≥ 6 ft
- • Move in 4 directions
- • ≥2 attack methods
- • Qualify for tournament bracket

Requirement and Assumptions

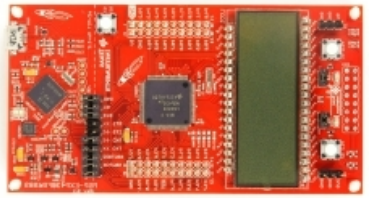
- **Requirements:**
- 16" × 16" × 16" and ≤ 5 lbs
- Single 9.6V battery (stockroom)
- 2 MSP430 for battle bot & remote
- No hazardous/disruptive mechanisms
- Qualification deadline: Nov 21

Assumptions:

- Flat arena (ECE 101)
- Fair referee enforcement
- IR noise manageable in lab

System context

9v
battery



motor

H-bridge

motor

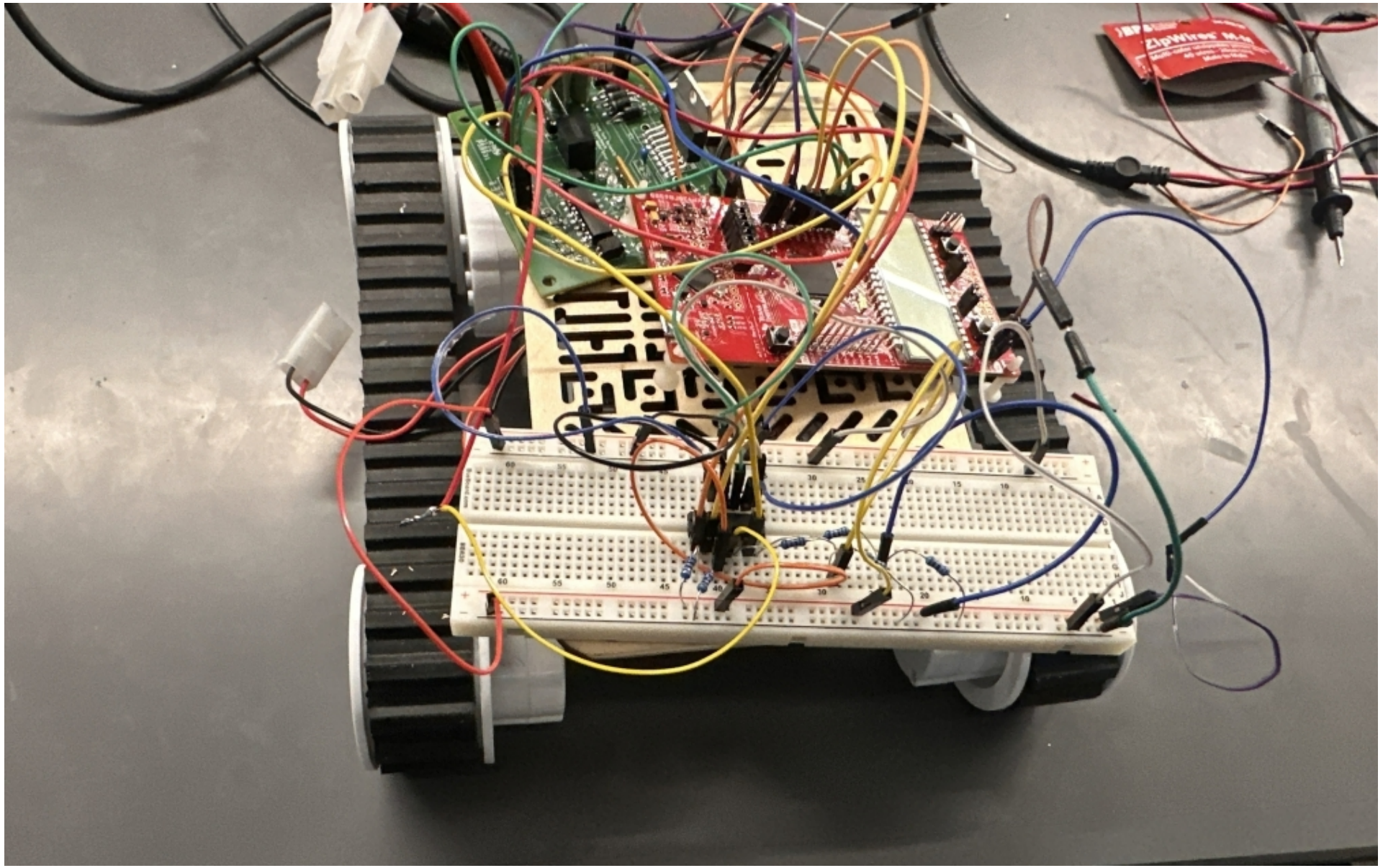
MSP-430

Choices and Trade-Offs

Option	Pros	Cons	Pick
IR Protocol	Simple: easy, Encoded: robust	Simple; weak, encoded: more code	Encode
Attack Mechanism	Push = Reliable, Immobilize = more points	Each alone has limits	Both
Bot Frame	Heavy = Stable, Light = Fast	Requires more current	Heavy

Attempts of the Week

- Overcurrent via hardware IC (INA219)
- Measured the current of rover via DC power supply: draws .5A with no resistance, draws .97A when tire is held
- Set reference voltage on comparator to 1 ->>>> reference voltage to .5
- Attempt different codes
- Stopping point



Jared Stephen

Next Week Objectives

- Get receiver from the stockroom
- Layout our model on KiCad
- Rewire/organize wiring for future productivity
- Start attempting to implement working receiver into our system (most of our week)
- Change up code in result

Jared Stephen

Verification Plan

IR Tests: remote sends & rover receives at ≥ 6 ft

Maneuver Tests: forward, backward, left, right

Attack Demo: push 1 ft and immobilize opponent

Tournament Prep: avoid DQ (stall >10s, crossing tape)

BOM

MSP430-FR6989 (stockroom)

IR LED + Receiver (stockroom)

Module DC motors + chassis (stockroom)

9.6V battery (stockroom)

Wires, resistors, hardware components (stockroom)

Attack mechanism add-ons (custom)

Total Spend: TBD

Buget Report

Main Project Buget Report	Running Total			Total Estimate			Start Date	8/29/2025		
Direct Labor:							**Today**	9/26/2025		
Category or Individual	Rate/Hr	Hrs		Rate/Hr	Hrs					
Lawal Abdul	$15	37	$555.00	$15	50	$750.00	**End Date**	11/21/2025		
Stephen Jared	$15	37	$555.00	$15	50	$750.00				
Omari fidele	$15	37	$555.00	$15	50	$750.00				
DL Subtotal (DL)		subtotal	$1,665.00		subtotal	$2,250.00				
Labor Overhead	rate:	100%	$1,665.00	rate:	100%	$2,250.00				
Total Direct Labor (TDL)			$3,330.00			$4,500.00				
Contract Labor:										
Lab Assistant	40	3	$120.00	40	5	$200.00			**Summary**	
Classmate	15	7	$105.00	15	10	$150.00			Labor + OH	$4,500.00
Instuctor	200	0	$0.00	200	2	$400.00			Contract Labor	$750.00
Total Contract Labor (TCL)			$225.00			$750.00			material and equipment rental	$236.22
									overhead	$3,017.42
Direct Material Costs:									total	$8,503.64
Total Direct Material Costs(TDM)			$0.00			$0.00				
Equipment Rental costs:	Value	Rental Rate		Value	Rental Rate		Date Begin	Date End	Total days rented	
Oscilloscope	$5,200.00	0.20%	$156.00	$5,200.00	0.20%	$156.00	9/12/2025	9/26/2025	15	
Function generator	$16.00	0.20%	$0.48	$16.00	0.20%	$0.48	9/12/2025	9/26/2025	15	
DMM	$958.00	0.20%	$28.74	$958.00	0.20%	$28.74	9/12/2025	9/26/2025	15	
Power Supply	$1,700.00	0.20%	$51.00	$1,700.00	0.20%	$51.00	9/12/2025	9/26/2025	15	
Total Rental Costs (TRM)			$236.22			$236.22				
Total TDL+TCL+TDM+TRM			$3,791.22			$5,486.22				
Business Overhead		55%	$2,085.17		55%	$3,017.42				
Total Costs:			$5,876.39			$8,503.64				

Abdul Lawal

Grantt chart for main project		% Done	Abdul Lawal	Jared Stephen	Fidele Omari	Location
Milestones						
Week 2 presentatic	9/5/2025	100%				
Week 3 presentatic	9/12/2025	100%				
Demo day	9/19/2025					
Summary						
Gathering materials		16%				
Code		42%				
Design		66%				
Assembly		0%				
Demo		0%				
Detailed						
Gathering materials						ECE Stockroom
Get MSP430		100%				ECE Stockroom
Get H-Bridge		100%				ECE Stockroom
Get Motors		100%				ECE Stockroom
Get chasis		100%				ECE Stockroom
Get wheels		100%				ECE Stockroom
Get voltage regulator		100%				ECE Stockroom
Code						
Research Code		100%				ECE Building
Make a flow chart		100%				ECE Building
Write PWM test code		100%				ECE Building
Write overcurrent test code		50%				ECE Building
write final PWM code		100%				ECE Building
compile code		100%				ECE Building
debugg code		100%				ECE Building
Design						
research MSP430		100%				ECE Building
Research PWM		100%				ECE Building
research overcurrent protection		40%				ECE Building
implement PWM test code		100%				ECE Building
implement overcurrent		40%				ECE Building
Design inproved schematics		100%				ECE Building
Assembly						
get chasis		0%				
attach MSP 430 to chasis		0%				
attach motors to chasis		0%				
Receiver						
Get Receiver		0%				
Test Receiver		0%				
code for Receiver		0%				
Receiver						
Get Receiver		0%				
Test Receiver		0%				
code for Receiver		0%				

Timeline columns: ## 9/21/2025 9/22/2025 9/23/2025 9/24/2025 9/25/2025 9/26/2025 9/2