Prince Mohammad Bin Fahd University
Department of Electrical Engineering

Learning Outcome Asse. III EE_113

THE CURIOSITY ROVER

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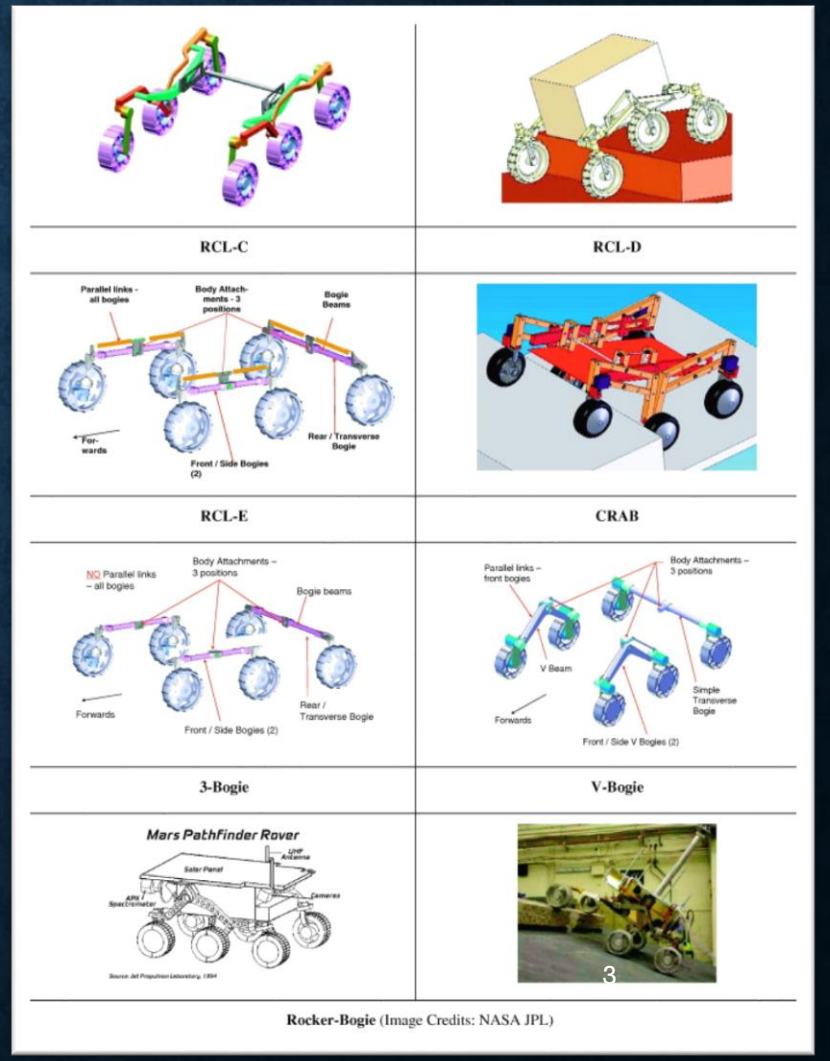
OUTLINE

- Project Definition
- Project Objectives
- Project Specifications
- Project Architecture
- Background
- Progress
- Subsystems
- Planning
- Budget Estimate
- References

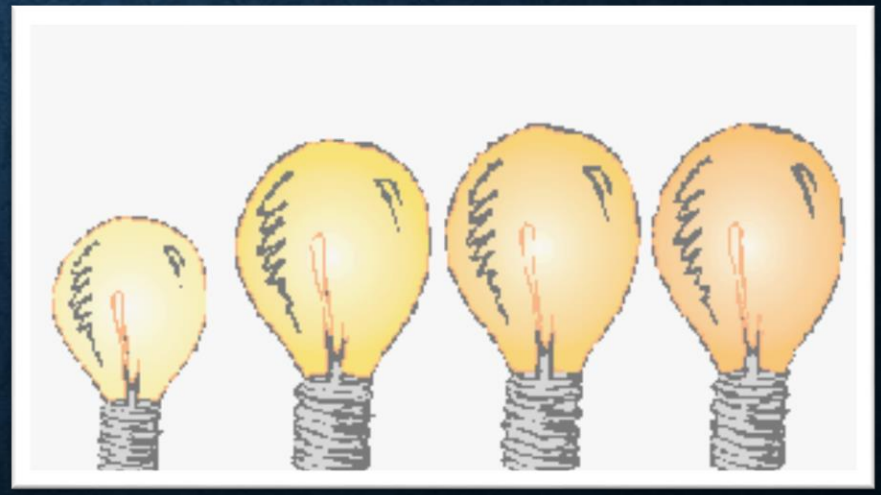
PROJECT DEFINITION

- A robotic vehicle remotely controlled or fully autonomous with sun tracking solar panels
- Designed to move across rough terrain
- Able to collect samples using a robotic arm



PROJECT OBJECTIVES

- Design a smart and automated rover
- Build and program the rover
- Implement sun tracking solar panels



PROJECT SPECIFICATIONS

- Chassis that can go over rough terrain
- Remotely controlled robotic arm
- Remote control mode, and autonomous mode
- Solar panels with sun tracking feature
- Multiple 12 volts motors
- Detect obstacles and avoid them in autonomous mode

PROJECT ARCHITECTURE

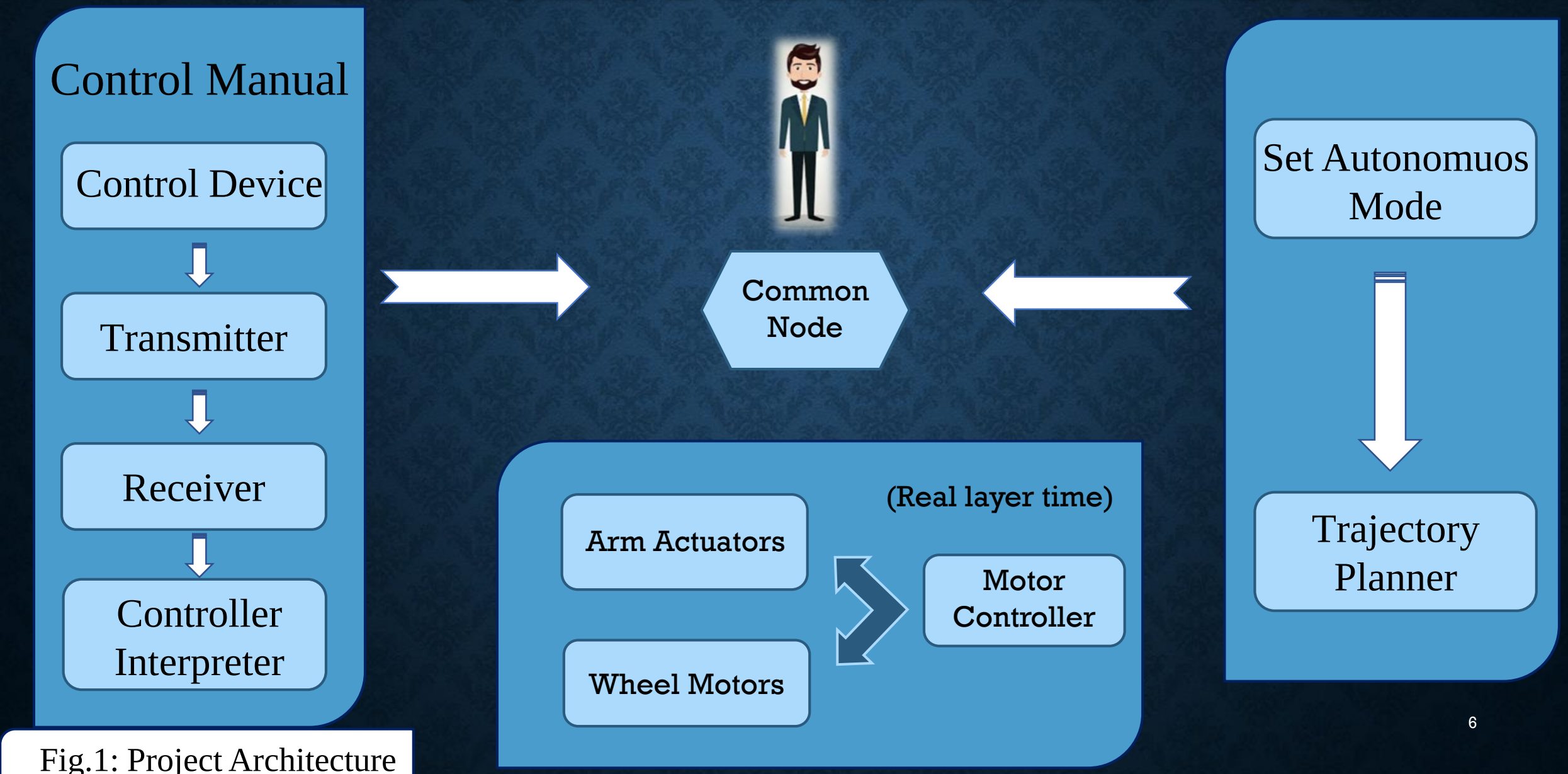
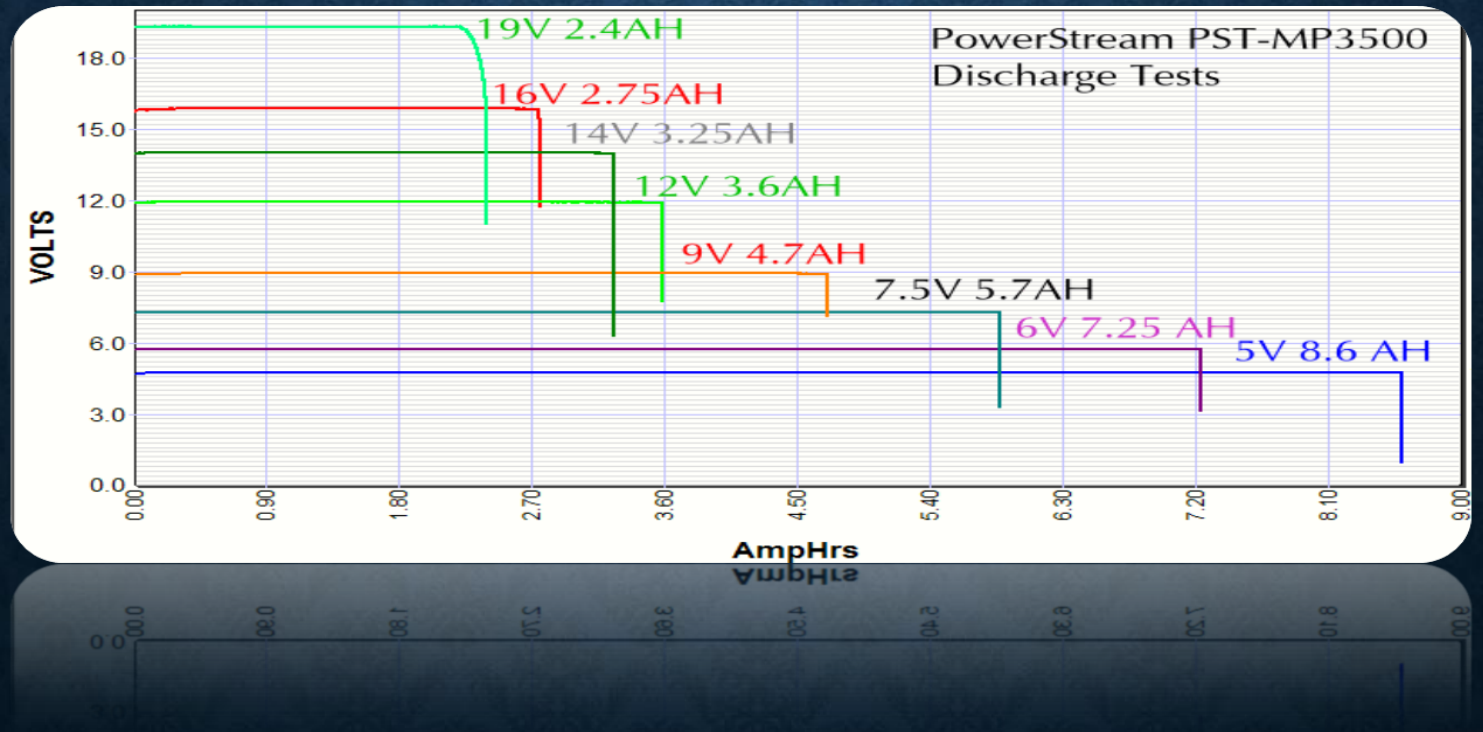


Fig.1: Project Architecture Block Diagram

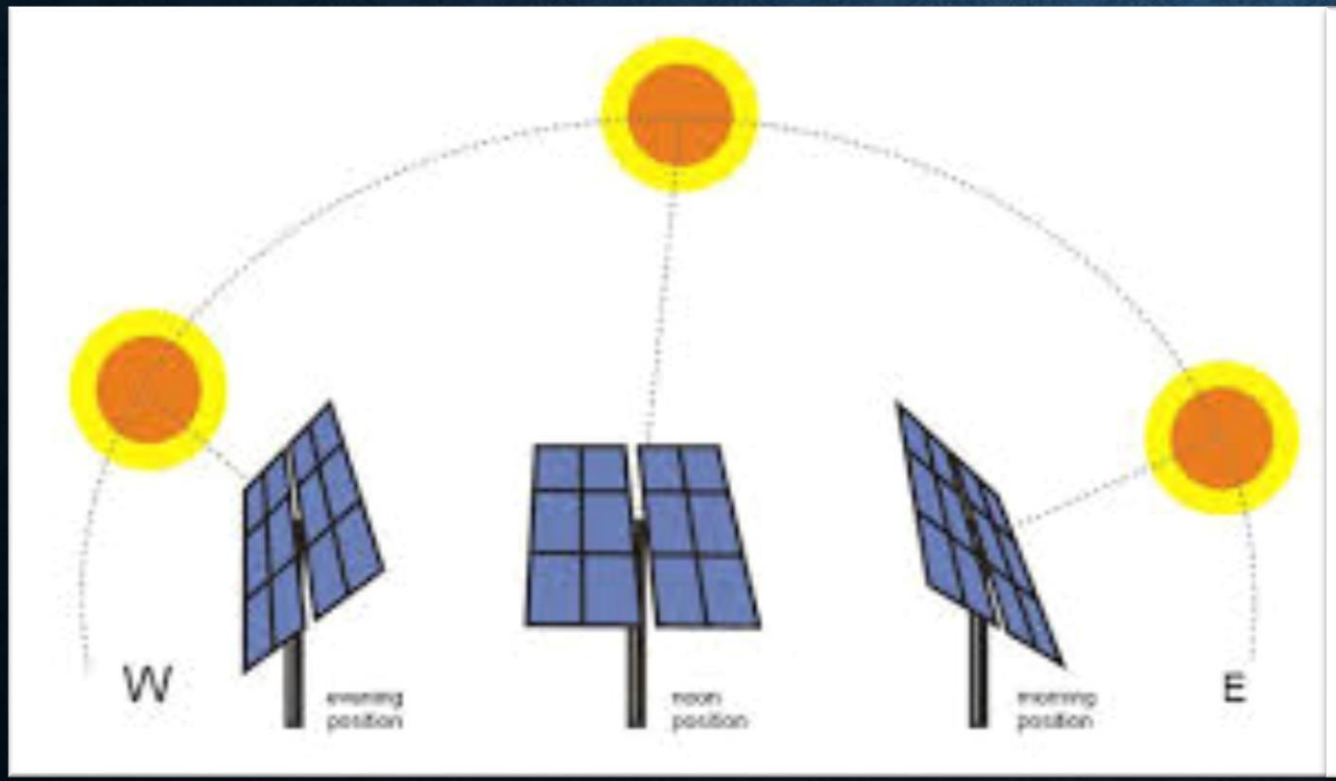
BACKGROUND: PROBLEM

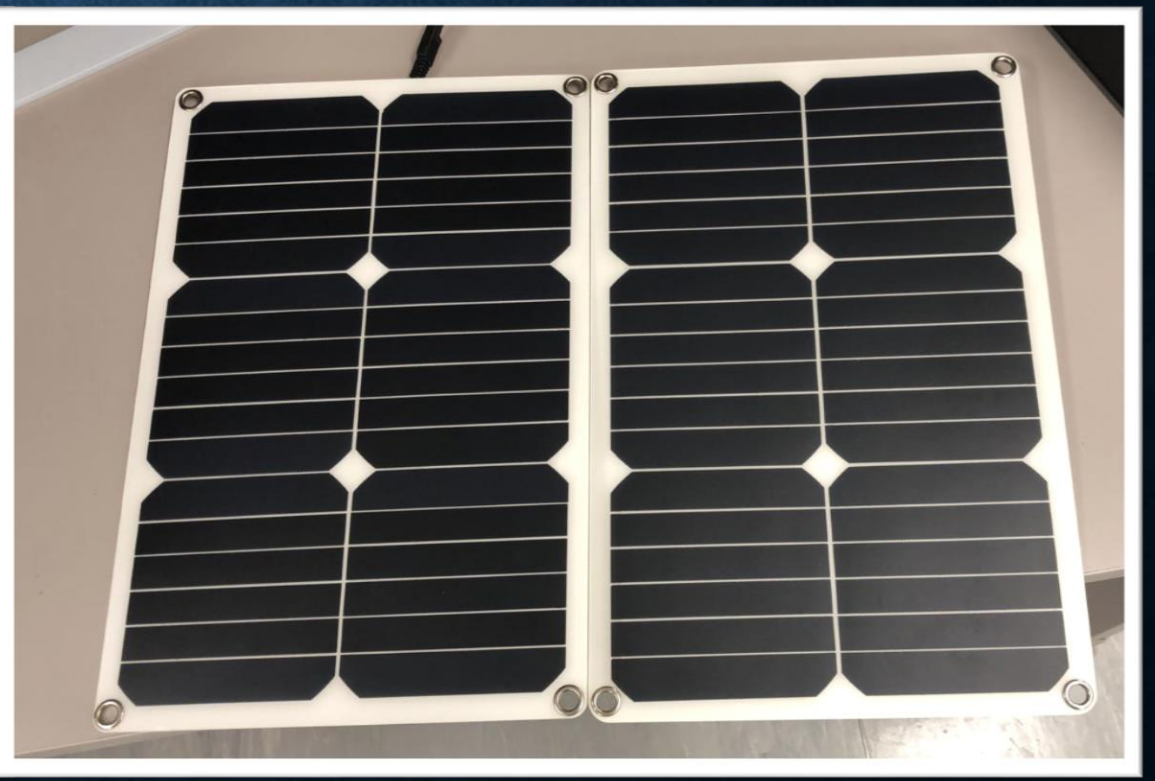
- **A 12 v battery life**
- **Sometimes a rove can stuck and can not goes to rough surfaces**



BACKGROUND: SOLUTIONS

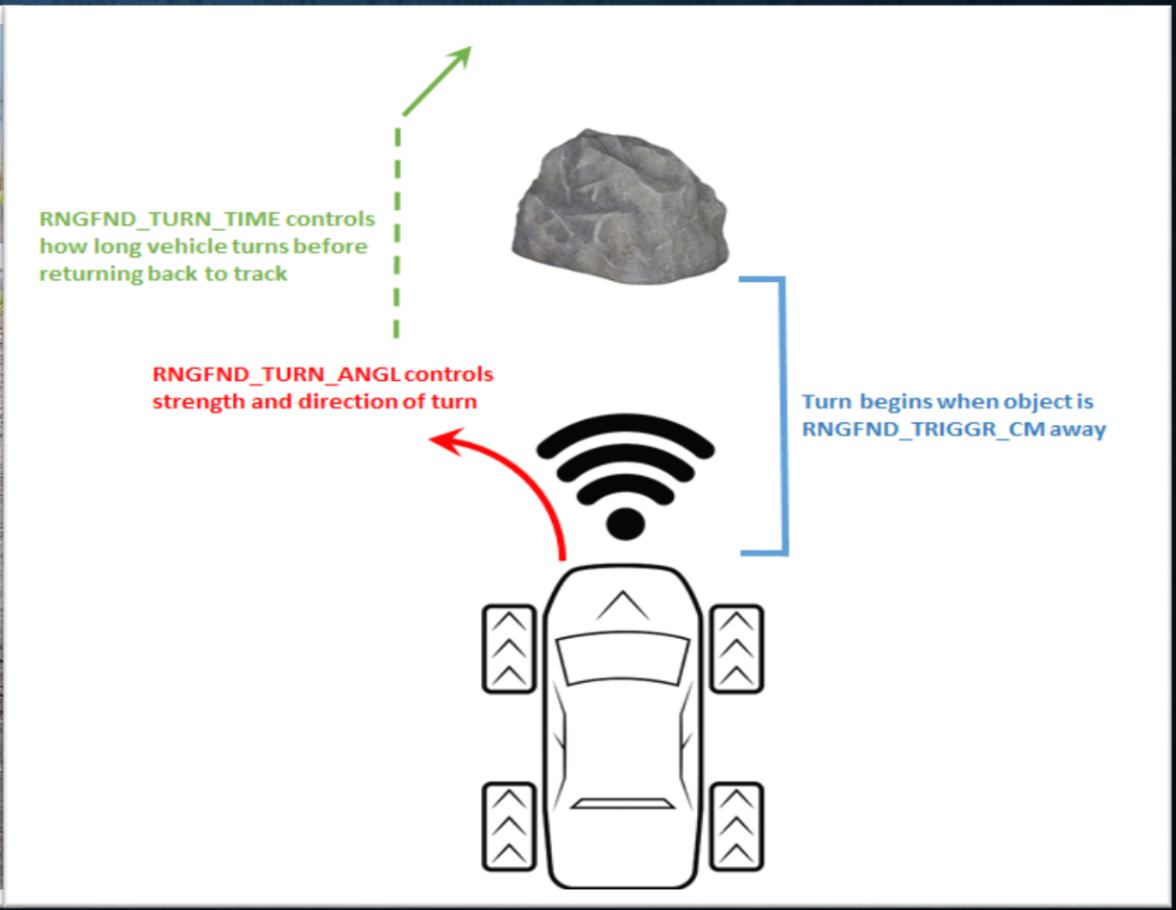
- Using a tracking solar panels will help the rover to charge the battery.





BACKGROUND: SOLUTIONS

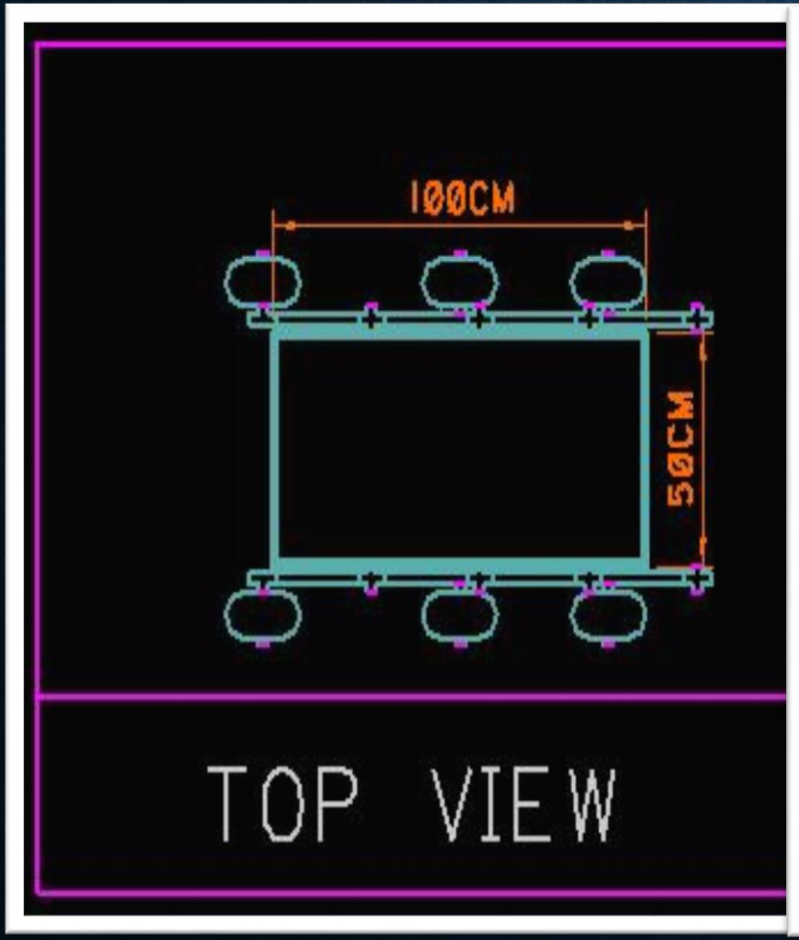
- Using a sensor to avoid obstacle.

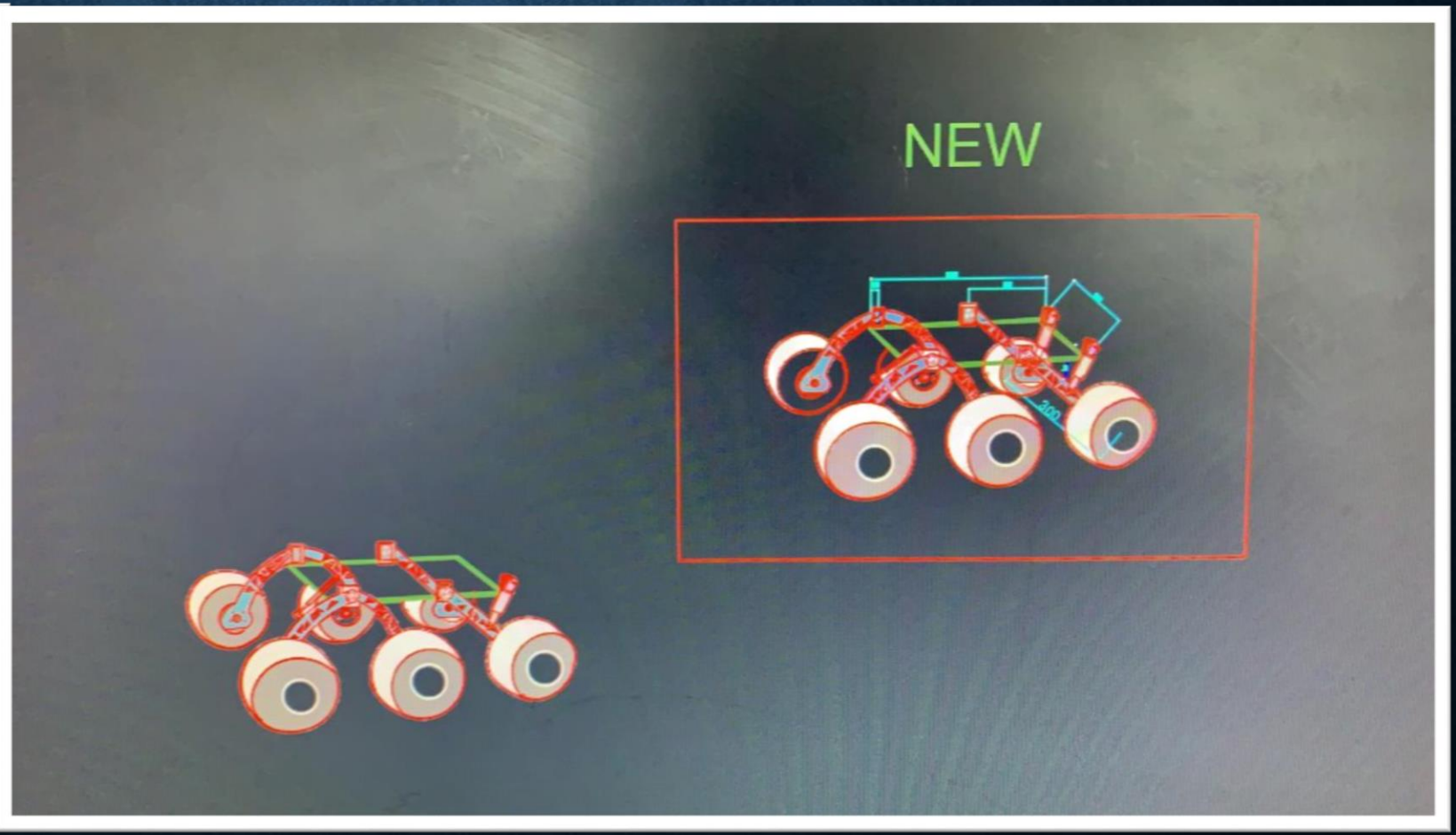


OTHER COMPONENTS

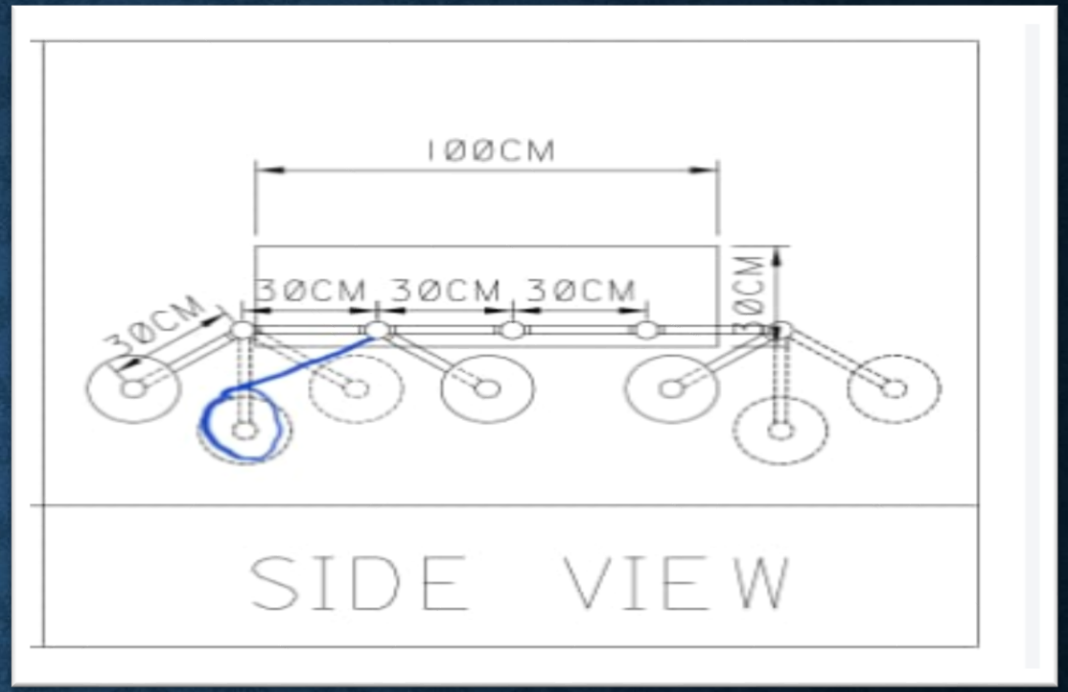
- Six DC motors
- 12 V and 18 Ah battery
- A number of six 25 mm wheels
- Two 14 cm shock absorbers for the front wheels
- Two 12 cm shock absorbers for the rear wheels
- Arduino mega, ultra sonic sensor, and servo motor

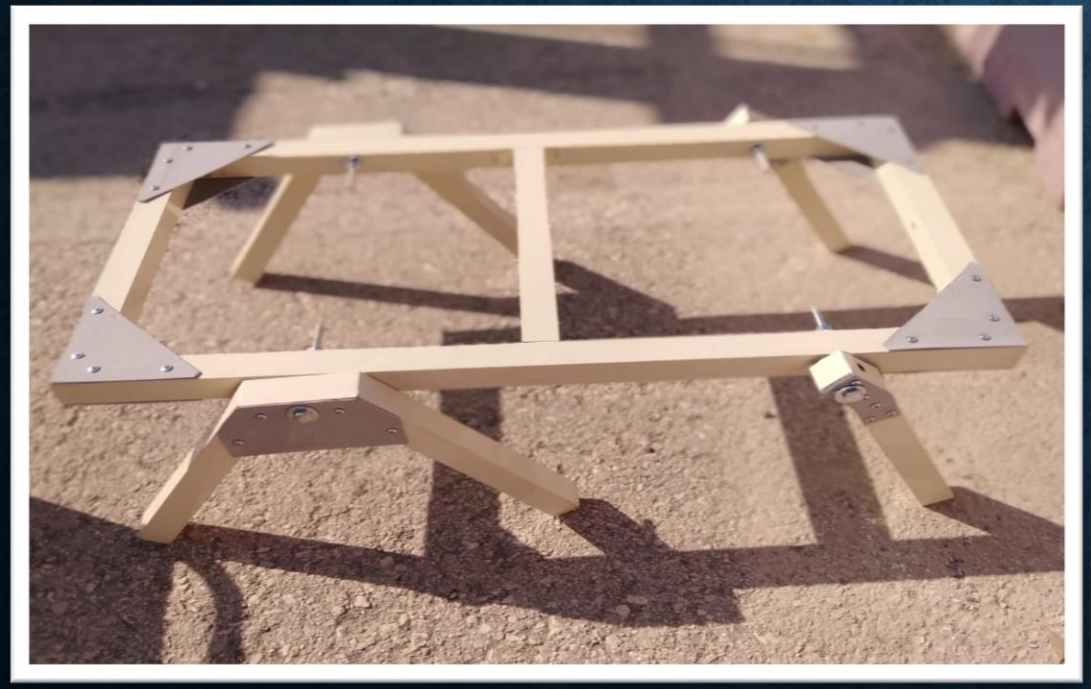
Rover Design



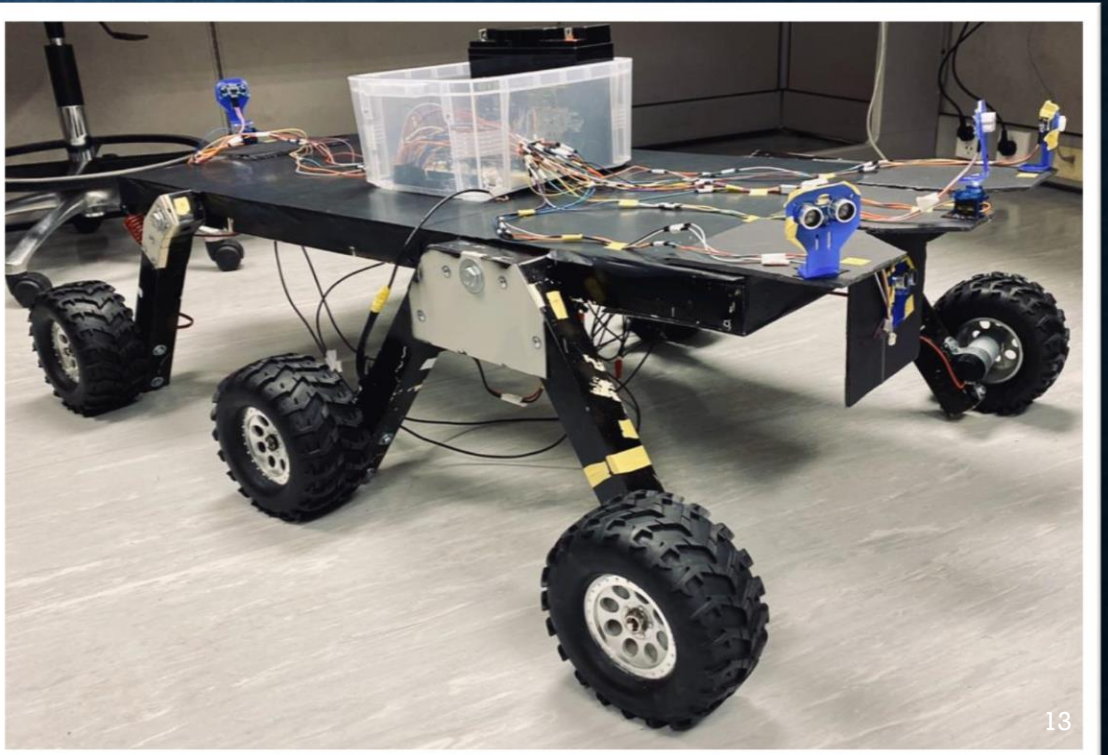


BUILDING THE ROVER

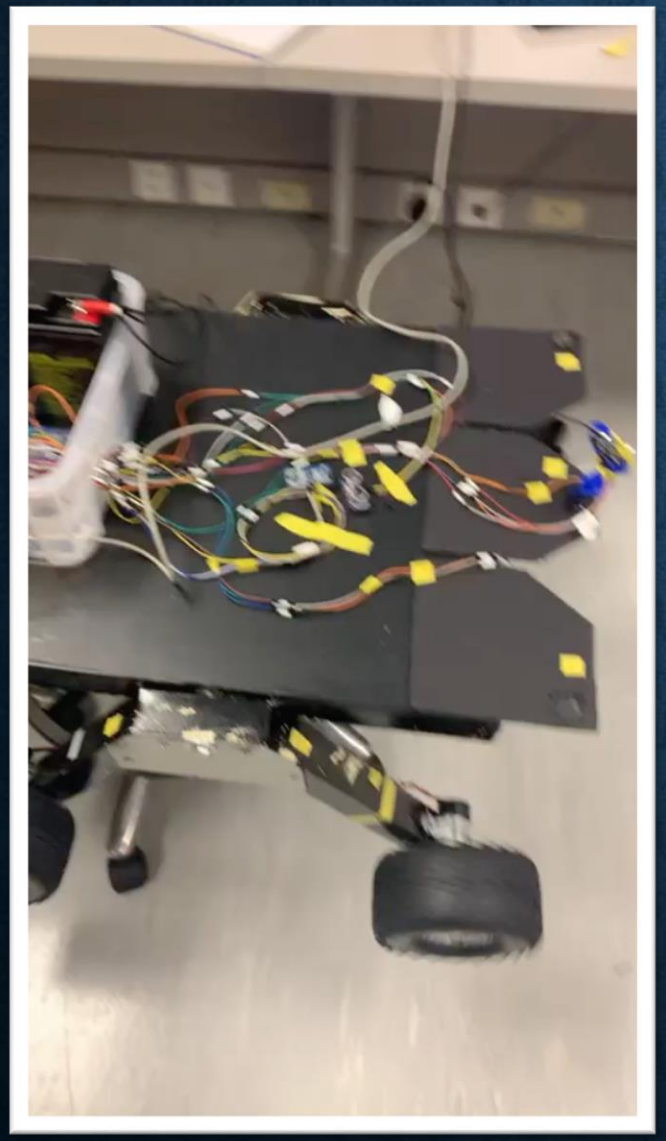




DEMO (PHASE I)

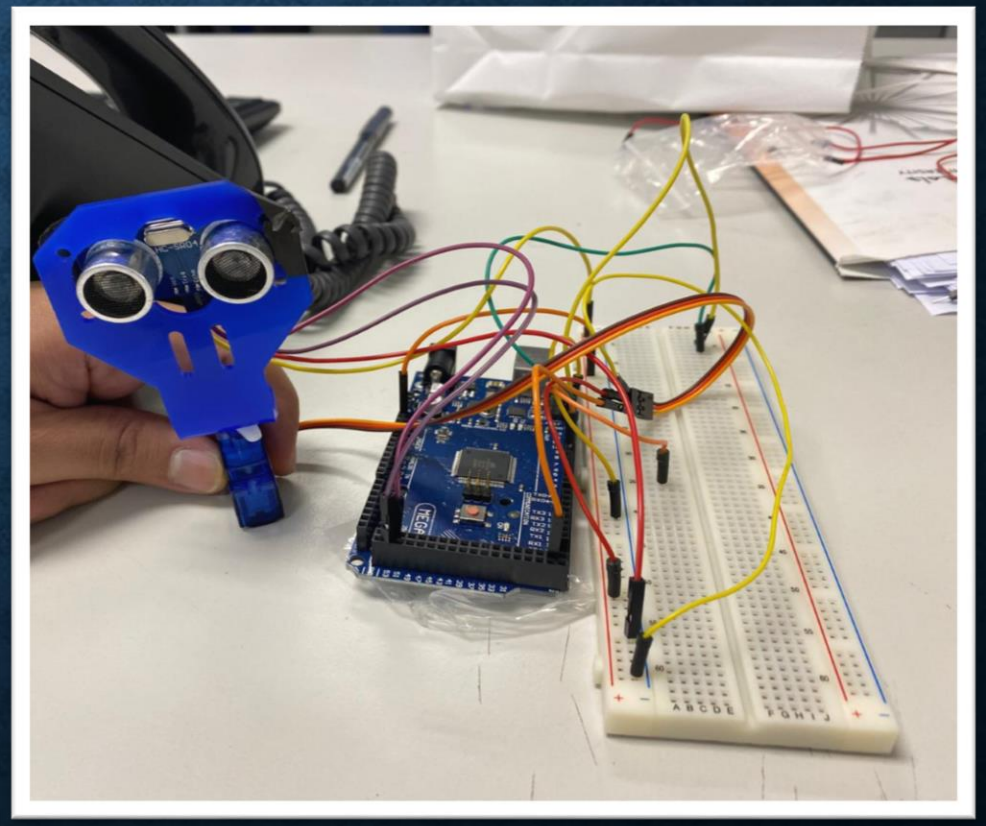


SUBSYSTEM I (AUTONOMOUS MODE)



Testing Phase

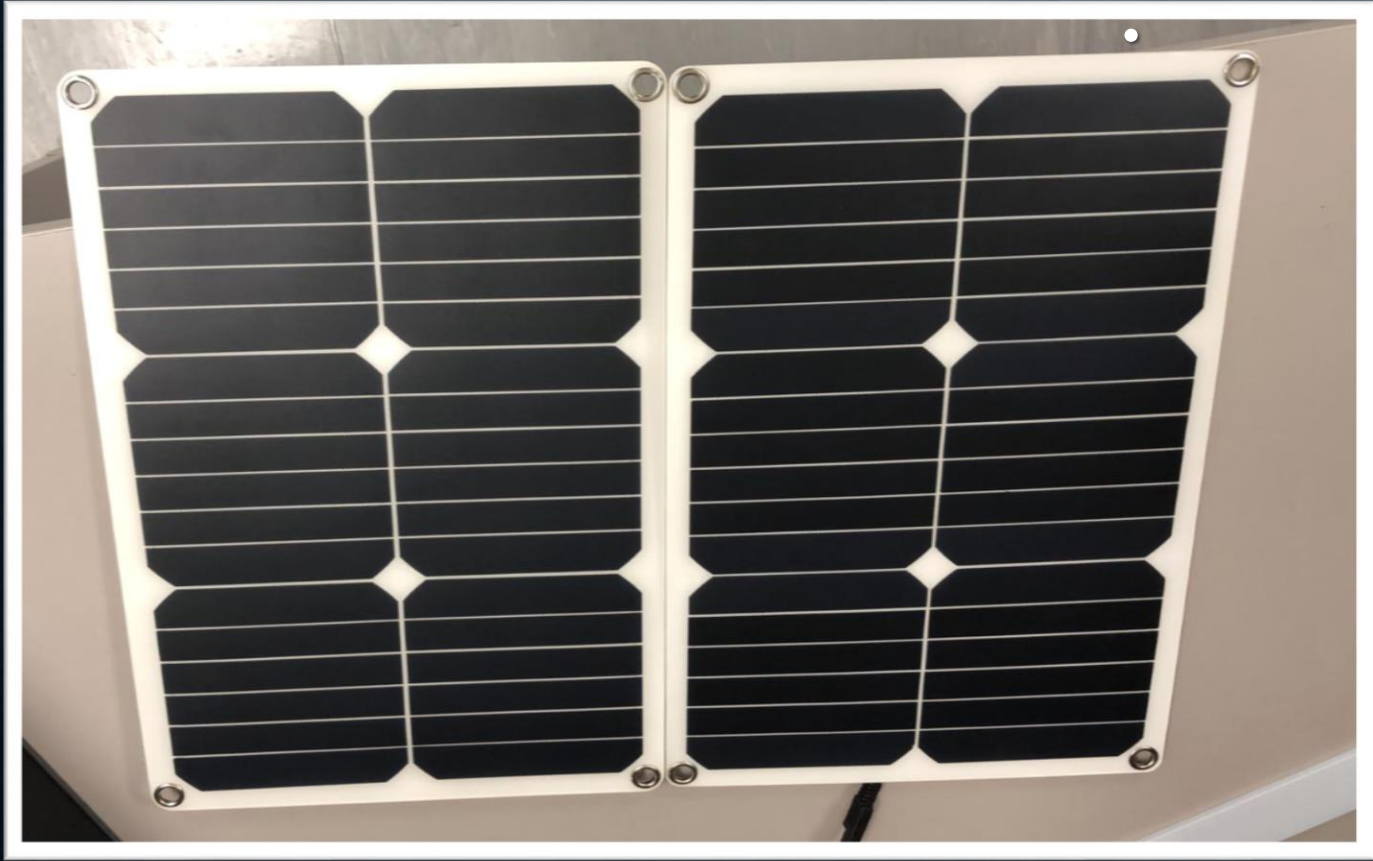
5 Ultrasonic Sensors & Servo Motors



SUBSYSTEM II (CONTROL MODE)

Testing Control Mode Through Bluetooth

SUBSYSTEM III (TRACKING SOLAR PANEL)



Subsystem Specification:

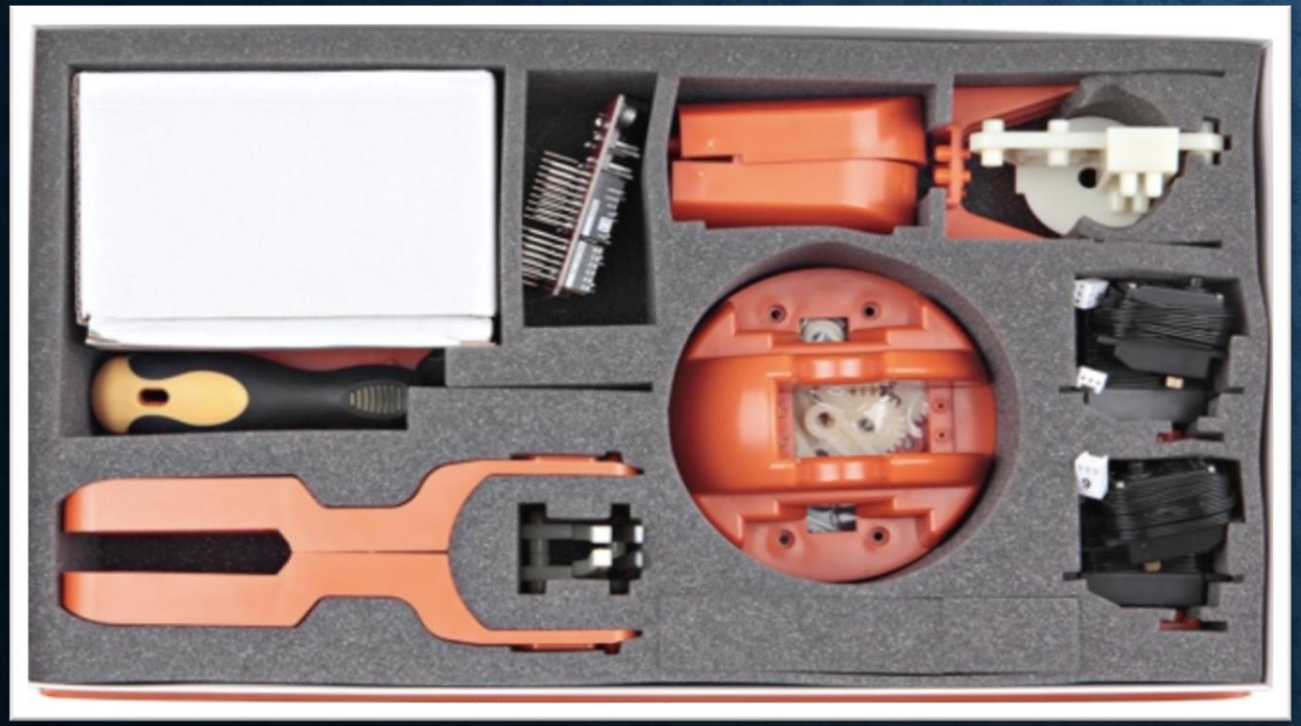
1. Solar Panel:

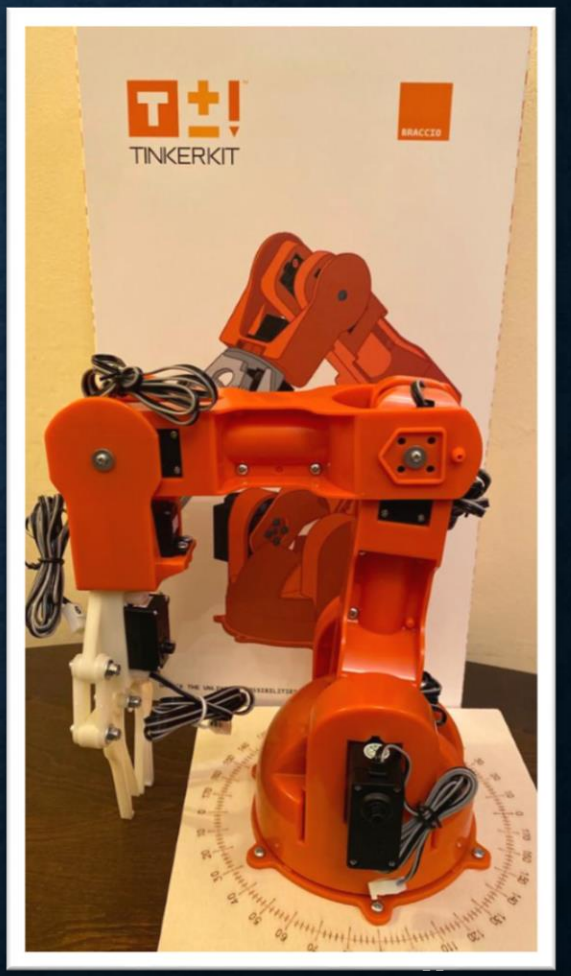
- **18 W**
- **18 V**
- **1 A**

2. Tracking System

3. Voltage Controller

SUBSYSTEM IV (ARM)





Planning

Plan for This Semester

- Manual Control W/ Long Distance Control
- Sun Tracking Solar Panels
- Robotic Arm
- Sensors for Detecting
- Fixing Wheels

- Be on Time W/ The Management Plan
- Start to Assemble Received Components
- Solve Issues W/ Quality and Within The Time Frame

Achieving

The Curiosity Rover

Saad Alnassar 201500439
Bandar Albalawi 201101356
Salman Alsunaid 201602839
Omar Yahya 201502345
Advisor Mr. Abul Hussain

Assessment III | Spring 2019/2020

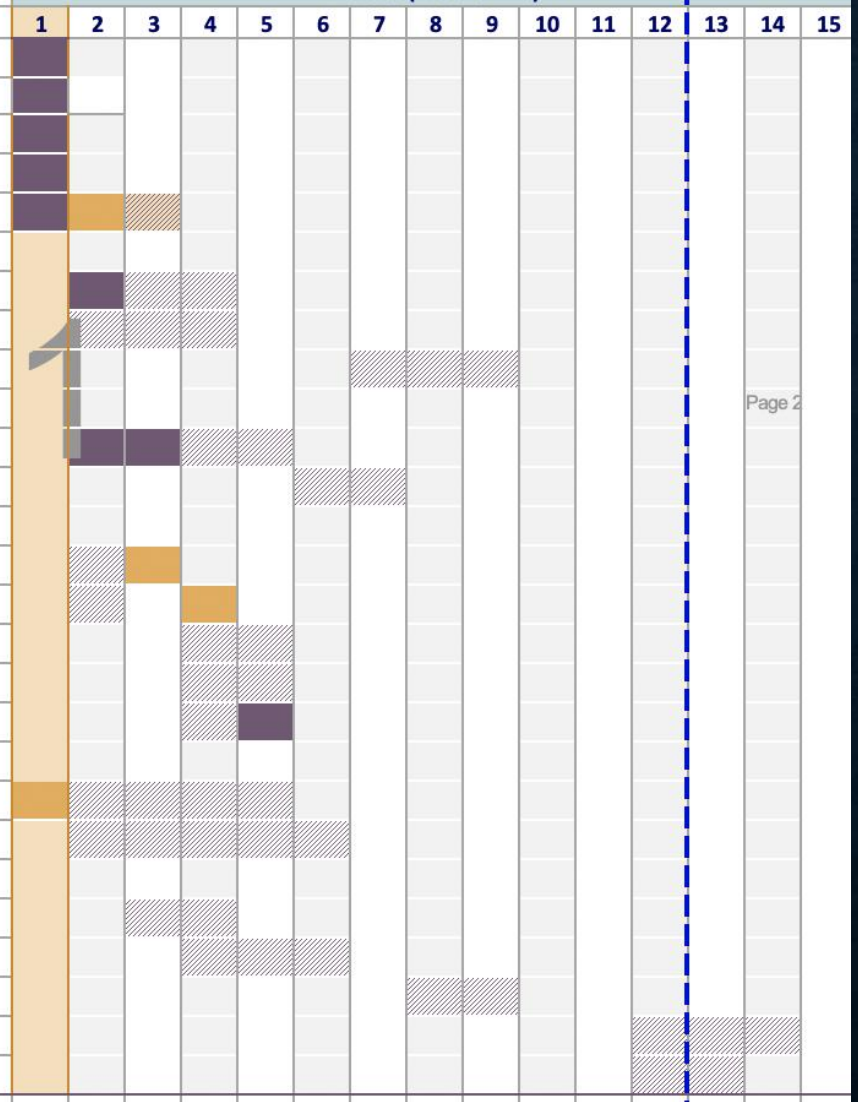
Project PLAN

Instructor: Dr. Sadiq Alhawaidi

Period Highlight: 1 | Plan | Actual | Actual (beyond plan) | % Complete (beyond plan)

ACTIVITY	PLAN START	PLAN DURATION	Assigned To	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Write a plan	1	1	ALL	1	1	100%
Time Management	1	1	ALL	1	1	100%
Finish The Plan	1	1	ALL	1	1	100%
Submitting Previous documents	1	1	..	1	1	100%
Search and Acquire Components	1	1	All	1	3	90%
Chasses			..			70%
Solution for Motor Place	2	3	Salman	2	1	100%
Legs	2	3	Salman	0	0	100%
Bomber	7	3	Salman			10%
Arm			..			50%
Order	2	4	Bandar	2	2	100%
Insallation	6	2	Saad & Bandar			10%
Programming			..			64%
IMU Sensors	2	1	Saad	3	1	80%
Arduino	2	1	Saad	4	1	50%
Control Mood	4	2	Omar	0	0	60%
Autonomose Mood	4	2	Omar	0	0	60%
Arm Program	4	2	Omar	5	1	70%
Solar System			..			65%
Solar Panel	2	4	Saad & Bandar	1		70%
Tracking System	2	5	Saad & Bandar			60%
Camera System			..			60%
Order	3	2	Omar			100%
Installation	4	3	Omar			10%
Final Testing	8	2	ALL			0%
Prepapre final presentation report	12	3	ALL			30%
Project demo w/ppt/rpt/banner	12	2	ALL			0%

Periods (Weeks 1-15): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15



Budget Estimate

- List key components and their approximate cost
- Add up total estimate

Item	Quantity	Unit Cost (SR)	Subtotal
Battery	1	150	150
Motor Drives	6	80	320
Chassis & Wheels	1	1000	1000
DC Motor	6	100	600
Solar Panel	2	150	300
Microcontroller	2	65	130
Servo Motor	2	100	200
Robotic Arm	1	800	800
			Total= 3500 SR

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THANK YOU