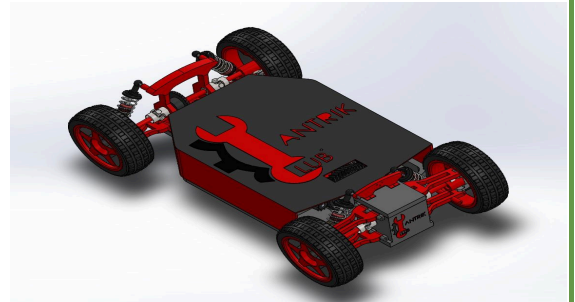


RC CAR

Project proposal

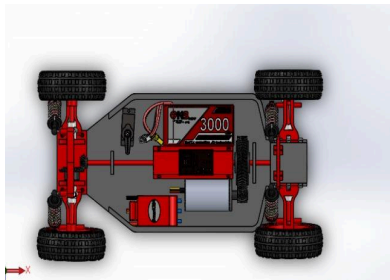
OVERVIEW

This project aims to develop, showcase, and operate a 2 kg high performance electric 1:16 Remote-Controlled (RC) car known as McQueen, for competitive events. We aim to enhance its design with modern technologies. The project will involve studying previous designs, integrating advanced electronics, and creating an optimized, lightweight chassis with robust systems for speed, durability, and agility. By thoroughly testing and refining the car, we intend to ensure peak performance in diverse competitive scenarios. This initiative not only aspires to excel in competitions but also seeks to inspire a culture of technical excellence, collaboration, and innovation, setting a high bar for RC car design and performance. Our aim is to make a competition-ready RC car, which would represent our institute in various competitions all over the nation



DESIGN

The RC car features a bell crank steering mechanism and an independent suspension system, both designed to enhance precision and handling. The bell crank steering mechanism efficiently converts steering input into accurate wheel movement, ensuring smooth and responsive directional control. This compact and durable system is ideal for the RC car's design, allowing for efficient use of limited space while maintaining reliability. The independent suspension system allows each wheel to move vertically independent of the others, providing superior ride quality and handling over uneven surfaces.



COMPONENTS

- **TRANSMITTER AND RECEIVER**

A [Transmitter](#) is a handheld device that allows the user to control an RC car. It sends signals wirelessly over radio frequencies to the receiver in the RC car, dictating its movements. These signals are generated through channels, each representing a specific function (like steering). A receiver is the component installed in an RC car that receives signals from the transmitter. It interprets these signals and converts them into actions by controlling various servos and electronic speed controllers (ESCs). The receiver ensures that the RC car performs the desired maneuvers based on the transmitted commands.

Flysky FS-i6X 6-channel transmitter and receiver supports advanced features such as adjustable steering which are useful for fine-tuning control for better handling and performance, especially in more demanding conditions. This setup provides flexibility for future enhancements while keeping the current control system simple and effective.

- **THE MOTOR**

The [Brushless DC](#) (BLDC) motors are far more efficient, faster in speed, and sustain a longer period of motion than their counterparts. Greater efficiency signifies that more power is delivered forthwith to allow higher acceleration and better performance on harsh terrains. Their high responsiveness to electronic speed controllers allows for precise control over speed, acceleration, and braking, making them suitable for use.

- **SERVO MOTOR**

Servo motors are mainly used for steering control. They take information from the transmitter, which is then utilized for the accurate movement of the steering linkages. This position allows the driver to smoothly maneuver the car through corners and dodge obstacles along the way.

- **ELECTRONIC SPEED CONTROLLER**

An [Electronic Speed Controller](#) (ESC) acts as an intermediary between the battery and the motor, translating the driver's throttle input into precise motor control. The braking system can bring the speed down sharply, thereby giving better control and security. When activated, the ESC reverses the motor's polarity, causing it to act as a generator, effectively slowing the vehicle down which is crucial for maneuvers like sharp turns, avoiding obstacles, and maintaining control.

We are using **80A 2-6S Brushless Electronic Speed Controller** to enhance control over speed and direction of the motor.



- **SHOCK ABSORBERS**

These shock absorbers in the RC cars also maintain traction and control-they absorb shocks from bumps and jumps and provide a smoother ride, thus, preventing excess bouncing and keeping the wheels on the ground. This provides for better balance during some high-speed turns and jumps and enables better handling.

- **STEERING KNUCKLES**

Steering knuckles connect the steering mechanism with the wheels so that the vehicle's direction can be controlled. They convert the steering input from the servo into wheel movement, allowing the driver to steer with perfect control and direction.

We are using **Enakshi (LABEL) 2x RC Car Steering Knuckle** to enhance overall performance in handling and durability.

- **GENERIC SPIRAL GEAR**

Spiral gears are used in the drivetrains to transfer power smoothly and efficiently from the motor to the wheels. The helical tooth design of **GEAR & PINION FOR ANGLE GRINDER 6-100 MODEL** reduces noise and vibration compared with spur gears, giving them quiet and smooth operation. Finally, spiral gears maintain an even load across the gear teeth, rendering them durable and less prone to wear and tear.

- **BEVEL GEARS**

Bevel gears are used in the differential for transmitting power from the driveshaft to the axles, which makes it possible for wheels to spin at different speeds while taking turns. We are using **KITSGURU Metallic Bevel Gear Small KG477** which is necessary for smooth cornering and traction on uneven surfaces.

- **GEAR SET**

Gear sets, which consist of a pinion gear mounted on the motor shaft and a larger spur gear, do the work translating the high-speed rotation of the motor into the required speed and torque at the wheels. By changing the size of the gears, which in a way affects the gear ratio, drivers can vary acceleration, top speed, and overall vehicle performance.

We are using **Marble Cutter Gear Pinion Set** for achieving desired balance in speed, torque and efficiency.



- **UNIVERSAL JOINT**

Universal Joints are essentially used in the drivetrain to transmit power and rotation through angles. **Universal Joint Metal Coupling (Model: D7L13)** which allows for flexibility in the driveline, thereby accommodating changes in the angle between the driveshaft and axles during suspension travel. This is crucial if a smooth power delivery is expected and binding in the drivetrain is to be prevented when traversing uneven terrains.

- **BATTERY**

We are using 2s lipo [Battery](#) of maximum 12 volts.

MATERIALS

- **CHASSIS :** Aluminium; due to strength, durability and corrosion resistance aluminium material is used.
- **TYRES:** plastic and rubber; due to flexibility, grip, and shock absorption plastic and rubber materials are used.
- **SUSPENSIONS: Metal,** Solid and durable; exquisite appearance, high polishing performance. Spring has high strength and durability, also can adjust tension alloy shocks to provide better performance
- **STEERING:** Aluminium; due to strength, heat dissipation and malleability aluminium material is used.

COMPETITIONS

- IIT BOMBAY TECHFEST
- IIT BHU AXELERATE
- IIIT GWALIOR BLAZING WHEELS
- TECHNOXIAN
- IIT MANDI XPECTO



MENTORS

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NIMIT GARG B23379

TEAM INFORMATION

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Osheen Mahajan	B24264
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Palak Goyal	B24317
Radhika Dwivedi	B24378
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Vidit Tank	B24409
Yash Vardhan Chaudhary	B24025

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- <https://www.youtube.com/watch?v=-pxNlrBaDrA&t=67s>
- https://youtu.be/VBldpvy-xSU?si=lmQ-8IfFy1Kiob_p

TIMELINE:

TIMELINE of the project.



BUDGET BREAKDOWN

Components	Price	Quantity	Total	Purchasing link
<u>MOTOR (BLDC , 3200 KV)</u>	₹2070	1	₹2070	BLDC Motor 1
<u>ESC (with braking system)</u>	₹ 928	1	₹ 928	ESC 1
TYRES	₹ 780	1	₹780	Tyres
<u>SHOCK ABSORBERS</u> (12*10*6) and(6.5)cm	₹800+900	2	₹ 1700	Shock Absorber 1 Shock Absorber 2
<u>STEERING KNUCKLES</u>	₹1329		₹1329	Steering Knuckles
<u>GENERIC SPIRAL GEAR</u>	₹235	1	₹235	Spiral Gears
<u>BEVEL GEARS</u>	₹ 500	1	₹ 500	Bevel Gear
<u>GEAR SET</u>	₹150	1	₹150	Gear Set
<u>UNIVERSAL JOINTS</u>	₹2000	1	₹2000	Universal Joints
Hardware(aluminium, bolts,ss etc)	₹2300	Approx 3 kg	₹2800	From A to z
Total			₹12492	

RC CAR SIMULATOR VIDEO

