

Bachelor's Thesis, Term Project

Control, Design and Fabrication of a Self-Driving Rover Used in Dangerous Terrain

Supervisor (s): (Assist. Prof. Dr. Eng. Amir Roushdy)

This project presents the design and prototyping of Self-Driving Rover capable of navigating & avoiding obstacles in its path whilst it simultaneously calculates the shortest or best route to achieve the primary task for which it is designed for, i.e. deploying it solar-panel on locating a spot of brightest light intensity. The main contribution of this project is the experimental validation for the autonomous vehicle using a control approach. Consequently, hardware and software design as well as experimentation are part of this project. **There is a Lab Engineer from the ARATRONICS Laboratory, guiding and directing the student with Assist. Prof. Dr. Eng. Amir Roushdy.**

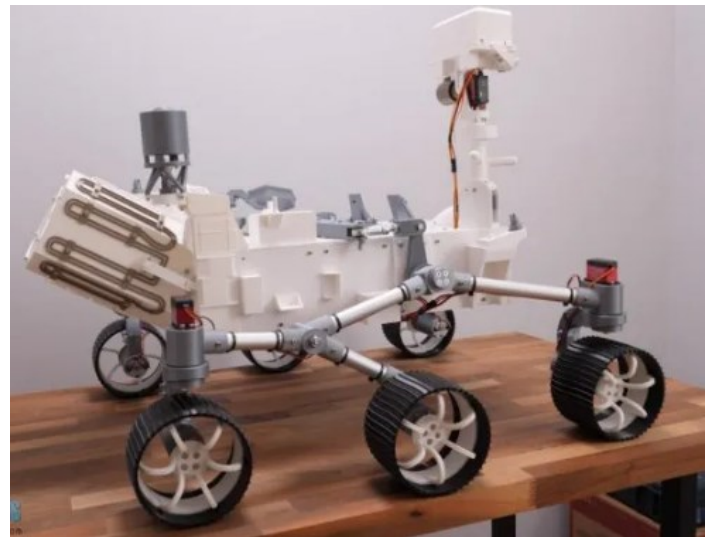
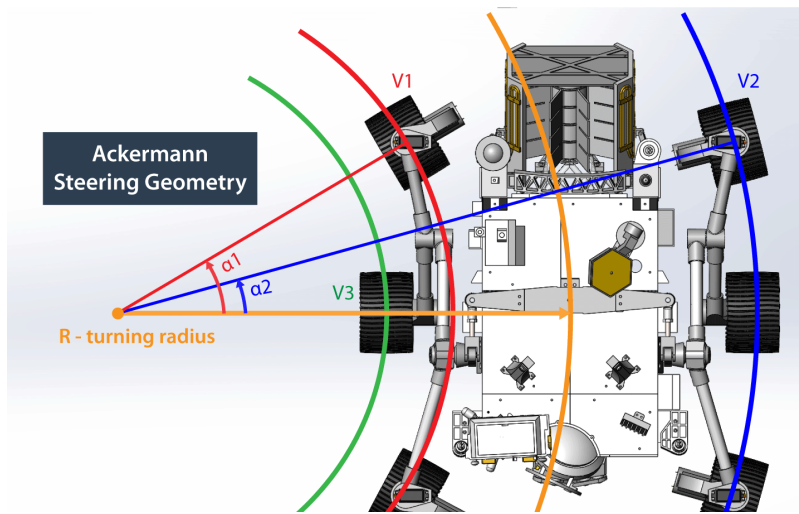


Fig.: A Self-Driving Rover

Project description and objective:

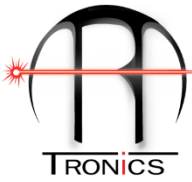
The main features of this rover. It employs a rocker-bogie suspension which allows the rover to run smoothly on uneven terrain and climb obstacles, such as rocks, that are up to twice the wheel's diameter in size while keeping all six wheels in contact with the ground all time. Each wheel has independent DC motor which drives the rover forward or backward.

Research focus of this project:

- Literature review on the project should be studied properly.

For more details please contact:

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- Not only, creating a software control system for the project but also the hardware.
- Experiments using the gadget and control system should be built properly.
- The outcomes must be documented.

Requirements:

- Passionate to learn more about Robotics, Vehicle Dynamics, and control.
- Prior mechatronic design expertise is desired like “SolidWork”.
- Enthusiasm for completing actual practical work with 3D printing staff (design fabrication and construction).
- A method of working that is both structured and self-contained.

General tasks of the project:

- The complete design for the Rover is already exist in the ARATRONICS lab and the ARATRONICS Lab Engineer will hand it to you from the first day.
- ARATRONICS will support you with the CAD Rover design on Solidwork. You, will adjust some parts on the design to fit with the motors and actuators in the local market.
- Fabricate the Rover using 3D printer.
- Assembly all parts of the Rover.
- Motion control study for the Rover.

Other notes:

- A weekly meeting with the advisors will be required for this project, as well as weekly progress updates (*The meeting could be more than once during the week based on your progress and based on your achievements*).
- You should to be in the Lab two days per week (*It could be more than two days based on your progress and based on your achievements*).
- All reports must be prepared in the style of a research paper.
- The outcome of this research will be published in one of the coming international Conferences and , or Journal