**Executive Summary**

In the project “Platoon (convoy)”, we are required to design a self-contained robot. The robot is a part of the convoy. The convoy is lead by a leader and the robots in the convoy should move in a single file according to the movement of the leader. Upon command , to any robot between the last robot of the convoy and the leader of the convoy, the respective robot should leave the convoy and join as the last member of the convoy. The robot should indicate the convoy when it leaves and also when it is in the last position.

The self-contained robot should be able to identify the following robot, which could be either the leader or similar robot in the convoy. The robot should also be able to process the leaving signal and act accordingly to the signal. When robot leaves the convoy, it should follow a leaving mechanism and it should be able to identify the last robot and get behind it.

If a robot in front of the self-contained robot leaves, the self-contained robot should be able to process the leaving signal of the leaving robot and follow the next robot or the leader.

The problem can be divided into three main categories, moving as a part of a convoy, follow robot in a convoy and leave the convoy (broadcasting a leaving signal) when externally commanded and re-joining the convoy as a last robot. To achieve these aims, the robot should be able to identify the robot in front of it using sensors. These sensors should sense carried identification marks (on robots in convoy) and the robot should set its speed and trajectory according to processed signal that comes from sensors. Also, the robot must be able to stop following a leaving robot and find a robot in front of leaving robot and increase its speed to catch it while trying not to crash leaving one. To rejoin the convoy, the robot should wait till it reaches the last robot and identifies the last robot, then join the back of the line as a last robot. The same sensors used to sense identification marks can be used to identify last robot. Different kind of sensors and signals can be used for these purposes, but exact ones will be defined after standard committees. Till now, the company has planned to use sensors such as proximity sensor (to check last robot), ultrasound sensors (to measure distance, maintain specific distance from robots in convoy to avoid collision) and camera (for identification of robot to follow). For signal broadcasting, speakers, LEDs and lasers are devised to be used.

Given the combined experience and skills of the OJO members, the company possesses sufficient knowledge and understanding to accomplish this project triumphantly. The OJO group has appointed its members to the project according to their specialties and skills. The specialists on computer area (Anar Abdullayev, Bulut Ulukapi and Umut Can Serçe) are responsible for the programming related problems, electronic part and image processing in the project. The control system specialist (Syed Saad Saif) is responsible for the control system (interfacing with microcontroller), feedback analysis of the project. The power system specialist (Abdullah Aslam) is responsible for the power related aspects such as power consumption and efficiency in the project.

The total duration of the project is estimated as 200 days from the current date (11th November 2017). Apart from the end product, the company plans to provide with necessary documents such as circuit design schematic, power consumption analysis report and a user manual, which will provide more understanding to the user to make the best use of the product. The total cost of the end product is estimated to be around $141 which, indeed, is within the range of the provided budget which is $200.