MEMO

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Subject: Safety Check 1 (IGVC / 00 January, 2017)

Project Title: GoBot

The purpose of the project is to build a fully autonomous unmanned ground robotic vehicle that navigates around an outdoor obstacle course. Guidelines are given from the Intelligent Ground Vehicle Competition, which sets an average speed of 1-5 mph, a size of three feet by 2 feet, and a lane of at least six hundred feet. The IGVC's measures of success include lane following and obstacle avoidance.

1. **What ultimate prototype, proof-of-concept, test, or experiment is anticipated for this project (experiment)?**

- The final prototype will be a small, autonomous vehicle. The proof-of-concept will be an efficient assembly design, and a well thought out decision tree. We will test that the design works by setting a few different basic tracks to make sure the vehicle can accurately traverse the area. We will test that the decision tree works by randomly placing obstacles along the track and noting if the vehicle can intelligently avoid these and continue along the path.

2. **What potential risks are there associated with this ultimate experiment (see potential sources below)?**

- The fully autonomous vehicle is self-controlled and is a potential risk to the surrounding objects and people. The vehicle needs 12-24V, which could lead to a potential voltage danger. The high rotational speeds of the motors and the manufacture processing of the frame also have potential risks.

3. **What is the engineering benefit of the proposed experiment?**

- The small fully autonomous vehicle should be able to avoid different obstacles under different ground conditions and should drive for at least 600 feet. The low-cost long-running prototype can potentially help vehicle companies improve the commercial self-driving cars and rovers.

4. **Does the engineering benefit outweigh the potential risks? Why or why not.**

- We believe the engineering benefit of the GoBot outweighs the potential risks of the project because some of the potential risks can be avoided with some subsystems like mechanical and wireless e-stop, safety lights, and so on. Compared to the previous awarded $10K autonomous vehicle, GoBot is ultra low cost (~$400) while having the same functions. This project can help us understand more about autonomous

vehicles and has the potential to lower the price of commercial vehicles.

5. **Are alternate, safer, experiments possible?**

   We could test each component of the robot separately to ensure that all of the wires are connected correctly and that each system is functioning as expected. This would make it much easier to identify the underlying problems, and greatly reduce the risk of testing the entire robot.