Tesseract Project Revisit: Specification and Requirements MSE 3302 B

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1 Design Specifications and Requirements

1.1 Performance and Constraints

1.1.1 Required Speed

The speed at which the system operates at must be maximized in order to reduce completion time while remaining stable with minimal overshoot and high accuracy. This speed must not exceed any limits imposed by the magnetic sensor, chassis, drive train, cube transportation system or any other subsystems.

1.1.2 Required Acceleration

To provide smooth operation, acceleration will be capped at xm/s^2. This will ensure minimal ware on the drive train components and will reduce the probability of dropping the cube.

1.1.3 Required Accuracy and Resolution

The sensors which track the wall must have sufficient accuracy to maintain a constant distance. The magnetic cube sensor must have sufficient accuracy and range to detect when the cube is within grabbing range.

1.1.4 Allowable Overshoot

Overshoot must be kept to a minimum to prevent system crashes.

1.1.5 Power Rating and Voltage Rating for Power Supply

The Power Supply must provide sufficient power to drive the motors at the required constant speed. The Voltage must not dip or rise outside of a specified range during operation to reduce negative disturbances on the sensors and control system.

1.1.6 Overall Dimensions

Must be agile enough to navigate the course and sweep the entire area.

1.1.7 Operating Forces and Torques

Operating Forces and Torques must not exceed the specified maximums of the materials used.

1.1.8 Mass and Inertia of Components in Motion

Yes.

1.1.9 Structural Frame Rigidity

Frame must support all components used in the system.

1.1.10 Expected Temperature Range

The system must comply with the Automotive Temperature standard of -40 to 125 degrees Celsius.

1.1.11 Expected Cleanliness

The system must not contaminate the environment. Possible Contaminants include Oil, Battery Acid...

1.1.12 Safety Features

The system must employ measures to protect human health sand safety. Ethics must be followed.

2 Milestones and Timeline

2.1 Project Timeline

Week of:

- Jan. 14 • Specifications and Requirement Deliverable
- Jan. 21 • *Research Applicable Senors?*
- Jan. 28 • *Do Design?*
- Feb. 04 • *Finalize Sensor Simulations?*
- Feb. 11 • Preliminary Sensor Selection Deliverable
- Feb. 18 • *Research Applicable Actuators?*
- Feb. 25 • *Do Design?*
- Mar. 04 • *Finalize Actuator Simulations?*
- Mar. 11 • Preliminary Actuator Selection Deliverable
- Mar. 18 • *Evaluate Preliminary Sensor and Actuators?*
- Mar. 25 • *Obtain feedback and iterate?*
- Apr. 01 • Finalize Final Simulations and Report