**Current State**

The following CAD drawings depict the Team’s robot. Bright red blocks were included to indicated motor components. All other parts were acquired via files on the VEX Robotics website. Note the front wheels on the CAD drawing do not match the real-life prototype. This was due to the file for the correct wheels being incompatible with the version of CAD used. The back wheels were used instead.

There is code written so that all parts of the robot can be tested with manual control to prove that everything works prior to coding the robot to function autonomously. The drive train has encoders on the motors already and they can be tested in a small scale by manually rotating the wheels to test values. A joystick controller will be used to test every other subsystem.

To gain the maximum number of points, the robot would require a mechanism to sort the magnetic and non-magnetic materials. Our team discussed possible methods of sorting but determined that the risk was not worth the reward. Sorting would greatly complicate the design. Our team found that without sorting, it is still possible to score 235 points, which is more than 80% of the total possible points. For this reason, we have elected to ignore a sorting mechanism and move forward with our robot accordingly.

**Work Ahead**

The collection and powertrain systems have taken up the majority of the team's attention, the bin subsystem that suspends and holds the collected astral materials has taken a backseat. This is because the prerequisites for collecting astral materials include a powertrain system that can propel a robot to move itself to the materials and also a collection system that can uptake materials and suspend them in the robot. Now that the team is confident in how and where astral materials will be taken, a location to store the astral materials can be planned as well as the mechanism to dump them into a bin. The bin system will be on the back of the robot with a motor that can rotate the bin about a point (much like a dump truck) so that the robot can pour out the astral materials into the respective bins. Team 507 is keeping in mind that this may not turn out to be the best design after experimentation.

There will be testing involved with a rubber band roller intake to mimic a handheld tennis ball or golf ball gatherer. This will be close to the ground and feed the astral materials onto a ramp and into a collection bin. This will be made with sprockets and a shaft connecting them with rubber bands in the space of the teeth. It is unclear whether running them straight across or having them angled with another set running at the same angle in the opposite direction will be more advantageous, and there will be multiple iterations tested to determine the best course of action. In tandem with the roller intake, there may be arms that stretch from the base of the drive train after the start of the match to move the astral material towards the intake. This will allow for more astral materials to be gathered in a shorter period of time, increasing the time available for other point scoring tasks.

Lighter build materials need to be purchased prior to the end of the semester so that everything arrives over break and the team is not in a waiting pattern to work on the final assembly. Dr. Chuy will be contacted to place the order of aluminum c channels and other parts not yet in the team’s possession.

**Problem Areas**

Communication between the ME and ECE teams has been a challenge this semester particularly with keeping everyone on the same page regarding the concept and the method of point scoring. Multiple times, comments have been made which contradict decisions that were assumed to already have been made. A meeting with all team members will be scheduled for the beginning of the spring semester to ensure both teams are on the same page and are working in the same direction rather than contrary to each other.

A potential area of concern is whether the motors we are currently using can be integrated with the microcontrollers used by the ECE group. If they cannot be integrated, new motors will need to be spec’d and ordered. The motors will need to have the same voltage and torque as the current motors as well as an encoder.