# Control Award Content Sheet

| Team # 8365 | Team Name: Gearmasters |
|---|---|

**Autonomous objectives:**

    a.  Lowers robot from Lander to score Landing points (30)

    b.  Detects and removes Gold Mineral using Computer Vision to score Sampling points (25)

    c.  Pushes Gold Mineral into Depot (2)

    d.  Drops Team Marker to score Claiming Points (15)

        **Total Points = 72 points**

**Sensors used:**

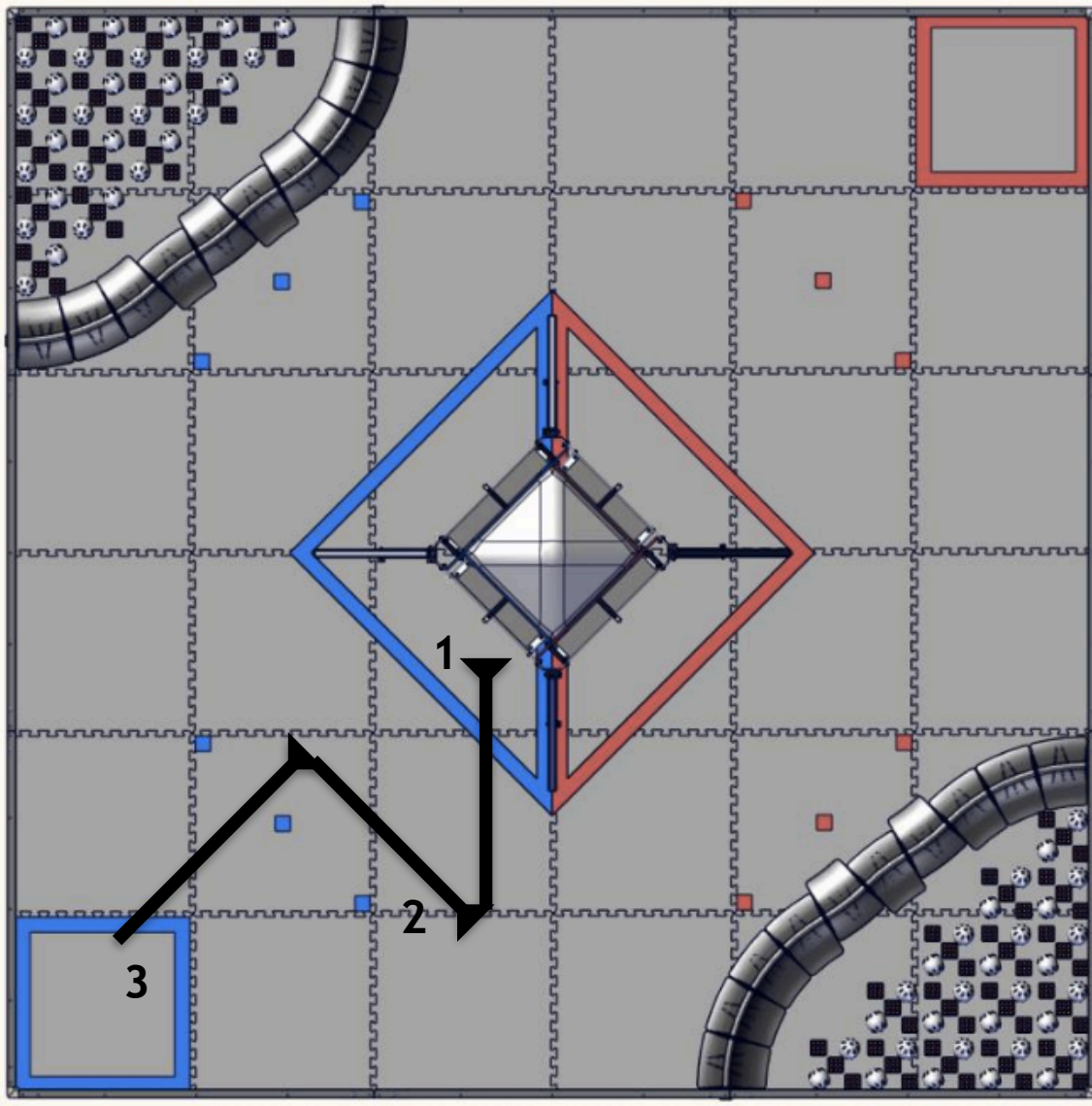| Sensor | Usage |
|---|---|
| Computer Vision (OpenCV) | Allows robot to detect portion of gold mineral using image filtering |
| Motor Encoders | Allows robot to move more precisely by measuring rotations. |
| Gyro Sensor | Allows robot to turn precisely by measuring degrees turned. |
| Range Sensor | Detects the height of the robot when hanging on the lander |

**Key algorithms:**

    Our robot is built with a U Drive system with wheels in the left and right side and in the back. This formation allows the robot to easily move in all direction using only 3 motors.  However, with an increased weight on the robot, sideway movement requires additional power from the back motor causing the robot to swerve.  Algorithm is added to offset the side wheel to enable the robot to move actually.

**Engineering Notebook references:**

| Reference | Notebook Page # |
|---|---|
| U-Drive | 24,25,28,63 |
| Computer Vision | 36,51,52,64,66 |
| Gyro Sensor | 44 |
| Range Sensor | 47 |

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**Autonomous program diagrams:**



**Steps (Blue Alliance):**

1. **Robot hangs on Lander, lowers itself using linear slide, stops when a range sensor (located at the bottom of the robot) reaches a value of 6**

2. **Robot turns away from the Lander, moves in front of the minerals, moves the phone to the front of the robot with the camera facing the minerals, slides right until the Gold Mineral is detected**

3. **Robot positions in front of the middle mineral, lowers the attachment arm and releases the game marker**