

Target Summary

System	Function	Target	Metric
Collecting Mechanism	Detect Objects	95% of materials are detected within a 20 cm radius in the front	Test detection by placing astral materials near the robot and measuring (tape measure) at what distance the materials are no longer detected at
	Grip Objects	Astral materials that enter collection mechanism are successfully up taken at rate of 90%.	Test gripping material by picking up the astral materials and observing if they drop or slip
	Integration with other Systems	Less than 2 second between material detection and collection start	Use a stopwatch or phone with timer
	Be Precise	Within ± 2 cm of the material's location during collection	Use a tape measure to determine the robot's precision

	Allow Proper Placement of each Bin	3.2 kg	Ability to move/support the weight of bins at maximum capacity
	Read April Tag	0.6 m	Can read April tag from within a certain radius
	Generate Power	5-24V	Use a battery to battery that can handle all systems
Bin Relocation	Control Motion	$\pm 125, \pm 245, \pm 500, \pm 1000, \pm 2000$ degrees per second for angular rate measurement	Use a 6-Axis Accelerometer & Gyroscope
	Interface with Sensors	IR Range: 2 to 30 cm Ultrasonic Range: 2 cm to 400 cm	IR sensor, Ultrasonic range sensor, and camera all communicate with powertrain

Power Train	Support Load	Weight of 15 kg	Move the entire weight of the robot and systems
	Place Beacon	Place beacon into hole within first 20 seconds	Put beacon mast into flag hole without falling out
	Work in the Cave	Successfully operate autonomously in the dark having at least 85% of what the robot does in the light	Detect and collect astral materials while successfully entering and exiting cave at will
	Be Autonomous	Successfully operate autonomously for 3 minutes before turning off	Independently operate to start up, detect astral materials, navigate field, and shut off
	Detect LED	Detect LED from any robot in a specified starting orientation within 2 seconds	Successfully detect LED to commence game

Navigation	Weight	Robot weighs less than 12 kg	Use a weight scale
	Speed	Robot moves at 0.3 m/s	Use an accelerometer to make sure velocity doesn't change
	Emergency Stop	All power goes to 0V	Complete shutdown of the robot
Structure			
Movement			
User Interaction			