Kathryn Atherton
Joshua Hahn
Hannah Schenck

TEAM 45 PROJECT 3 POC SPECIFICATIONS

Customer Need	Technical Need	Technical Requirement	Target Value	Current Performance
TASK 1: MOBILITY IN OBSTACLE-FREE AREA				
Move quickly	Time to travel 1 foot in a straight line	Travels 1 foot in < 1 second	Travels 1 foot in < 0.5 seconds	
Move straight	Travel to a specified location via a straight line and stop with marker over a specified point	Marker < 2 inches from point	Marker < 0.5 inches from point	
Make tight turns	Turning radius -- radius of the smallest circular path the ALV can follow	Radius < 5 inches	Radius < 3 inches	
Can follow a path that turns	Travel to a specified location via a path with at least 1 turn immediately before the location and stop with marker over a specified point	Marker < 2 inches from point	Marker < 0.5 inches from point	
Move over a large distance	Minimum distance able to travel	Minimum distance > 20 feet	Minimum distance > 25 feet	

	without breaking			
TASK 2: NAVIGATE USING GPS SIGNAL/ SURROUNDING OBSTACLES				
Stops at a given destination	The ALV stops within a small distance of given location	Distance < 3 inches	Distance < 1 inch	
Navigate around surrounding obstacles	Distance from edge of obstacle to edge of ALV while maneuvering around obstacle	Distance < 5 inches	Distance < 2 inches	
Can navigate along a straight path	Distance offset from a straight path 5 feet long	Distance < 5 inches	Distance < 2 inches	
Can navigate around corners	Distance offset from a circular path of radius 3 feet	Distance < 5 inches	Distance < 2 inches	
Can turn to face next checkpoint	Difference in angle between a randomly selected checkpoint and where the robot is facing after orienting itself	Angle < 10 degrees	Angle < 5 degrees	

Troubleshoots if ALV runs into an obstacle it cannot overcome	Time to re-route around obstacles ALV cannot overcome	Time < 5 seconds	Time < 2 seconds	
TASK 3: ABILITY TO TRAVERSE SMALL OBSTACLES				
Overcome small hazards	Height of obstacle AVL able to overcome	Able to bypass obstacles of height > 10 mm	Able to bypass obstacles of height > 20 mm	
Move quickly to overcome hazards	Time to travel 1 foot while overcoming obstacle with maximum height 10 mm	Travels 1 foot < 2 seconds	Travels 1 foot < 1 second	
Traverse a variety of obstacles and terrain	Time to travel 1 foot while traversing irregular terrain (squishy, slippery, rough, uphill, downhill, uneven, etc.)	Travels 1 foot < 2 seconds	Travels 1 foot < 1 second	
TASK 4: LOCATE BEACON AND STOP AT IT				
Locate and stop at beacon	Distance from the center of where antenna would be placed to the	Distance < 1 foot	Distance < 6 inches	

	center of the beacon			
Make known that a beacon location has been identified	Time to beep 3 times after correctly identifying (i.e. stopping at) a beacon	Time < 1 second	Time < 0.5 seconds	
TASK 5: TRANSPORT AND DROP ANTENNA IN PROPER ORIENTATION				
Can carry multiple antenna	Distance can walk fully loaded	Can walk at least 10 feet with 600 grams loaded onto the robot without falling over	Can walk at least 20 feet with 800 grams loaded onto the robot without falling over	
Can place antenna close to drop point	Distance from a drop off point to the closest part of the box to drop off location	Can drop antenna off 0 inches away from the drop off point	Can drop antenna off 0 inches away from the drop off point	
Can place antenna in proper orientation	Number of antenna that are placed with the correct side facing up	Can drop all 3 antenna in the correct orientation	Can drop all 3 antenna in the correct orientation	
Can disengage	Distance the robot can move away from a drop off point after unloading an	Can move 2 cm away from the antenna after unloading it	Can move 3 cm away from the antenna after unloading it	

	antenna package within 30 seconds			
Does not drop antenna en route to destinations	Distance the ALV can travel without losing any antenna	Can travel at least 10 feet fully loaded without losing any antenna	Can travel at least 20 feet fully loaded without losing any antenna	
TASK 6: UTILIZE GPS TRACKING SOFTWARE				
Can display its current coordinates	Distance from where the robot is to where it thinks it is	Distance is less than 10 cm	Distance is less than 5 cm	
Can recognize invalid coordinates	Time to recognize invalid coordinates	Time < 10 seconds	Time < 5 seconds	
Can determine its direction	Difference in degrees of where the robot is facing versus where it thinks it is facing	Degree difference is less than 30 degrees	Degree difference is less than 10 degrees	
Can receive GPS coordinates	Time to receive and display GPS coordinates	Takes less than 10 seconds to receive and display the correct GPS coordinates	Takes less than 5 seconds to receive and display the correct GPS coordinates	