

This work presents a design of an indoor/outdoor SLAM technique combined with navigation for mobile robots. The system does not use any external beacons and relies on only one 2D range finder. This work focuses mainly on an implementation of already established algorithms which were significantly improved (which in effect helped also to overcome the set sensory limitations). To localize the robot and create a map of an unknown environment, we are using a variant of a Rao-Blackwell's particle filter. We also present techniques for navigating in the map and recognizing terrain types. The method for recognizing terrain types creates a much more unique map and also improves the outdoor localization. The outdoor environment that we focused on are city parks where the robot has to stay on designated paths.