Object Position and Orientation Tracker

The purpose of this project is to develop a tracker that can determine the exact position and orientation of object in a predefined area. This has applications for such things as locating objects in a room and determining what a person is looking at depending on their orientation. Other applications include wall detection for when an object is too close to a wall, or area detection for when an object is in a predefined area.

This project will model these scenarios through the use of a remote controlled car as the object to be detected. The car will be placed in a box to simulate the room. The setup of the model will include 3 receiving sensors that will receive and record signals from emitted from the car. The car will be equipped with two emitters, one in the front and one in the back. By analyzing the time delay between when signals are received at each receiver, the exact position of the emitter can be determined. Since the two emitters will be emitting at different frequencies, it will be possible to differentiate between the front and the back and thus be able to determine orientation.

Once the locations of the emitters are determined in relation to the emitters, the position of the object can be displayed on the screen as an object in a rectangle that is facing in a certain direction. By analyzing the position of the object, it is possible to determine the distance to a wall or objects scattered throughout the area such as "mines" and can then emit a warning. It is also possible to define an area such that a user will be notified if the object enters the area.

Other potential applications for this project would be defining a virtual racecourse that the object must follow by staying in the computer-defined area.