

# Autonomous Vehicle Sensor Data Processing to Enable Control of Material Handling Equipment

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## Abstract

In this project, a multi-sensor system that will be attached to a robot for navigation. The sensor system will collect and process data to navigate the environment by the robot. The essential features of the project are how the sensor system will interpret the environment data; how it will parse and pull valuable information out of the data streams.

## Introduction

Currently on the market there are a variety of robotic kits that turn manual robots into Autonomous Guided Vehicles (AGV). These robots are the future of warehouse loading/docking and transportation within warehouses and construction environments. UniCarriers Americas came to the team to get assistance in making their own version of an autonomous robot kit.



## Methods and Materials

**ROS:** A flexible framework for writing robot softwares.

**-RViz (ROS Module):** RVIZ is a configurable 3D visualization tool for ROS applications.

**Intel RealSense Camera:** A device designed to give machines depth perception capabilities and much more.

**Toposens 3:** This sensor provides similar data as the RealSense camera: 3D depth data.

**ABS-Like Photopolymer Resin:** Used for creating Sensor Module Housing.

**Turtlebot:** A testing robot that will carry all the listing components.

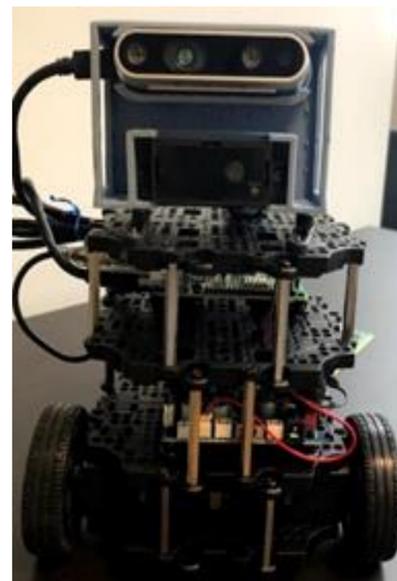


Figure 1:  
Integrated Sensor Module + Testing Unit

## Results / Discussion

**TopoSens 3 Sensor:** The data points that were gathered revealed to be flawed. External high frequencies caused false data points to appear within the ultrasound map.

**Intel RealSense Camera:** internal testing revealed that a realistic range for this sensor was around five meters; with any practical data being only generated when the sensor was within two to three meters away.



Figure 2:RBC Data Stream

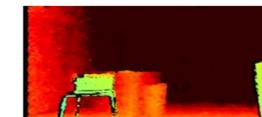


Figure 3:Depth Data Stream

## Conclusions

Our goal is to create a system that can turn manually controlled vehicles into fully autonomous vehicles. This project brings together two different types of sensors to create a more accurate representation of the surrounding environment.

## Acknowledgements

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