

# UGV Assisted Navigation

## UGV Assisted Navigation for Off-Highway Environments

Unmanned Ground Vehicle (UGV) Assisted Navigation is a navigation system for UGVs in off-highway environments. The technology locates the position and orientation of a UGV as well as presents to a UGV a path and trajectory to navigate.



### Overview

UGV Assisted Navigation offers a navigation system for UGVs in off-highway environments such as agricultural plantations, construction sites and mining quarries. It provides accurate and reliable position and orientation information of a UGV. It also presents an optimised path and trajectory information for a UGV to navigate from an initial location to the desired destination.

### Features

UGV Assisted Navigation provides the following features:

- Responsive Control Mechanism**  
 A responsive control mechanism (throttle, steering and braking) for a wheel-based mobile robot's velocity while maintaining stability.
- Localisation Mechanism using Sensor Fusion**  
 A localisation mechanism using sensor fusion technique (Global Navigation Satellite System (GNSS) and Real-Time Kinematic (RTK), Inertial Measurement Unit (IMU), and visual odometry) that is accurate and reliable for position and orientation.
- Navigation Planning Mechanism**  
 An optimised navigation mechanism (computational efficiency, path length, smoothness and safety) that uses occupancy grid mapping, path and trajectory planning techniques.

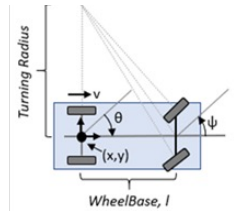
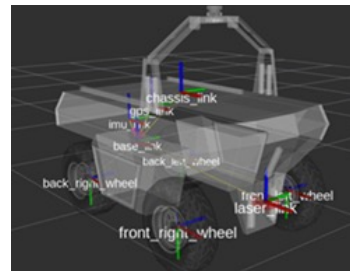
### Technology Benefits

The main impact of UGV Assisted Navigation is:

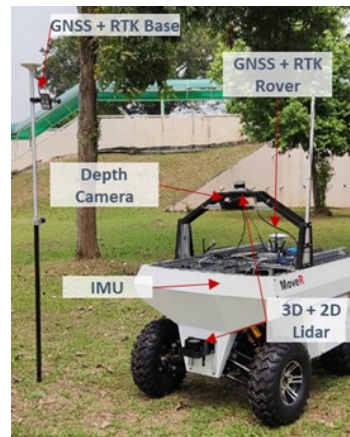
- Integrated Navigation System for UGV**  
 An integrated navigation system that provides accurate and reliable position and orientation of a UGV, and optimised path and trajectory for a UGV to navigate in off-highway environments.

### Applications

UGV Navigation for Off-Highway Environments: Agriculture, Construction, Mining



Ackermann Kinematic Model



UGV Assisted Navigation model, system and navigation

