

Autonomous Vehicle (AV) Project Progress Summary

January – April 2025

Project Initiation

- Inspired by the 2024 FSAE competition, I proposed the launch of our club's first autonomous vehicle project upon returning to Tasmania.
- Initial resources included a Pandar40P LiDAR and a single laptop. Despite limited hardware, I began laying the foundation for AV development.

System Setup & Configuration

- Installed and configured **Ubuntu 18.04** with **ROS Melodic**, **RViz**, **CARLA**, and **LeGO-LOAM** for LiDAR-based SLAM.
- Successfully integrated **Pandar40P LiDAR** with LeGO-LOAM, and initiated 3D mapping using RViz.
- Configured ROS topics to support real-time data processing from LiDAR.

Perception & SLAM

- Developed initial LiDAR-based **SLAM pipeline** using LeGO-LOAM.
- Started building environment maps in both simulation and real-world test environments.
- Integrated basic **cone detection** using vision and LiDAR data.

Simulation

- Built custom simulation scenarios in **CARLA** to test perception and planning algorithms.
- Experimented with sensor fusion approaches within the simulated environment.

Hardware Expansion

- Currently acquiring a **Jetson Xavier NX Developer Kit**, which will support real-time inference and control for the AV platform.

- The Xavier NX will enable object detection, SLAM, path planning, and low-level vehicle control under Ubuntu 18.04 / ROS Melodic compatibility.

Next Steps

- Transition from handheld sensor testing to a **1:10 scale AV prototype**.
- Integrate perception, planning, and control modules on physical hardware.
- Prepare for participation in the 2025 FSAE-A Autonomous Division.







