CAVL4R

Connected & Autonomous Vehicle LIDAR for Road – DfT C-ITS Project

iHUB Oxfordshire

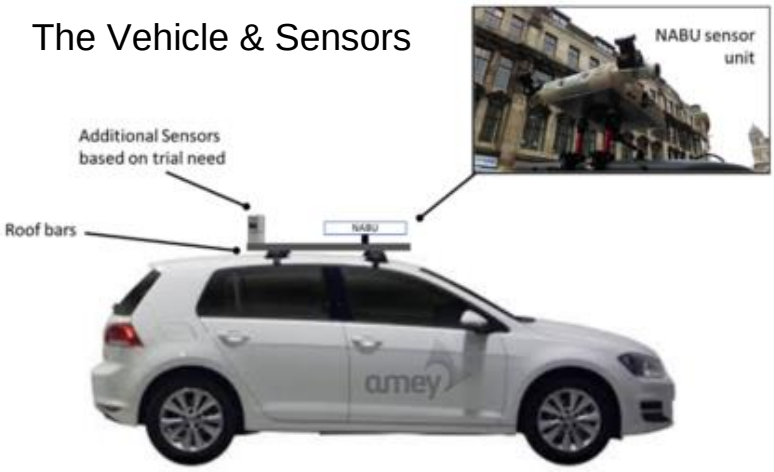
Project Overview

The key aim of the project is to investigate the application of LIDAR and other sensor scans from CAV's to complete key inspection tasks carried out by local authorities. While this data is often collected, it currently must be processed manually and this project will investigate how AI algorithms can be used to automate the process. This is not about creating digital mapping system.

The Three Use Cases

Presence and condition of road markings.
Auditing of regulatory road signs.
Inventory surveys where inspectors record all assets when a new stretch of road is adopted.

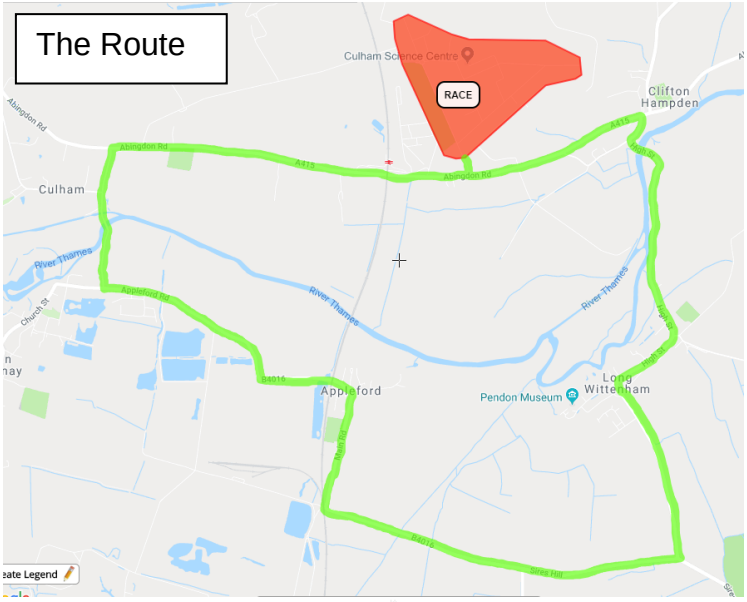
The Vehicle & Sensors



Objectives

- Undertake scans of defined stretches of road at 4 - 6 week intervals.
- Process the data collected and present it in a standard (CSV formal) point cloud map system.
- Compare these scans, across the routes and time series (including against the 2013 data set that will be made available by OCC).
- Identify the assets (Road Marking, Sign or other street furniture)
- Audit the asset (Location, visibility, damage)
- Classify the condition of the asset (how worn, is it twisted, verticality, cracking)
- Produce a synthesised commentary

The Route



Yotta - Horizon example data

OXFORDSHIRE COUNTY COUNCIL · amey · RACE · ORI OXFORD ROBOTICS INSTITUTE · YOTTA FROM DATA TO DECISIONS

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Why CAVL4R

Each use case LIDAR data will be integrated into the existing process to see if it compliments manual exercises with the aim being to identify which areas can be replaced with CAV collected data. This will apply equipment and learning from an existing Innovate UK project (Connected Autonomous Sensing Service Delivery Vehicle (CASS-DV) to test these new use cases. This will be analysed and published in a final report summarising the findings with recommendations identifying which use case shows the greater benefits in relation to use of LIDAR data.

Partner Roles

- Oxfordshire County Council (OCC) are the lead partner and project sponsor.
- Amey (Amey Group Information Services) will lead the delivery of the project and project manage.
- RACE (Remote Applications in Challenging Environments) & ORI (Oxford Robotics Institute) will provide vehicle capable of carrying an externally mounted NABU unit along with another vehicle that has 3 LIDARs as part of its level 4 autonomy and associated mapping capability. Undertake the scans. Process the data collected and present it in a standard point cloud map. Comparing these scans, across the routes and time series with data other data provided by OCC which will feed into the ORI algorithm that auto-classifies anomalies on the highway network.
- Yotta will be importing the LIDAR data into their Horizons database so that data can be styled according to different asset attributes. Classifying the condition of the asset.

Example of the results table

Scenario	Description	Suitability of LiDAR	Justification
Street furniture orientation	Street furniture may become knocked and damaged over time, meaning it is risk to drivers and may not fulfil its purpose (e.g. street signs not displaying key messages).		
White Lining	White lining must be consistent across the network to ensure road safety.		
Inventory surveys	These are completed when a road is adopted by a local authority.		

Example of problem signs