



Planning and Transport Research Centre (PATREC)

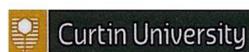
Planning intermodal and general logistics infrastructure for the future needs of Perth:

Telemetry Systems for Tracking Road Freight Activity

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EXECUTIVE SUMMARY

The larger project of which this report forms a part, comprises a suite of related research streams to support the state of Western Australia (WA) and the Westport Taskforce in particular, in the planning for landside logistics infrastructure and services, including a possible new container berth in Kwinana, to support container trade growth. This major long-term infrastructure planning process provides an opportunity for the development of logistics infrastructure including road and rail corridors and terminal facilities to ensure the most cost-efficient and environmentally sympathetic supply chains for businesses depending on imports and exports. Further, it provides the opportunity to consider the impacts of unfolding global trends in logistics and supply chains on the development of port areas and industrial zones throughout Perth. The project also explores the potential to use freight transporters' operational data already being generated via in-cab GPS monitoring systems for public policy purposes, particularly in short-haul urban environments.

The wider project: Planning intermodal and general logistics infrastructure for the future needs of Perth, comprises three components:

- Intermodal Systems for Perth
- Global Supply Chain Trends and Local Perspectives
- **Telemetry Systems for Tracking Road Freight Activity**

This report concerns the third component: Telemetry Systems for Tracking Road Freight Activity, involving the study of road freight movement activity, using GPS fleet management systems, aggregated for mapping and analysis via a software tool developed by the Bureau of Infrastructure, Transport and Regional Economics (BITRE). The aim was to pilot, adapt and test BITRE's methodology for short-haul urban environments to support BITRE's continued national roll-out and to ensure that local WA needs are met in the longer term. Success would enable cost-effective annual or ongoing monitoring of truck movement activity between the major surveys for longitudinal review and modelling

Research question

Can BITRE's YULO software be adapted to monitor trucking activity in short-haul urban environments to supplement major commercial vehicle surveys and inform local and state transport planning and policy?

Key objectives

- To pilot BITRE's YULO software in Perth and adapt the software for local context and specific purposes (Appendix A)
- To test the adapted YULO software using local data (Appendix B)

Key findings

- BITRE's YULO framework is viable for application in analysing short-haul, urban freight activity (Appendix A)
 - YULO is able to succinctly analyse and visualise aggregated and single trip information for use in policy and planning.
 - As part of the adoption of the framework from regional activity analysis to urban / short-haul freight analysis in Perth, the following adaptation were implemented and shared with BITRE:
 - Re-implementation of most of the existing front-end into Python to facilitate faster prototyping

- Creation of a directed road network 'mini-segments' shapefile for better visualisation of urban routes
 - Implementation of directionality of travel on road segments in the Neo4j back-end
 - The ability to save interactive maps as stand-alone files for sharing with stakeholders
 - Development of a weighted routing algorithm
 - Initiated shapefile merge, periodicity mining and top-k paths of length-p algorithms
- The adapted YULO software was tested using GPS data for Oversize-Overmass (OSOM) escort vehicles made available by Main Roads WA, Heavy Vehicle Services (Appendix B).
 - Demonstrated the power of GPS telemetry data-bases for future governmental use in the management of the road network, vehicle registration system and administration of the freight transport industry
 - Specifically for Main Roads WA, this analysis provides pointers as to how the OSOM escort fleet management data routinely produced and stored, might be useful for other purposes, both within the narrow management interest, and into the realm of highway planning.
 - Escort vehicle data is significant, as it provides proxy information on routes taken by a subset of heavy freight vehicles in Perth and WA, as well as details on the performance of vehicles under escort, and the average speeds achievable by freight vehicles on all sections of the highway network.

Key Challenges

The primary difficulty was to source useful data from transport firms, despite their willingness in principle to assist the research. Some of the reasons for this are:

- many firms have no reason to keep trip data for very long
- many firms do not utilise or know how to utilise the full capacity of their fleet management systems
- some systems do not present data in compatible format
- there is little incentive for firms to assist in research in this direction

Acknowledgements

The YULO software framework and methodological information provided to PATREC by BITRE has been critical to the project and the research team is grateful for this assistance from BITRE.

The research team also wishes to thank the Western Roads Federation for their assistance in promoting the research to members and encouraging them to make their data available.

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