Overview
The Intelligent Transport Systems Lab (ITSL) is Victoria’s first dedicated traffic analysis research Lab established in April 2012 through a joint collaboration and partnership between Swinburne University of Technology and VicRoads to:
■ deliver the benefits of technologies and smart information use in the area of transportation, to Victoria and Australia
■ facilitate and foster excellent, industry relevant and cross-disciplinary research in Australia and internationally
■ train the next generation of PhDs and engineers/practitioners in smart transport.

Traffic data is streamed in real time from over 3000 traffic intersections around Melbourne to the ITS Lab at Swinburne. The live traffic data is analysed in order to develop new technology and models to improve traffic flow, and reduce congestion and accidents. This is done via the partnership with VicRoads, and other transportation agencies such as Australian Road Research Board (ARRB). ITSL research outcomes are used to inform the road authorities about viable solutions to combating congestion by developing new and innovative control strategies for urban traffic management and technology-driven smart travel by users, to create a sustainable future transport network.

Our research focus
Our research activities are divided into three key areas:

**Intelligent Transport Systems** – applications of smart information use to reduce congestion, provide better network utilisation and environmental sustainability

**ITS Infrastructure** – performance evaluation of infrastructure used to support ITS applications, their optimal design and robust operation including scalability, quality and security

**Big Data Analytics** – data intensive systems, data mining, knowledge discovery and big data visualisation to support better, more efficient operation and management of urban traffic networks and road user supports such as real time route guidance.

Industry involvement
The Lab has established collaborative research programs with the following institutions and organisations:
■ VicRoads
■ ARRB

ITSL is open to partnership opportunities with other interested stakeholders in the development of Intelligent Transport Systems and Smart Infrastructure.

Collaborations
The centre maintains links with a number of universities and research organisations including:
■ Technical University of Delft (TU Delft, The Netherlands)
■ University of Amsterdam (UvA, The Netherlands)
■ Institute for Transport Studies, University of Leeds (UK)
■ Northland Advanced Transportation Systems Research Lab, Univ. Minnesota Duluth (USA)
■ City University of Hong Kong (CityU, Hong Kong, China)
■ Smart Transport Research Centre, Queensland Univ. of Technology (QUT, Australia)
■ University of Melbourne (Australia)
■ Monash University (Australia)
Recent Projects

Urban traffic control and management
The Praktijkproef Amsterdam (Field Operational Test Integrated Network Management Amsterdam, referred to as PPA) is one of the first large-scale FoTs testing coordinated network-wide deployment of traffic management in practice. After a successful Proof-of-Concept in 2009, in 2013 the first part of the concept approach has been tested in the field. Currently, work is in progress for a full deployment of the framework for the city of Amsterdam. Led by Professor Serge Hoogendoorn and his Transport and Planning Group at TU Delft (the Netherlands), the Integrated Network Management (INM) framework has been developed in the last several years with the aim of improving the effectiveness of deploying traffic management measures in an integrated and coordinated way within a large scale regional (urban and freeway) network.

In 2013, a feasibility study of the above INM framework for the Melbourne urban network has been conducted, under the joint supervision of Professor Vu and Professor Hoogendoorn, with staff and traffic engineers at VicRoads and ARRB. The outcomes point to a significant reduction in network travel times and congestion, when applying the framework to a small selected area (City of Stonington) in Melbourne. The continuation of this project during 2014 is currently funded by ARRB, for the development of better and more efficient real-time network performance evaluation methods, utilising traffic data from multiple sources.

Bus tracking system
Swinburne is developing a bus tracking system with a base level capability to provide near real-time position GPS data on city buses. The data will then be used for application on a mobile phone app that provides users with an overlay of where the next bus is relative to their desired destination and nearest bus stop. Further application of the GPS data is expected to be utilized with the addition of OBD data for fleet management and traffic congestion information applications. The project is part of the recently signed Memorandum of Understanding between Swinburne and Malaysia Automotive Institute (MAI), ARCA Corporation Sdn Bhd and AutoCRC Ltd, to develop and manufacture electric buses, lithium ion batteries and a commercial vehicle tracking system.

Swinburne ITS testbed and demos
Swinburne students have developed and successfully demonstrated – through final year student capstone projects – fast, reliable vehicle-to-vehicle communication where connection has been established and maintained between two fast moving cars going in opposite directions. Another noticeable success was the creation of the Swinburne Traffic Watch webpage that reports in real time traffic incidents by collecting and analysing a mass amount of tweets on Twitter. Links to demo videos and the webpage can be found here https://sites.google.com/site/profhailvu/videos

Education
ITSL facilitates and offers an ideal environment to train the next generation of PhDs and engineers/practitioners in the field. A number of PhD research projects in Intelligent Transport Systems have been completed and more are in progress. The centre will be facilitating a joint (cotutelle) PhD degree between TU Delft (The Netherlands) and Swinburne University of Technology (Melbourne, Australia) in this area.

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ITS Lab home page

Personal home page

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