

High-tech sensors successfully monitor traffic in Australia

In late 2013, VicRoads, the state of Victoria's DOT, teamed up with Laser Technology Australia (LTA) to launch a traffic technology test site on Melbourne's M80 ring road. The aim was to validate the accuracy of the various sensors being used on the road network, which feed data to the DOT's central STREAMS traffic management system. This 38km-long stretch of freeway around Melbourne links with various other freeways and arterial roads in Australia's second-largest city.

An overhead gantry was selected that spanned five lanes and afforded good access to mount several sets of Laser Technology's TruSense T100/T200 lasers. LTA was also commissioned to write custom software that would take in data from the TruSense T-series and compare it with data collected by other sensors, which included in-ground studs, microwave sensors and infrared across-the-road beams.

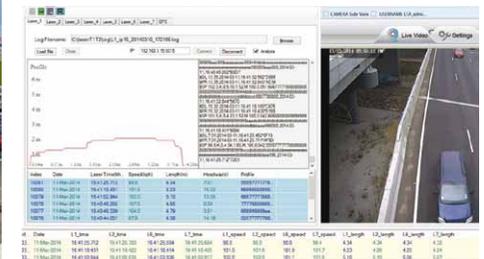
Initially, multiple sets of LTA sensors were installed over a single lane to compare different baselines, and their effect on the measured speeds and vehicle lengths. The dual TruSense laser systems had baselines between 1.8m and 3m, and were configured to capture vehicle speeds within 0.1km/h (0.06mph). The sensors also measured vehicle length and profile, and the traveling distance between vehicles (headway) to centimeter precision, with the sensors pulsing up to 25kHz. The occupancy of each lane was then calculated based upon the measured data.

Accuracy and reliability

The test concluded that LTA's laser sensors were very accurate



(Above) The dual sensors provide highly accurate measurements
(Left) The technology is installed on a gantry
(Below) Remote monitoring and analysis



Need to know

A dual-laser system gathers highly accurate vehicle data on the M80 in Melbourne

- LTA is currently testing a new sensor that uses the company's proprietary algorithms to track vehicles through an optically enhanced 'beam' pattern, capable of covering an entire single lane and measure ranges and speeds
- The advantage of having the measurements made at closer proximity is the potential to integrate with ANPR and speed cameras

in detecting the leading and trailing edges of vehicles. As a result of the laser system's dual sensors, it was able to calculate the required parameters at a higher degree of accuracy than others previously used.

The LTA system was to be used as a benchmark from which to compare other sensors and was itself to be validated using a high-speed video to verify speed, length and headway accuracy. Since the lasers could also measure range very precisely, a series of rapid pulses was recorded to create a visual profile of each vehicle in real time.

IP video cameras were installed above each lane and connected through a hard-wired Ethernet network to a 4G wireless modem, enabling remote monitoring of the site. Engineers could view a live feed of traffic passing under the

lasers and see the corresponding profile appear on their PC, with length and speed data.

The lasers have been in operation since late September 2013 and have not skipped a beat, detecting approximately 100,000 vehicles per day on the M80 ring road at typical speeds of 100km/h (62mph). The project is ongoing and VicRoads hopes to use TruSense over the next five years to evaluate various new technologies before making a commitment to implement them into their road network. Reliability and accuracy are critical. LTA's sensors have proven to deliver a high level of reliability and precision. ○

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