National Motor Vehicle
Theft Reduction Council

13 December 2007

The Research Director
Travelsafe Committee
Parliament House
George Street
BRISBANE QLD 4000

Submission to the Enquiry into Automatic Number Plate Recognition (ANPR) Technology

Introduction

This submission is made to the Travelsafe Committee by Raymond Carroll, Executive Director of the National Motor Vehicle Theft Reduction Council who is authorised by the Council to make submissions on its behalf. It is made to provide the Committee with the Council's perspective on the utility of ANPR technology in the deterrence and detection of motor vehicle theft. It also provides the Committee with information on an ANPR related trial the Council is currently undertaking in conjunction with the New South Wales and Victoria police services.
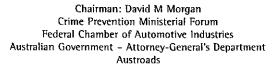
Organisational background

The National Motor Vehicle Theft Reduction Council (NMVTRC) was established by all state and territory governments and the insurance industry in 1999. Its charter is to facilitate infrastructure reforms that are designed to reduce the level of motor vehicle theft in Australia. The Council has representation from the peak national bodies of insurers, police services, transport agencies, motor companies, motor trades, motoring associations and state and Commonwealth governments.

The NMVTRC's work program includes identifying and facilitating improvements to Australia's registration systems, the national exchange of vehicle related information, motor vehicle design, policing practices, insurance practices, motor trades practices, young offender diversion programs and public education. The Queensland Government, Queensland Police and Queensland Transport are very strong supporters of the NMVTRC and its work programs.

Relationship of Vehicle Theft Reduction to the Travelsafe Terms of Reference

As well as imposing a financial and emotional cost on the community vehicle theft also has significant implications for road safety through the reckless driving of stolen cars including placing police and the community at risk during dangerous pursuits. Nationally, on average 25 people are killed each year in stolen vehicle related incidents. Of these, 21 will be either the

driver or a passenger in the stolen car and 4 will be innocent motorists or pedestrians[1]. While records of stolen vehicle related road injuries are not kept they are believed to be in the hundreds each year.

Another often overlooked road safety aspect of vehicle theft is the unsafe rebuilding by criminals and unlicensed or "backyard" vehicle repairers who strip stolen cars to re-instate written-off vehicles that are subsequently on-sold to unsuspecting motorists. These vehicles very often have superficial and cosmetic repairs that allow them to pass standard road worthiness inspections but mask serious structural defects that can lead to increased risk of accidents and serious injury.

Vehicle theft peaked in Australia in 2001 with 127,288 passenger and light commercial vehicles reported stolen. By 2006 this had been reduced to 64,131, a 49% decrease. The number of stolen and not recovered vehicles; which is the broad benchmark used to gauge the level of activity of profit motivated thieves, have reduced from 15,292 to 12,356, a decrease of 20% in the same period.

Reducing the overall level of vehicle theft further reduces the potential for stolen vehicle related deaths and injuries and helps to create a safer motoring environment. Reducing profit motivated theft by implementing barriers to the re-registration of unsafe re-built written-off vehicles provides motorists with greater protection from buying unsafe vehicles from fraudulent sellers.

Assessing the In-field Role of ANPR in Reducing Vehicle Theft

One of ANPR's cited policing applications is to identify stolen vehicles[2]. From the NMVTRC's perspective there are two key aspects of assessing the role of ANPR for this application. The first is the technical capability of the various technologies deployed and these are discussed later in this submission. The second is the in-field application of the technology and the challenges that are imposed by the dynamics of vehicle theft as opposed to the broader range of traffic enforcement applications where the registered operator is in charge of the vehicle. A short overview of these situational challenges follows to provide context for the NMVTRC's ANPR project aims.

Opportunistic Theft: Opportunistic theft is characterised by the short term theft of a vehicle for use in either joyriding, simple transport or the commission of another crime. While an opportunistic thief may have a preference for a particular make and model vehicle the selection of the actual vehicle is most often at random and subject to "opportunity" such as finding an unsecured vehicle of choice in a location and at a time the thief wants it. The sheer volume of older unsecured vehicles on Australian roads (approximately 6 million) means that opportunity

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[1] National Coronial Information Service 2005.

[2] Parliamentary Travelsafe Committee Issues paper No.12

almost always exists. An opportunistic thief is not stealing the vehicle for its intrinsic value as either a whole vehicle or as parts and will abandon the vehicle when he is finished using it. Increasingly, opportunistically stolen vehicles are being burnt when abandoned in order to avoid fingerprint and DNA traces. Around 75% of all theft is classified as opportunistic.

Profit Motivated Theft: By definition, profit motivated theft is stealing a vehicle for its value; either as a whole car that is re-identified and on-sold, to re-build a written-off vehicle, to sell the separated parts or for export. Profit motivated thieves are generally more discerning in regard to the vehicle they want to deal in and are more deliberate in their planning, execution of the theft and their conversion methods. Cars stolen for this purpose are on balance newer, more valuable and more secure than opportunistically stolen cars. Theft methods most often include theft of the owner's keys and transponder, gaining fraudulent access to the vehicle, such as test drives, towing the car away, or in small but increasing numbers, using threats or violence against the driver. While profit motivated theft makes up only 25% of total theft volume it accounts for more than 50% of the cost.

The major challenge for the utility of ANPR technology as a deterrent or detection tool for either of the theft motivations is the relatively short period of time that the vehicle is driven by the thief with its original number plates in place and the need to intercept the vehicle to identify the driver.

In many opportunistic thefts vehicles are deliberately stolen in circumstances where the thief expects to use and abandon the vehicle before the owner has had the opportunity to report it stolen. A common example is a vehicle that is stolen in the morning from a transit car park and used to commit daylight house burglaries. Similarly, joy riders will steal a car from a residential street late at night in the expectation that it won't be missed until morning. In all of these types of scenarios it is far more likely the vehicle will come to police notice because they observe reckless or suspicious driving behaviour and ANPR could be expected to have very limited detection and deterrence outcomes.

In profit motivated theft the thief will take a much more deliberate approach and will plan to have a very short period of time driving or transporting the vehicle before hiding it. If the vehicle is taken from a situation where the thief knows there will be a time delay in reporting he may leave the number plates intact, however if he believes the car will be reported immediately he will most often change or disguise the number plates within a few minutes of taking the car.

Of course incidences do occur where a stolen vehicle will be promptly reported stolen and it may be entered on the police data system while still in possession of the thief. Paradoxically, if ANPR did lead to an increase in on-road identification of these vehicles it would have serious implications for police pursuit policy and for community road safety as the likelihood of pursuits taking place would increase proportionately.

The NMVTRC's ANPR Project

Encouraging an improved strategic police response to vehicle crime in local areas is an important part of the NMVTRC's work program. Notwithstanding the limitations surrounding the conventional use of ANPR as a theft deterrent and detection tool, the NMVTRC is presently engaged in an ANPR trial in conjunction with New South Wales and Victoria Police. The theory being tested in the trial is that an improved version of ANPR can be used to elicit intelligence and tactical information regarding the activities of organized profit motivated theft rings that can subsequently focus other enforcement/disruption action such as business premises inspections and ultimately assets seizures as an alternative to traditional 'long tail' resource intensive investigations.

The NMVTRC's Assessment of Existing ANPR

Forms of ANPR technology have been used in Australia since the mid-1990s. The first significant example was Safe-T-Cam developed for the NSW Roads and Traffic Authority (RTA) by the CSIRO. The system was designed as a heavy vehicle compliance tool—checking speed (including average speed between camera locations), driving hours and route access control.

Based on video optical character recognition (OCR) the system now has an extensive network of cameras in NSW and South Australia. However, current systems are dependent upon expensive camera hardware and site protection (against malicious damage) and are subject to high error rates in certain environmental conditions.

More recently tolling systems, which use video capture as a back up to electronic tag detection, have become increasingly common as part of new road developments in eastern Australia. However, they too are prone to relatively high error rates due to the duplication of number plate character sets between jurisdictions and their inability to successfully read the state/territory identifier on the plate.

Finally, fixed and mobile ANPR technology is increasingly being used by police and transport agencies to detect unregistered and other vehicles of interest but have again been limited in their application by their generally narrow *field of view* and other environmental considerations. NSW Police deploy an extensive network of cameras across Sydney for operational purposes.

Trial of New ANPR technology

The NMVTRC's project is aimed at examining the utility of ANPR technology in a car crime setting utilising an experimental system of ANPR that is being developed by SenSen Networks (formerly a commercial arm of the University of Technology Sydney).
The SenSen system utilises *off-the-shelf* wireless camera and processor hardware (which is substantially lower cost than existing system hardware) and is supported by sophisticated fuzzy logic software dubbed by SenSen as *Data Fusion*.

The proposed benefits of the SenSen system over existing technology are that it offers greater operational flexibility by being capable of functioning effectively under ambient street lighting without the need for infra-red or other low light support and importantly, managing character image aspect ratios so that the plate will be detected anywhere in the camera's field of view rather than having to track through a narrow 'channel' in order to be detect the plate. It is also capable of reading multiple plates within its field of view, such as a tow truck and the vehicle it is carrying.

SenSen claims that the system is ultimately capable of being fine tuned to read the plate's state or territory designator (which conventional traffic cameras cannot) and even vehicle badges to confirm make and model.

Trial sites have been selected in New South Wales and Victoria on the basis of a high suspicion of organised car crime activity. Covert deployment will be used to detect vehicles of interest and patterns of movements of other vehicles such as licensed tow trucks, car carriers etc. It may also be deployed in areas where car burning has become an issue by detecting vehicles used for transport from the scene.

In its initial phase the trial will be used to evaluate the technical proficiency of the system—ie what percentage of vehicles passing monitored sites is conclusively identified, what environmental factors such as lighting and weather conditions have on accuracy rates etc?

The second phase of the evaluation will be to gauge the intelligence value of tactical information that is collected and its application to vehicle crime investigation. The results of the trial will be disseminated to all police services.

Timelines

Off-site develop is underway. Full field trials in both jurisdictions will commence in mid-January 2008 and operate for 3 months. A final report on the trial is expected in June 2008.

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