Point-to-point speed enforcement: Recommendations for better practice

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Overview

- The problem of speeding in Australia
- Point-to-point speed enforcement
- Research methodology
- Recommendations of the research
  - Operational, technological, legislative and privacy, public education, evaluation
- Conclusions

Speeding in Australia

The Speeding Problem

- Positive relationship between speed and crash risk/severity (Aarts & van Schagen, 2006; Kloeden, McLean & Glonek, 2002)
- Speed variability also associated with increased crash risk (Transportation Research Board, 1998)
- A pervasive behaviour in Australia, a major contributor to traffic crashes and related trauma (Australian Transport Council, 2011)
- Arguably, socially acceptable, particularly at low levels over the speed limit (Ipsos Social Research Institute, 2013; Fleiter & Watson, 2006; Hatfield & Job, 2006)
- Punishment avoidance strategies means innovative speed enforcement approaches are continually needed

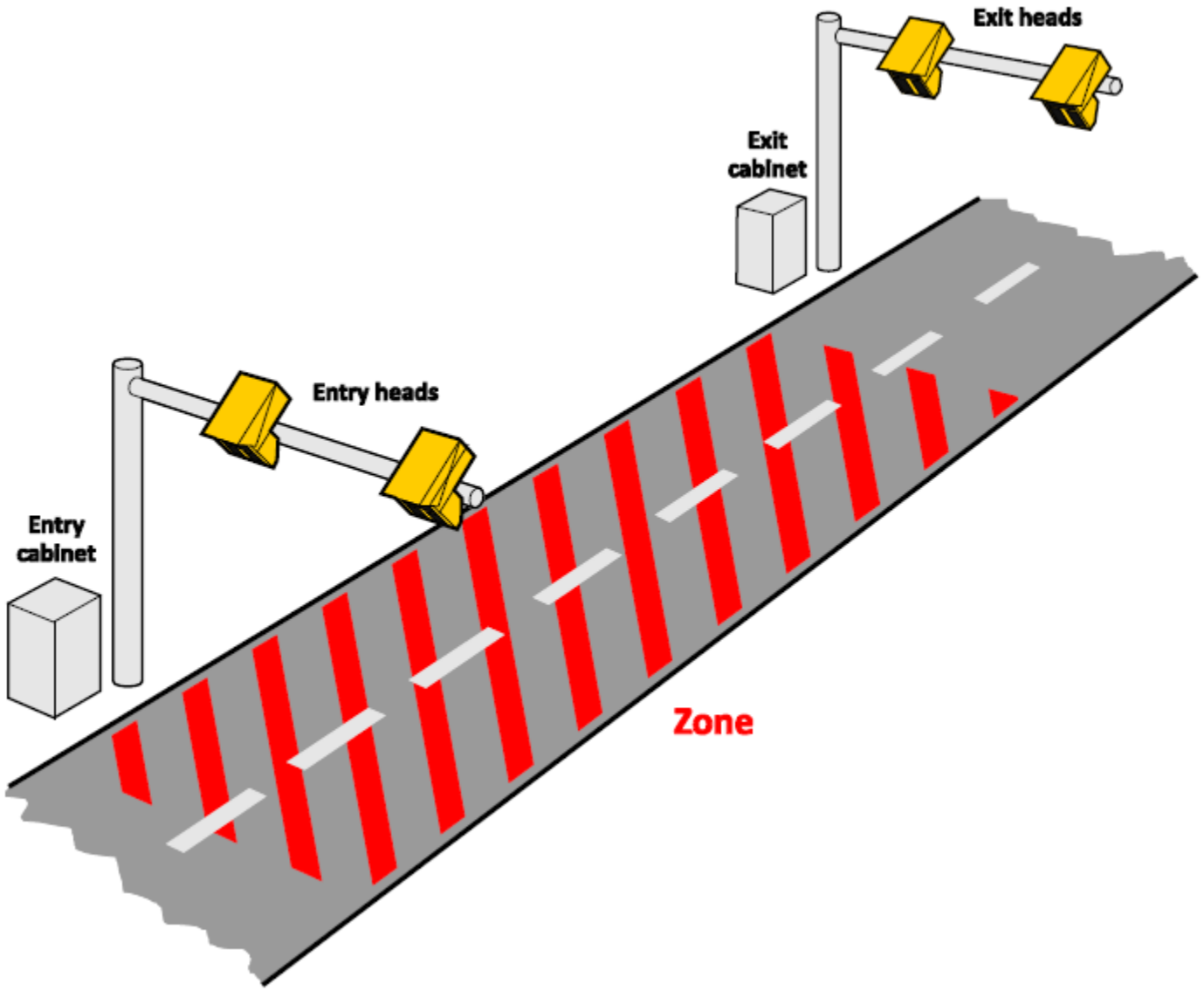
Point-to-Point Speed Enforcement

Where Is It Used?

- Relatively new approach to Australia and New Zealand
  - Currently operates in Vic, Qld, ACT, SA, NSW (heavy vehicles only) and New Zealand
- More extensively used in the UK, Netherlands, Austria, Italy and some other parts of Europe
- Commonly referred to as ‘average speed enforcement’ or ‘section control’

How It Works?

- At its most basic, a point-to-point system involves:
  - Two or more camera sites along a section of road
  - Cameras may be forward or rearward facing (or both) depending on system requirements
  - Image and vehicle registration data collected at each point and matched using ANPR technology
  - Local processor > Communication network > Back office
  - Average speed calculated by dividing distance between two camera sites by time taken to travel that distance



Source: RedSpeed International

What it aims to do

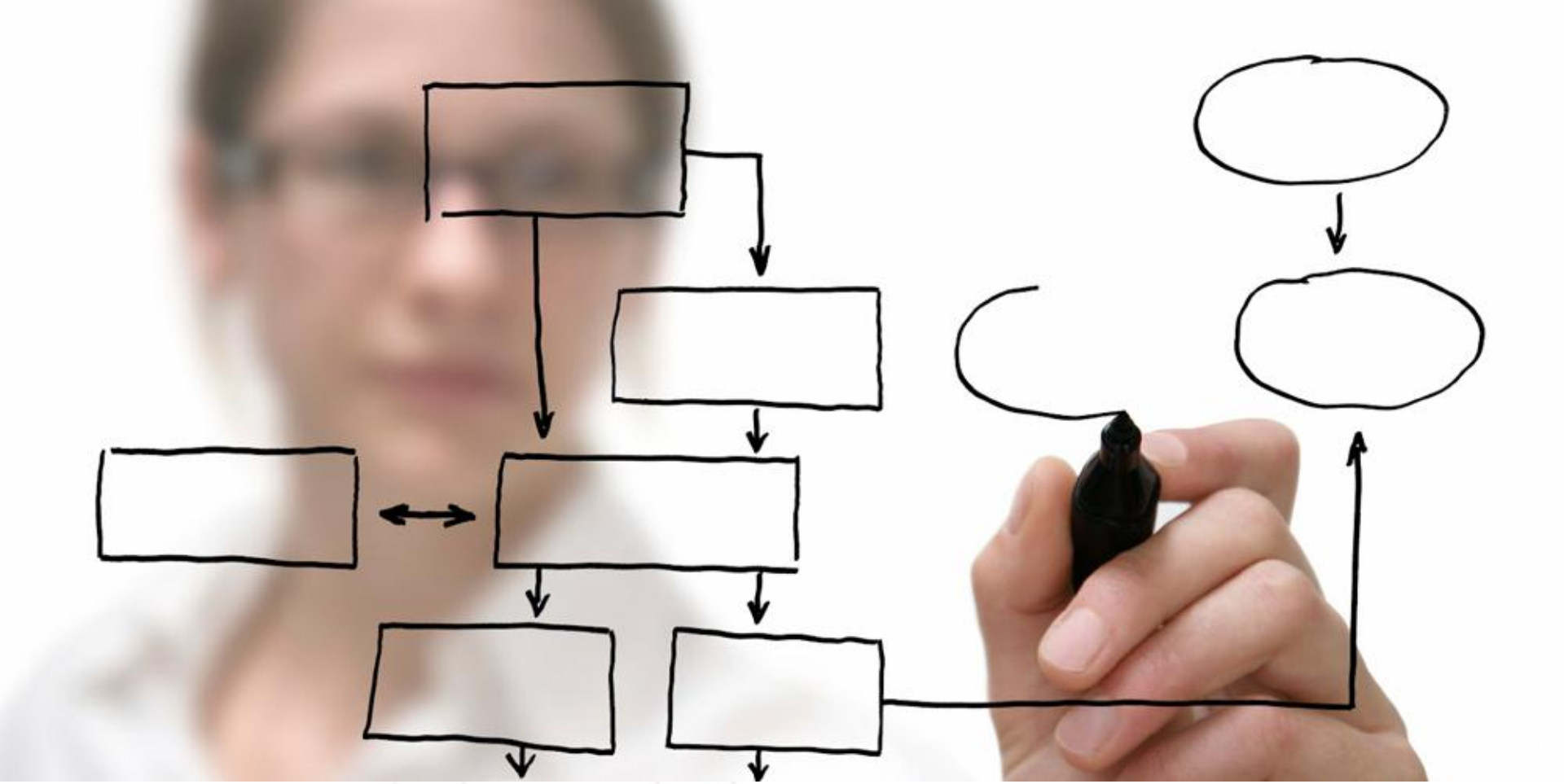
- Promote reductions in speed over longer road sections
- Achieve greater network-wide effects than cameras that measure instantaneous speeds

What the Research Says

- Reductions in vehicle speeds, especially high-range speeding (Barker, 2005; Cascetta & Punzo, 2011; Charlesworth, 2008; Stephens, 2007)
- Reductions in speed variability (improved headway) (Charlesworth, 2008)
- Reductions in fatal and serious injury crashes (Galata, 2007; Punzo & Cascetta, 2010; Speed Check Services, 2009, 2010)
- Homogenised traffic flows (Cascetta, Punzo, & Montanino, 2011; Collins, 2007; Koy & Benz, 2009)
- Reductions in vehicle emissions and noise (Stoelhorst, 2008 ;Thornton, 2010)
- High rates of driver acceptance (Crawford, 2009; Schwab, 2006; Walker et al, 2009)

Status of Current Research

- No evaluations from Australia or New Zealand to date
- Majority of empirical research from UK, Netherlands, Austria, Italy & France
- Poor methodological rigour common
  - Comparison/control sites not used
  - Confounding factors rarely controlled for (exposure, regression-to-the-mean)
  - Statistical significance testing typically not performed
  - Some non-independent studies conducted by equipment manufacturers
- However, consistent positive effects are encouraging



Research Methodology

Stakeholder Consultations

- A total of 46 stakeholder organisations
  - Face-to-face, telephone, survey
  - 24 from Australia & New Zealand
  - 22 international (UK, Netherlands, Austria, Italy, France, Finland, Switzerland, Belgium, Slovenia)
- Organisations included:
  - Police agencies, transport and highway authorities, motoring groups, manufacturers of speed detection equipment, other road safety research centres, and measurement and privacy departments within government

Working Group

- Full-day working group
- Involved key Australian and New Zealand stakeholders
  - Police agencies
  - Transport and highway authorities
- More in-depth discussion of issues emerging during the stakeholder consultations

Operational Recommendations

Operational Recommendations

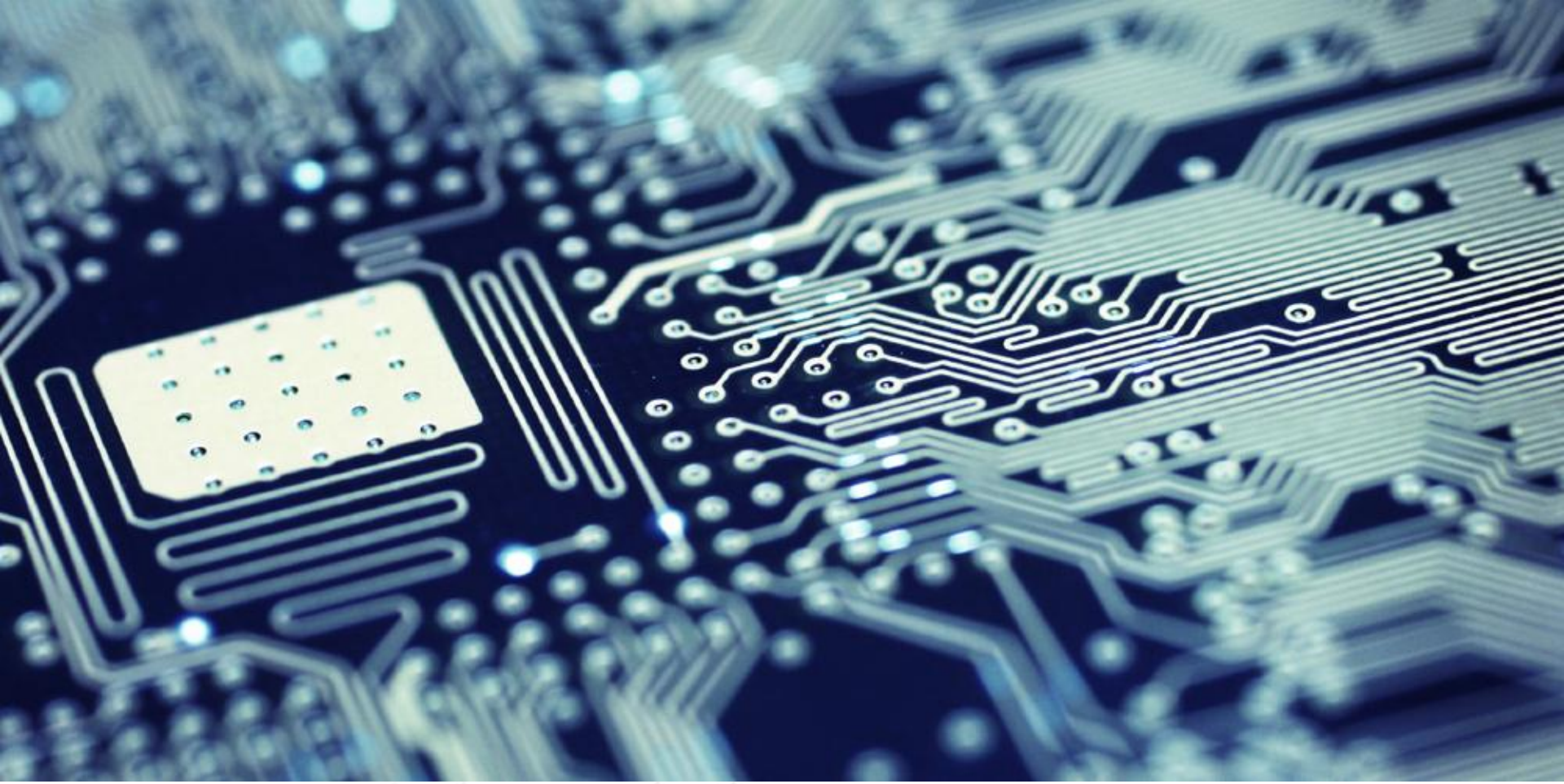
- Site selection based on strict criteria
  - Speed-related crash history across a section of road as a minimum
  - Proactive identification of potential crash sites (eg new residential/business developments)
  - Locations where other enforcement not safe/viable (eg tunnels)
- Complementary rather than a replacement for existing methods

Operational Recommendations

- Not a long-term alternative to addressing underlying road design or maintenance issues
- Other enforcement activities within the enforced section should continue
- Jurisdictions responsible for own policies on enforcement tolerances & multiple infringements

Operational Recommendations

- Continue to operate overtly
  - Advance signage; additional signage within long enforcement corridors
  - No signage at end of enforcement corridor may increase deterrent impact
- Enforcement corridors should have:
  - Minimal opportunities for access and egress
  - Relatively high traffic volumes
  - No foreseeable major infrastructure changes (need to resurvey shortest practicable distance)
  - Minimal impact on other parts of the road network



Technological Recommendations

Technological Recommendations

- Camera mounting approach should maximise capture rates and minimise disruption during maintenance
  - Above lanes (e.g., on a gantry) is best or high side-mounted poles
- Cameras:
  - Should monitor all lanes (incl. emergency lanes)
  - Both rearward and forward facing if feasible, or choice based on requirements
  - Plate camera at minimum; scene camera if feasible (can provide verification for evidentiary purposes)
  - Monochrome digital cameras with infra-red flash

Technological Recommendations

- ANPR processing conducted at camera site
  - Only data on offending vehicles transmitted to the back office
- Appropriate security protocols required to ensure data being transmitted is safe
- All infringements data should be manually verified at the back office – systems should not be fully automatic

Legislative/Privacy Recommendations

Legislative/Privacy Recommendations

- Prescribed device
  - Equipment approved and gazetted
- Prescribed process
  - Approval of formula to calculate average speed
  - Collection of data from multiple detection devices
  - Average speed as prima facie evidence of actual speed

Legislative/Privacy Recommendations

- Shortest practicable distance
  - Measured independently by a certified surveyor
  - To traceable national standards
  - Re-surveyed following changes to road alignment
- Regular clock synchronisation
  - To a common traceable time source
  - Secondary reference system (to ensure accuracy and safeguard from malfunctions)

Public Education Recommendations

Public Education Recommendations

- Public education campaigns should focus on:
  - How the systems operate
  - How many systems are operating in a jurisdiction
- Should highlight P2P is an effective approach for dealing with persistent, intentional speeders
- While P2P often perceived by drivers as a “fairer” approach, this term should be avoided as it suggests other speed enforcement approaches are unfair

Evaluation Recommendations

Evaluation Recommendations

- Evaluation is critical
  - Very few rigorous evaluations conducted to date
- Evaluations should be costed into plans to implement P2P systems
  - Outcome; process; driver acceptance; cost-effectiveness
  - Matched comparison sites; statistical significance testing; control for confounding factors; sufficient baseline and follow-up data periods

Conclusions

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- P2P often seen as a “fairer” approach – scope to improve overall community acceptance of speed enforcement activities
- Determining how P2P fits into the speed management strategy will differ in each jurisdiction
- Existing research supports increased implementation of P2P systems

Conclusions

- Mobile P2P systems represent a new approach that should be explored further
  - Used for temporary purposes (e.g., roadworks)
  - Scope to increase the general deterrent impact of traditional mobile speed cameras

Future Research

- Must improve scientific rigour of evaluations
- Investigate:
  - impact of P2P across the entire road network (e.g., halo effects)
  - utility of mobile P2P systems
  - utility of P2P systems in urban & residential environments

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