NEXT GENERATION INFRASTRUCTURE FOR AN INTELLIGENT MOBILITY FUTURE

MICHAEL CALTABIANO

arrb YOUR NATIONAL TRANSPORT RESEARCH ORGANISATION


SHAPING OUR
TRANSPORT FUTURE

ADVI - Australian Driverless Vehicle Initiative

OUR VISION:

To accelerate the safe and successful introduction of driverless vehicles onto Australian and New Zealand roads.

Australia & New Zealand Driverless Vehicle Initiative

ADVI PARTNERSHIP | June 2018

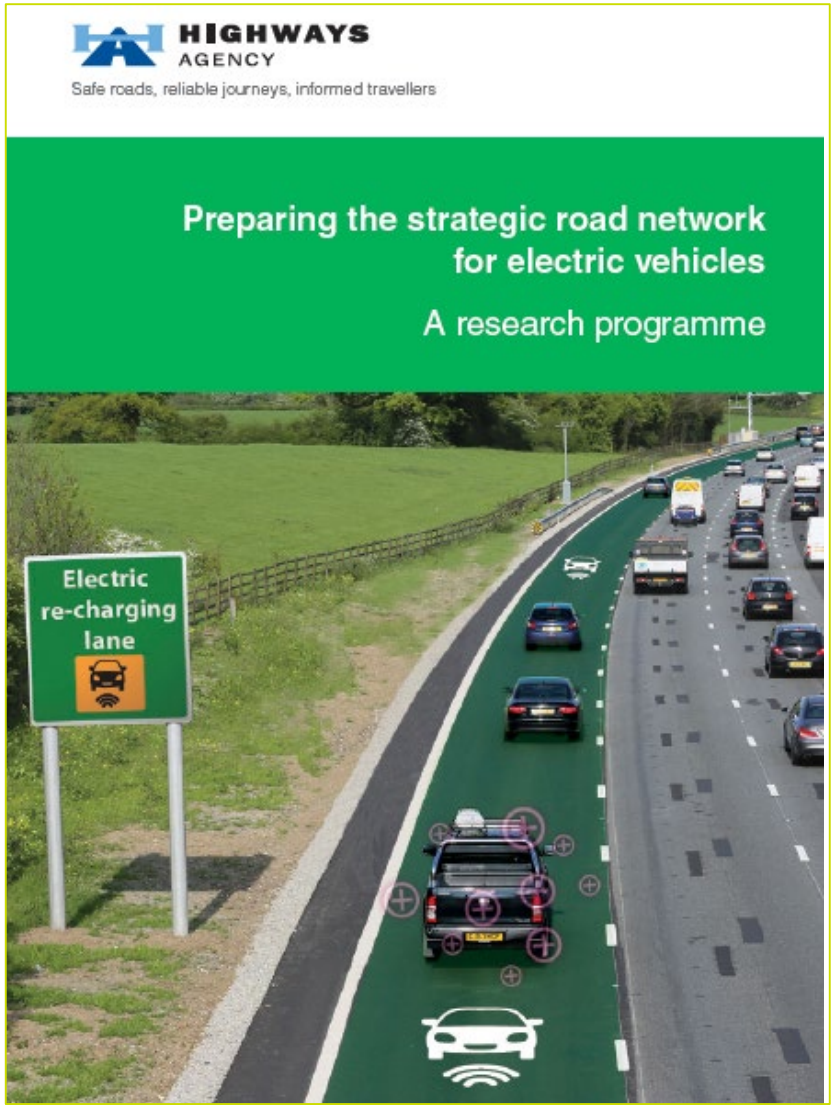
Infrastructure demands are going to change

IT'S TIME FOR A "RESET"

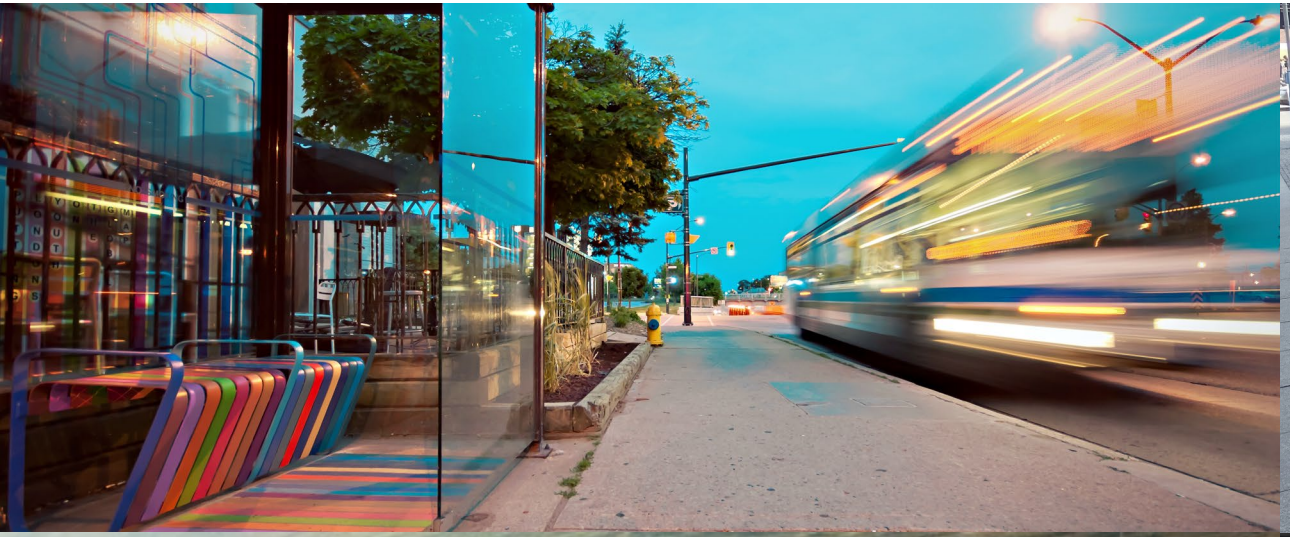
Chapel Street, South Yarra.

- Mobility as a Service
- Connected and Automated
- Shared spaces
- Innovative vehicles
- Last mile mobility
- Safety
- Sustainability
- New Economy

RESET THE INFRASTRUCTURE



NEW MATERIALS & NEW PRODUCTS



CREDIT: http://transenergize.comwp-contentuploads201704Macrebur-1
CREDIT: https://www.distinguished-mag.com/wp-content/uploads/2017/07/20170203-GTOI-Herv%C3%A9-DOURIS-22-R-991x470.jpg

PLATOONING FOR FREIGHT & PASSENGERS

Driverless Trains

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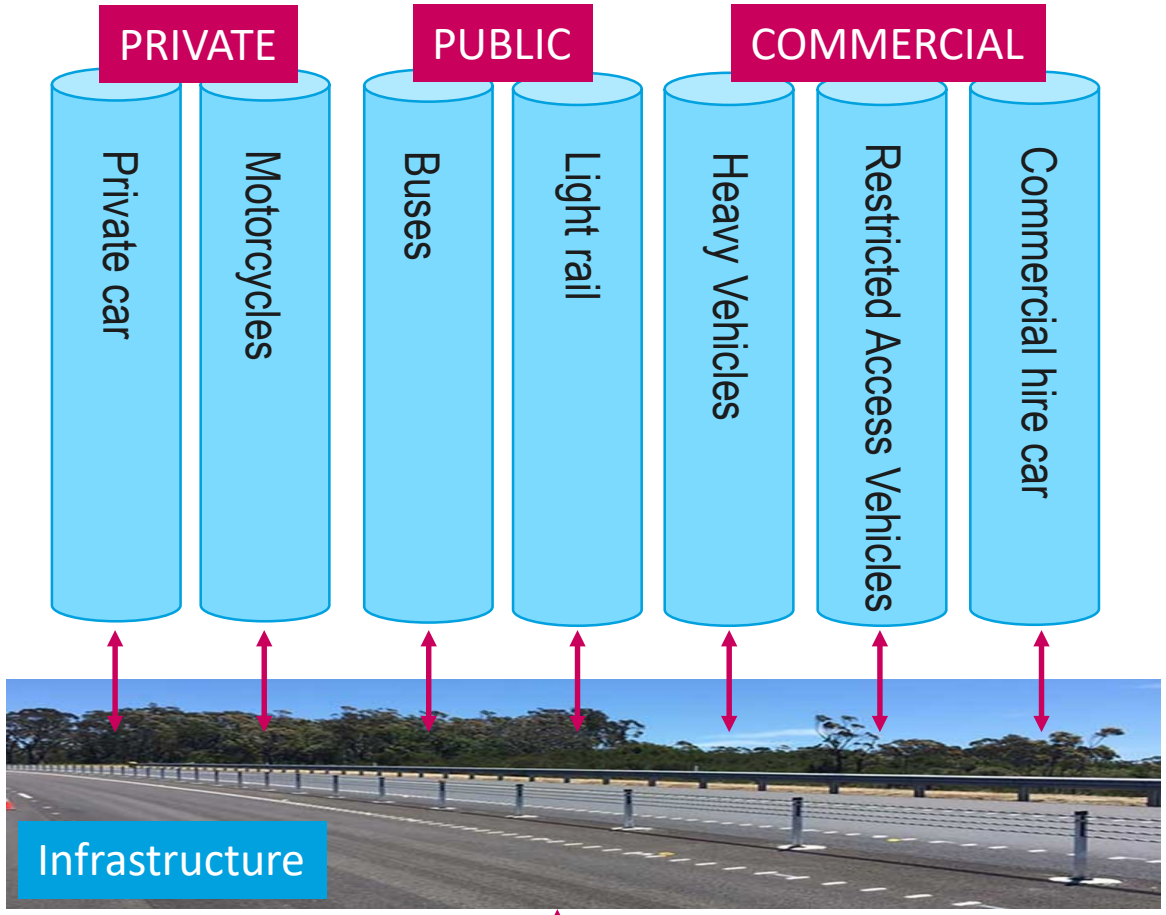
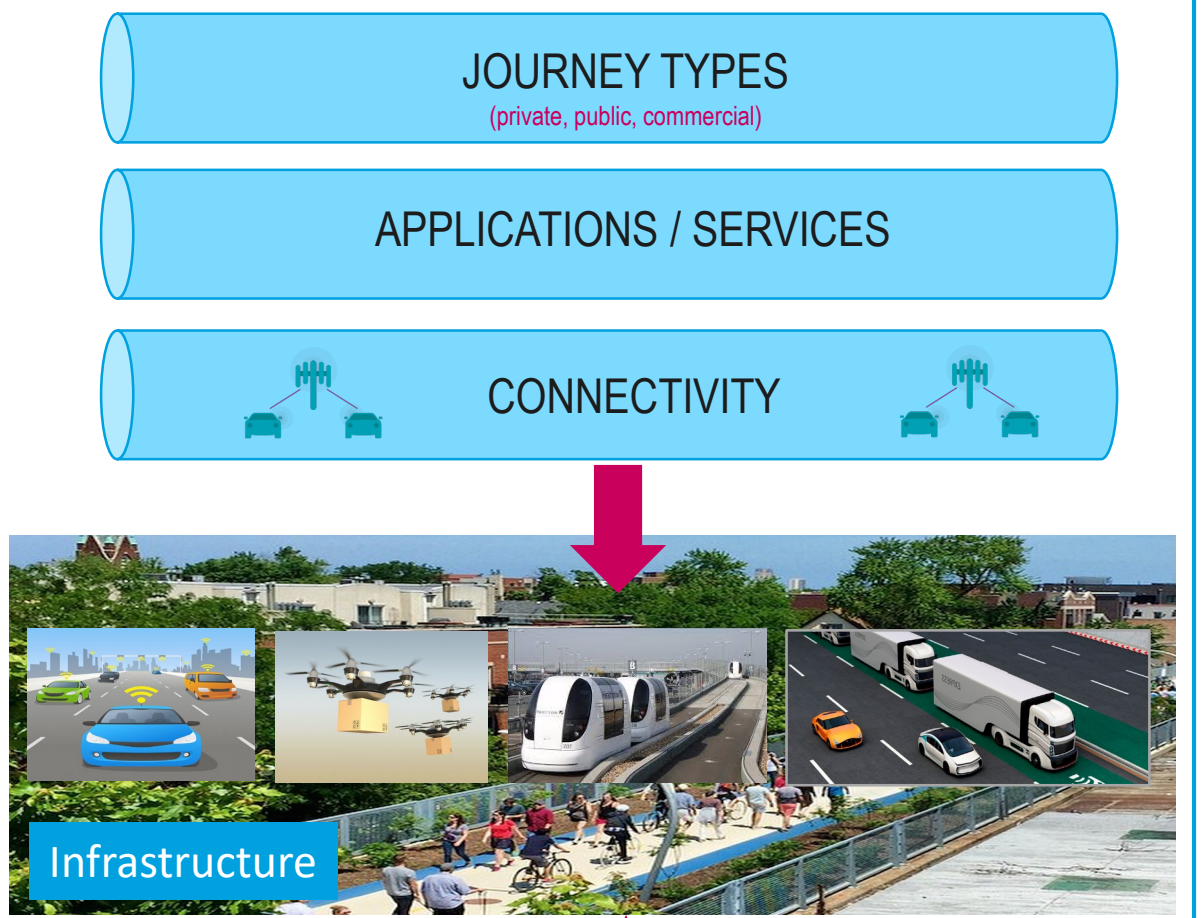
NEXT GENERATION TRANSPORT





(adapted from "**Broken Concepts** – The Australian Communications Legislative Landscape, ACMA, August 2011, p7)

Road Corridors of today, are set to be mobility corridors of tomorrow

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NEW JOURNEYS : NEW VEHICLES

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FREIGHT TASK RE-IMAGINED

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CONNECTED JOURNEYS

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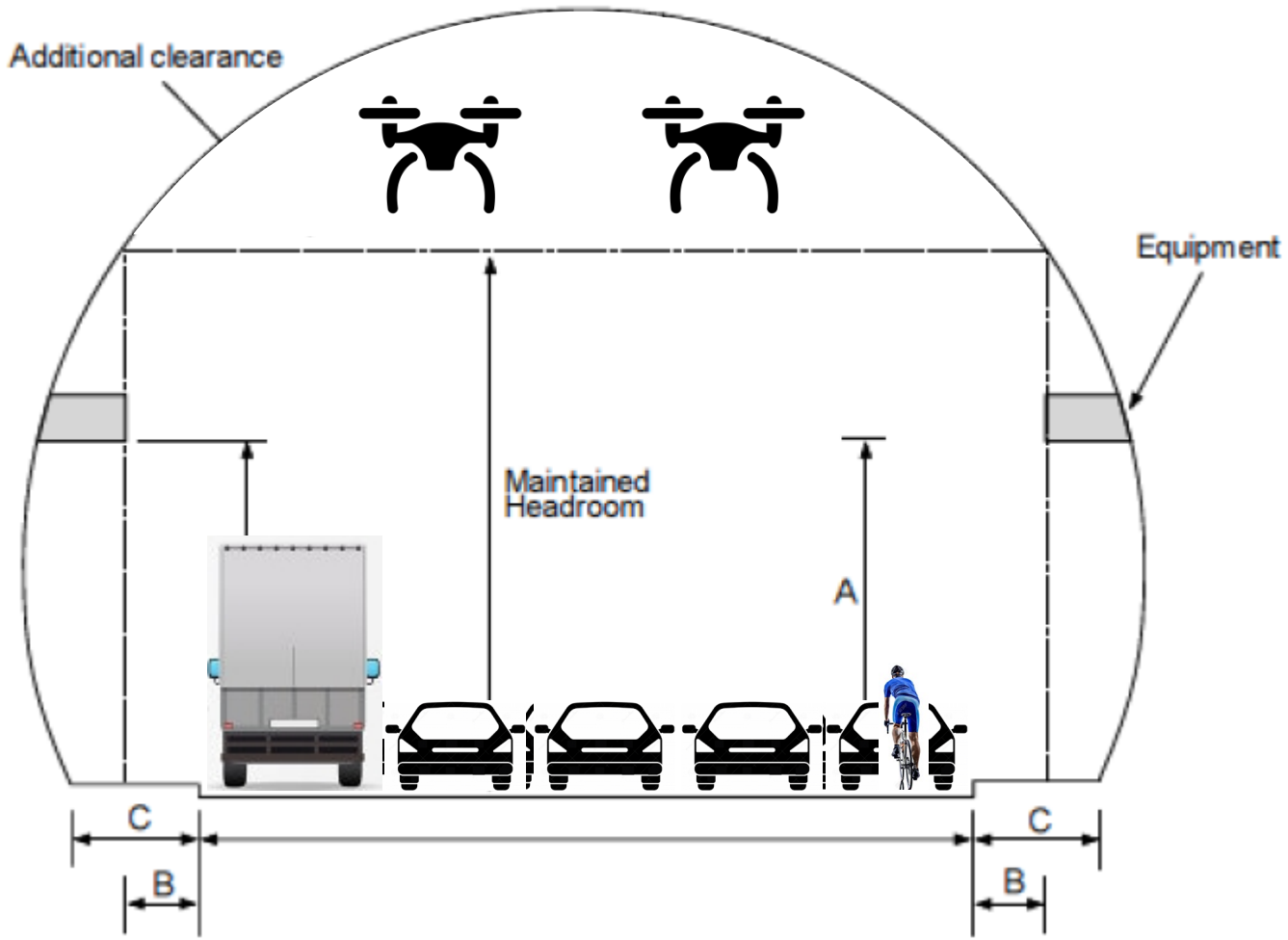
“What if”: Tunnel Configuration



Current configuration:

- Assume 3 lane-tunnel, no curvature
- Total width = 3 x 3.5m + 2 x 0.5m = 11.5m

New configuration:

- 1 Truck-lane and 4 light vehicle lane (no shoulders)
- Truck only lane = 2.6m
- Light vehicle lane = 2.2m

What ARRB Does

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ARRB's Expertise

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NEW FACILITIES TO MEET NEW CHALLENGES

iPAVE—INTELLIGENT PAVEMENT ASSESSMENT VeHICLE

- Understanding road condition above & below surface
- Data is used to manage road networks
- Definite safety benefits
- Network level assessment

Pavement response under load
Velocity of deflecting road surface
→ via Doppler lasers positioned ahead of loaded rear wheel

GREENWOOD ENGINEERING

Road surface characteristics

- Wheel-path roughness & texture → via **point lasers**
- Rutting & cracking → **Automatic 3D system**
- **Asset cameras**
- Positioning: **Gipsi-Trac inertial & RTK-GPS**

HAWKEYE
SCALEABLE SURVEY SOLUTIONS

iPAVE Efficient Infrastructure Mgt Tool

iPAVE — Data Collection Update

Since 2014:

- Queensland (90,000km)
- New South Wales (80,000km)
- New Zealand (60,000 km)

2017:

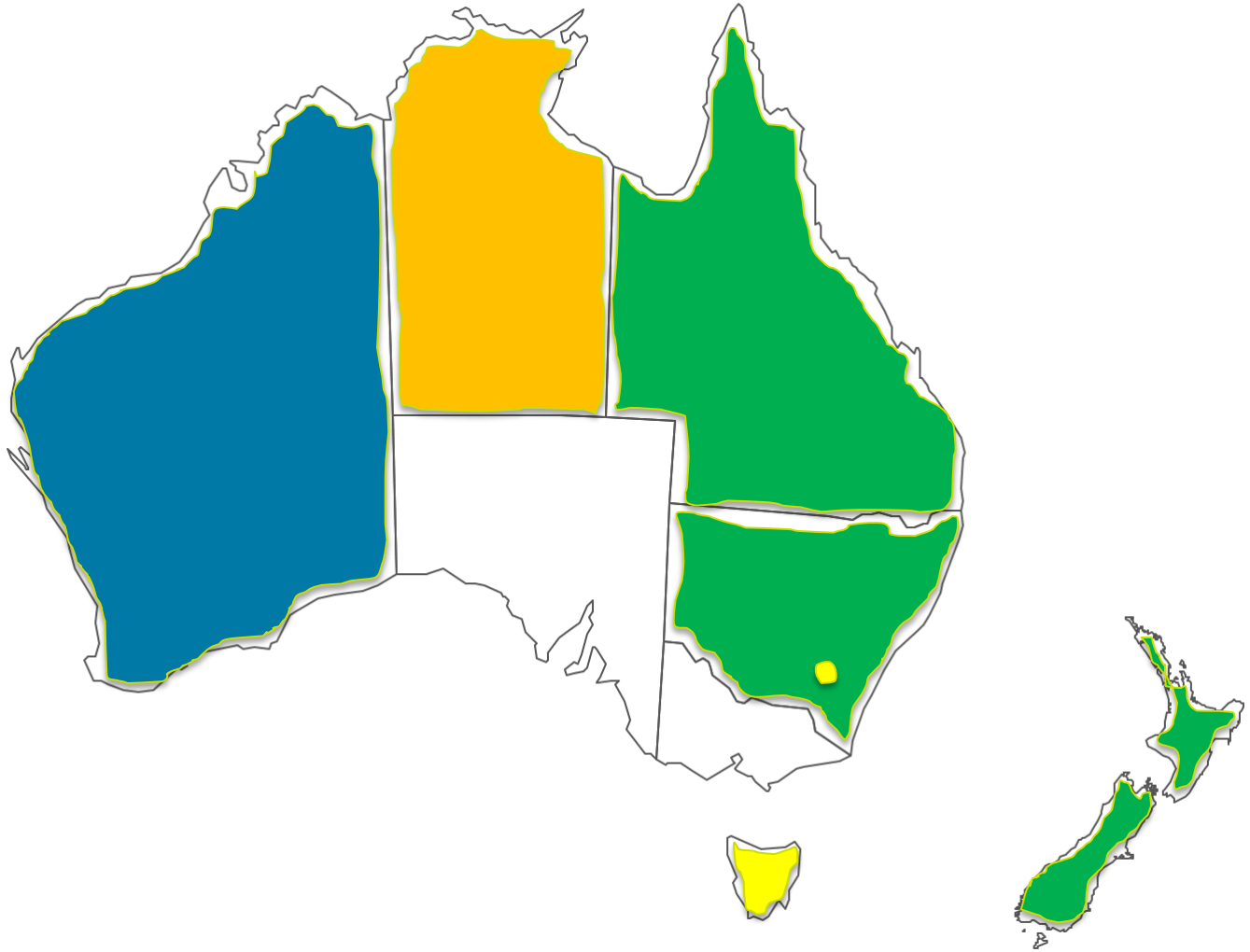
- ACT (200km)
- Tasmania (1,500km)

2018:

- Western Australia (36,000km)

2019:

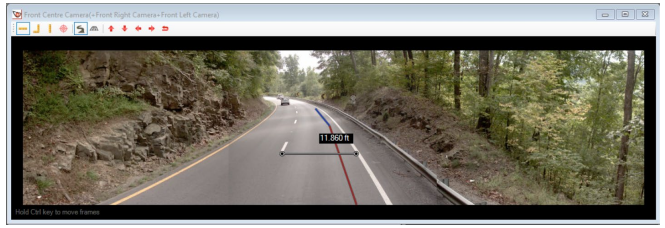
- NT (12,000km)



iSSAVE - iNTELLIGENT SAFE SURFACE ASSESSMENT VeHICLE

- Sideways force skid resistance measurement
- Also includes integrated systems for measuring safety related pavement condition parameters
- Skid resistance is critical to run off road incidents

iSSAVE - iNTELLIGENT SAFE SURFACE ASSESSMENT VeHICLE



+ Digital imaging system

+ Rutting

+ Texture
Centre and Both wheel paths

+ GNNS DGPS geospatial location

+ Geometry
Cross fall, Grade, Horizontal and Vertical curvature

Continuous Friction Response

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Are our roads CAV ready? - survey of 1000 km

The vehicle

ARRB network survey vehicle with front facing cameras

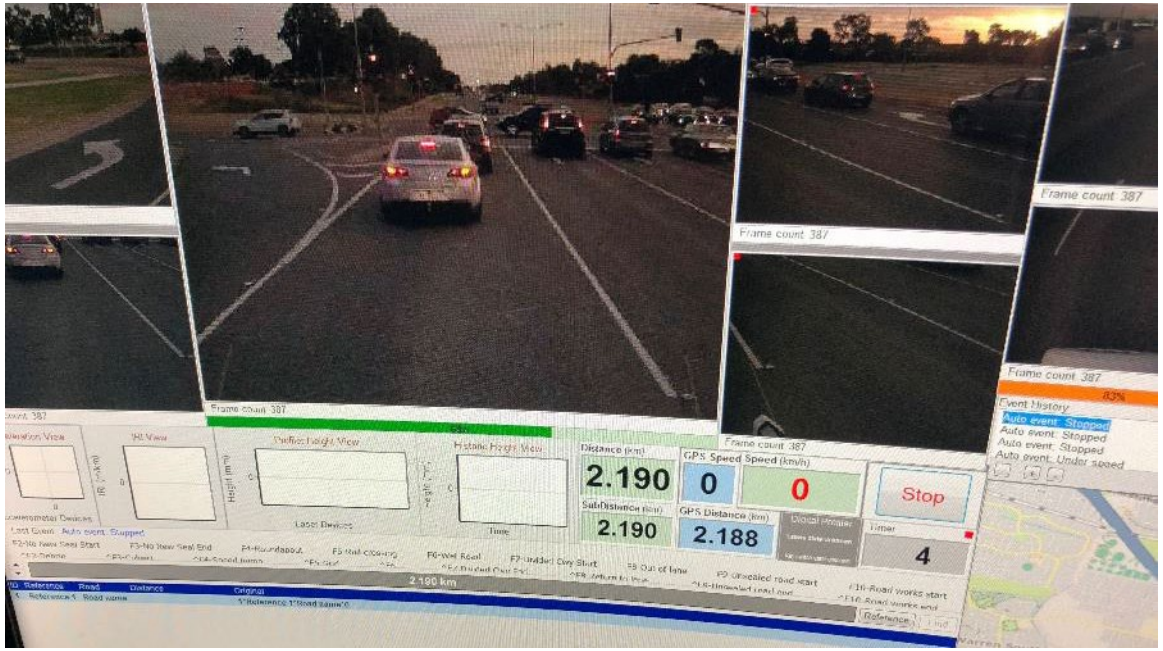
The driving task

A survey of 1000 km of priority roads

Sample of data outputs

Mobileye – data logger interface

ARRB Video imagery interface



GPS data

- Lat, long, time, distance, speed

Line markings

- **Type:** 6 variations
- **Quality:** low or high
- **Width:** 1cm resolution

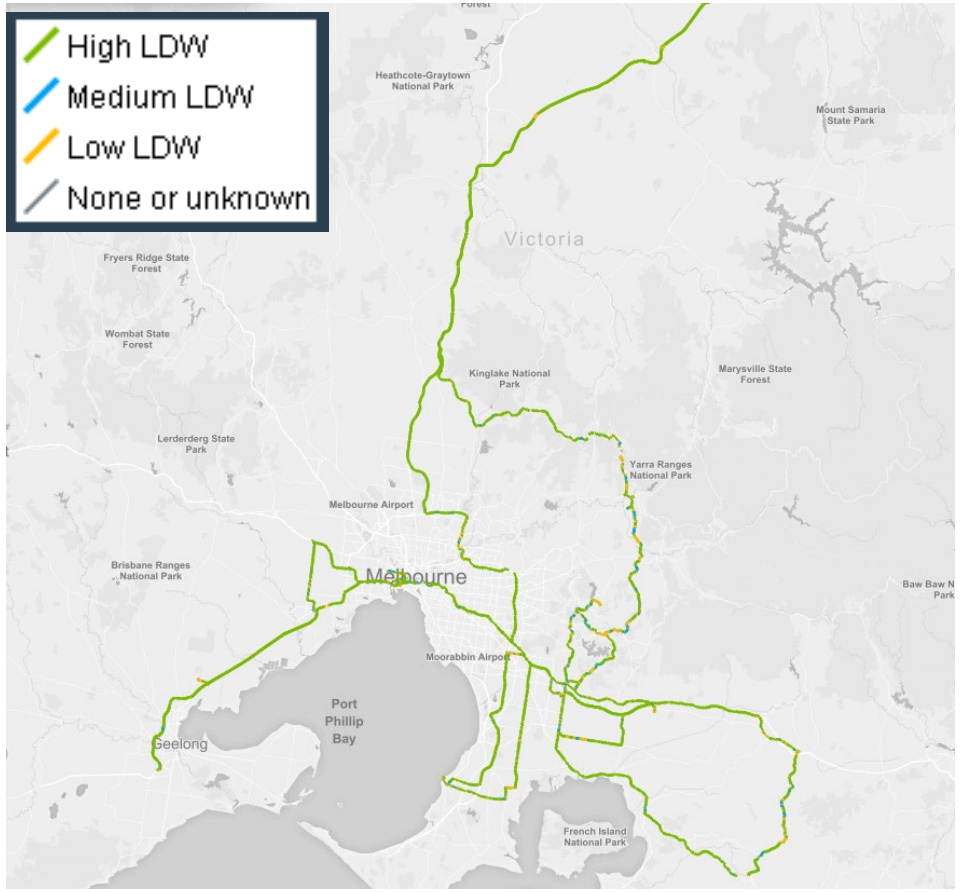
Signs

- **Type:** 73 variations
- **Position:** x, y, z

Line marking map based on real-time data

Quality

Lane Departure Warning availability



WARRIP

NACOE
NATIONAL
ASSET CENTRE
OF EXCELLENCE

Australia &
New Zealand
Driverless Vehicle
Initiative

NRSPP
NATIONAL ROAD SAFETY
PARTNERSHIP
PROGRAM

YOUR NATIONAL TRANSPORT
RESEARCH ORGANISATION

SHAPING OUR TRANSPORT FUTURE

Our Activities

Research, standards & best practice, knowledge sharing, and partnerships

Research

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NACOE NATIONAL ASSET CENTRE OF EXCELLENCE

NRSPP NATIONAL ROAD SAFETY PARTNERSHIP PROGRAM

Austroads

SPARC Hub

iMOVECRC

Standards & best practice

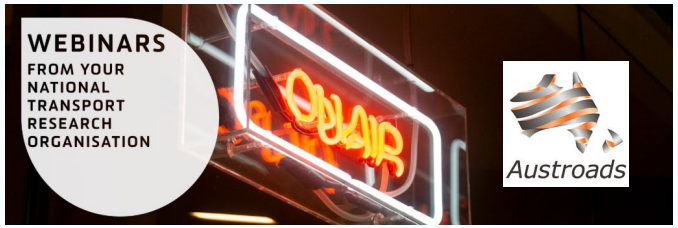
ISO

NTC AUSTRALIA National Transport Commission

Austroads

WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE AIPCR PIARC

Knowledge sharing



29th AUSTRALIAN ROAD RESEARCH BOARD INTERNATIONAL CONFERENCE next generation connectivity

ACCELERATING THE MOBILITY EVOLUTION

Partnerships

bast Federal Highway Research Institute

RIOH

TRL

TRB TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

vti

IFSTTAR

Australian Government Department of Infrastructure, Regional Development and Cities

ndvi Australia & New Zealand Driverless Vehicle Initiative

vicroads

AUSTRALIAN LOCAL GOVERNMENT ASSOCIATION

CITY OF PORT PHILLIP

VOLVO

iag

National Farmers' Federation

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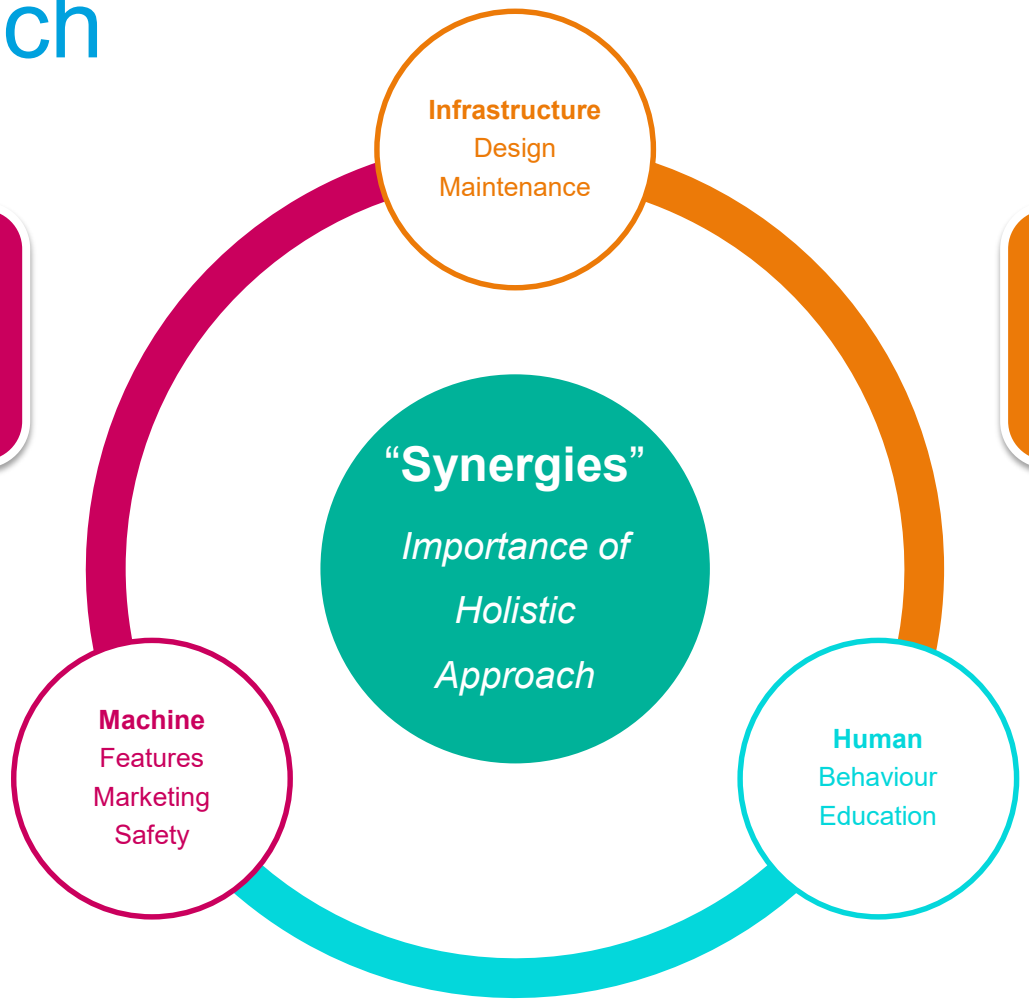
A Holistic Approach

Governments & OEMs need to discuss necessity, and which infrastructure will assist adoption of new technology?

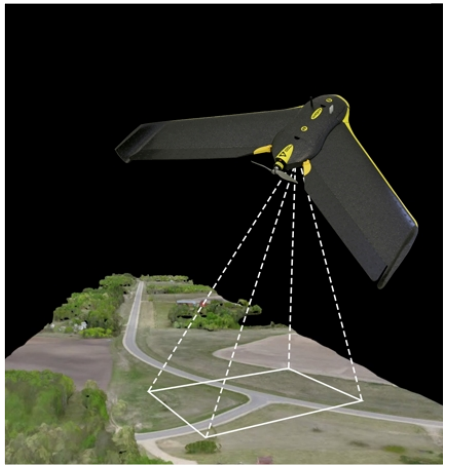


How can government assist with transitional technology changes?

How do OEMs share features with drivers/owners?
Is there consistent marketing within the industry?

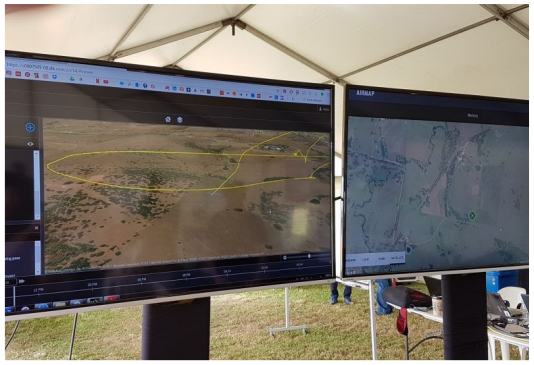
Drones

- Ease of use will increase demand
- Potential infrastructure problem
- Human attitude towards them
- Management system



Some Drone Uses

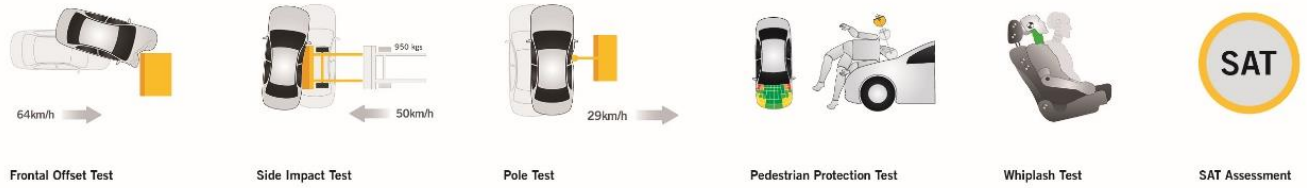
- Delivery
- Health
- Life saving
- Surveillance
- Safety
- Recreational
- Construction
- Mining



SHAPING OUR TRANSPORT FUTURE

NEW & UPDATED TESTS

PREVIOUS TEST REGIME:



NEW TEST REGIME (from January 2018):

TOYOTA COROLLA

ANCAP
SAFETY

TESTED
2018

★ ★ ★ ★ ★