

Innovation: next
generation
mobile speed
camera vehicle



NATIONAL PUBLIC SECTOR
FLEET MANAGERS'
CONFERENCE 2019

Thursday 10 October to 11 October 2019

*INTELLIGENT
TRANSPORT*

The banner features a dark blue background with a stylized white and light blue wave graphic at the top. Below the wave, the conference title is written in white and light blue. The dates are in white. The bottom section shows an aerial view of a road and greenery, with the text 'INTELLIGENT TRANSPORT' overlaid in white, italicized font.

Craig Norris
National Manager
Electric Vehicle Projects
Mitsubishi Motors Australia

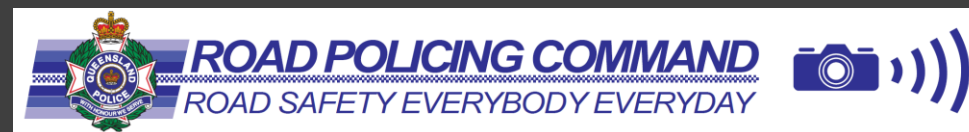


Stephen Simons
Principal Advisor
Road Safety Camera Office
Queensland Police Service



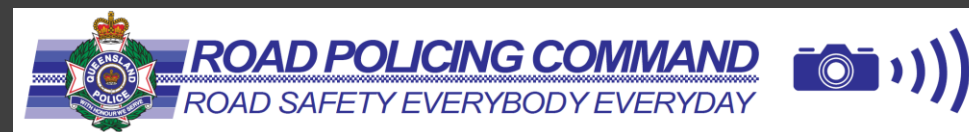
Camera Detected Offence Program (CDOP)

- Partnership between the Queensland Police Service (QPS) and Department of Transport and Main Roads (TMR)
- TMR is responsible for developing the strategic policing governing the CDOP – maintaining crash data and identification of potential speed camera sites; public education campaigns; collection and distribution of funds raised from infringement notices; legislation; Whole of Government oversight; and, program evaluation and research.



Camera Detected Offence Program (CDOP)

- The QPS is responsible for all aspects relating to the enforcement of speed limits – managing the operation and procurement of cameras; development of appropriate sites; and, processing of infringement notices and court prosecutions
- The QPS manages a network of fixed cameras including speed cameras, red light cameras, combined speed and red light cameras and point to point speed camera systems. The QPS also owns and operates a fleet of mobile speed cameras, portable hand-held speed cameras, and unattended trailer mounted speed cameras to enforce speed limits



101 year history of MMC

In 1917, Mitsubishi developed **Mitsubishi Model A**.
The Japan's first series production passenger car.

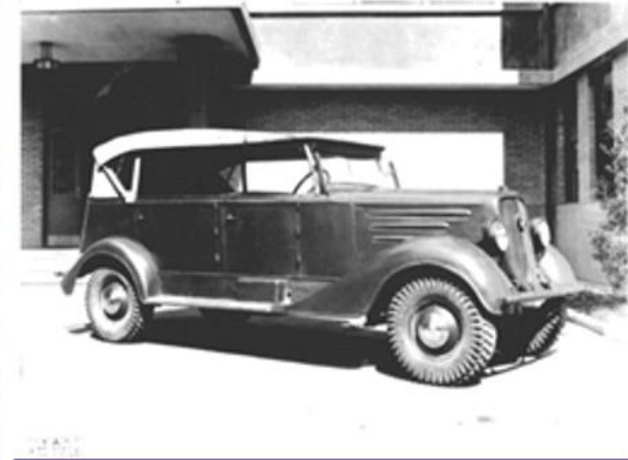


The Japan's first mass produced passenger car, Mitsubishi Model A (1917)

MMC nurtured reliability and driving performance to meet the needs of demanding professionals.

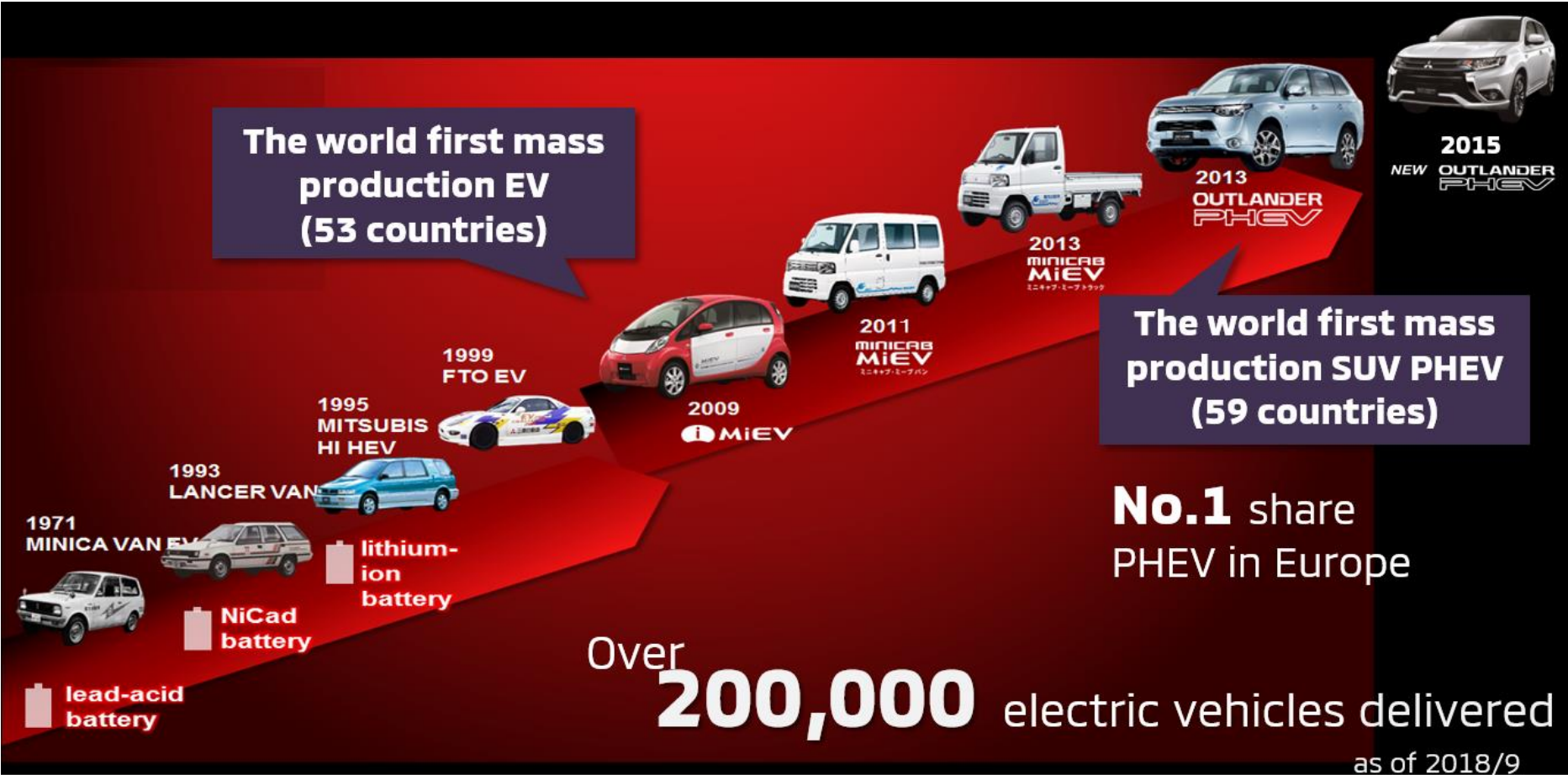


Commercial trucks and buses at the government's request from the 1920s



New technical challenges: The Japan's first diesel engine and 4WD passenger car prototype

MMC EV history



World wide distribution

OUTLANDER PHEV
CUMMULATED SALES

173k

NORTH AMERICA
7.6k

EUROPE
116k

JAPAN
45k

OTHER REGIONS
0.9k

AUSTRALIA
3.3k



As of 2018/9



Mobile Speed Cameras

- Deployed and operated by sworn Police officers from Constable to Senior Sergeant throughout the State
- 3000+ mobile speed camera sites – including primary sites, school zones, roadworks zones and stakeholder sites
- Deployments typically 3-4hrs in length twice per day. Vehicles are idled to maintain sufficient charge to the camera system (VITRONIC PoliScan) and operator comfort (air conditioning/heating)
- All deployments are conducted on overtime as extraneous duties to not interfere with core road policing function
- Mobile speed cameras vehicles (marked and unmarked) allocated from Cairns to Gold Coast and west to Mt Isa and Charleville
- Environmental conditions range from high heat and humidity in tropical north Queensland in summer to very low temperatures in southern Queensland highlands during winter
- Mobile speed camera fleet consists of Isuzu MUX and D-MAX (diesel); Mercedes-Benz Valente (diesel), VW Caddy (petrol and diesel) and Mitsubishi Outlander Plug-in Hybrid Electric Vehicle (hybrid petrol)
- To maintain vehicle warranty a minor service is usually conducted every 28 days



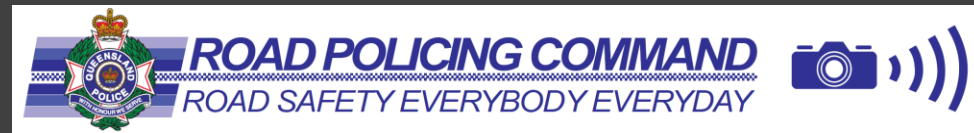


Mercedes-Benz - Valente





Isuzu - MUX





Isuzu - DMAX





Issues and environmental concerns



The Vehicle

Dual Electric motors

- One on each axle
- 120kW combined / 60kW each

2.0L Petrol engine

- Located at the front of the vehicle
- 45 litre fuel tank
- Regular unleaded (91 RON) compatible

Electric Generator

- Located in the engine bay
- 70kW

Main Drive (Traction) Battery

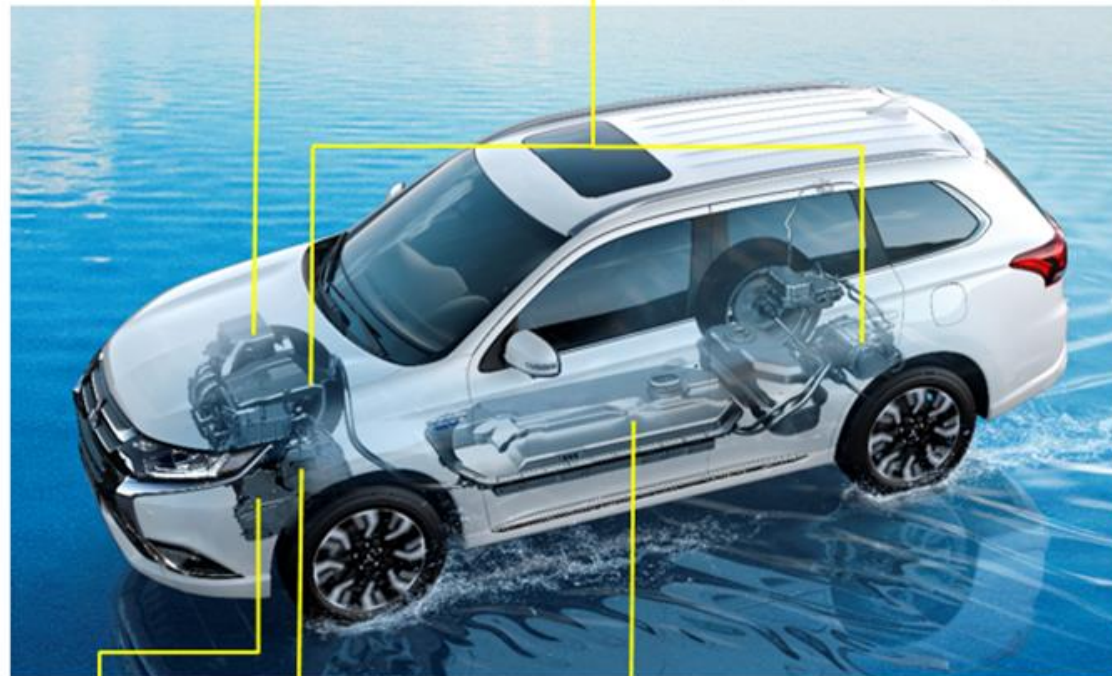
- 12kWh Lithium-ion
- Located between the front and rear axles

CO2 Emissions

- 41g/km (grams per kilometer)
- None in EV mode

2.0-litre engine
The powerful, highly efficient engine minimizes CO₂ emissions.

Front Motor PDU & Rear EMCU
These intelligent control units contribute to heightened energy efficiency and optimal motor control with instant maximum torque that outperforms a 3.0-litre engine.



Generator
The high-performance generator transforms engine power into electricity to recharge the drive battery and assist the motors when needed.

Twin Motor AWD and S-AWC
Separately mounted motors at the front and rear axles deliver incredible responsive AWD performance with S-AWC (Super All Wheel Control) ensuring excellent driving stability and intuitive, linear handling.

Drive Battery
The battery is stored under the floor to maximize interior space and lower the center of gravity for improved safety and handling.

S790BUD



S791BUD



MMAL HVAC PHEV A/C test
12 February 2018

Results

Outdoor test 9/2/2018

Time	Ambient Temp C	S790BUD		S791BUD		
		HVAC set at 18 (minimum) Cabin Temp C	EV Battery Charge	HVAC set at 22 Cabin Temp C	EV Battery Charge	
8:10	25		25 100.00%	25 100.00%		Light
9:10	28		13 87.50%	17 100.00%		Cloud
10:10	34		14 68.75%	19 93.75%		Light
11:15	35		15 50.00%	21 81.25%		Cloud
12:10	38		13 31.25%	24 75.00%		Sunny
13:10	42		17 12.50%	23 62.50%		Sunny
13:50	37		16 6.25%	22 50.00%		Sunny
15:10	40		17 6.25%	22 37.50%		Cloud
16:15	36		17 6.25%	23 25.00%		Light
						Cloud

Workshop test 8/2/2018

Time	Ambient Temp C	S790BUD		S791BUD	
		HVAC set at 18 (minimum) Cabin Temp	EV Battery Charge	HVAC set at 22 Cabin Temp C	EV Battery Charge
8:05	23		23 100.00%	23 100.00%	
8:08	23		17 100.00%	19 100.00%	
8:13	24		16 100.00%	18 100.00%	
8:18	25		13 100.00%	18 100.00%	
8:28	25		14 100.00%	18 100.00%	
8:48	25		12 93.75%	18 100.00%	
9:38	26		11 81.25%	18 93.75%	
11:17	30		12 50.00%	20 93.75%	
12:21	31		13 31.25%	18 81.25%	
12:45	30		15 12.50%	18 81.25%	
13:14	28		14 12.50%	18 81.25%	
14:15	31		14 6.25%	20 68.75%	
14:45	27		15 6.25%	19 68.75%	
15:30	28		14 6.25%	19 62.50%	
16:30	27		14 6.25%	19 56.25%	



Findings showed a/c ran for 5 hours, before ice motor engaged



Next Generation Speed Camera Vehicle

Mitsubishi Outlander (Plug-in Hybrid Electric Vehicle)



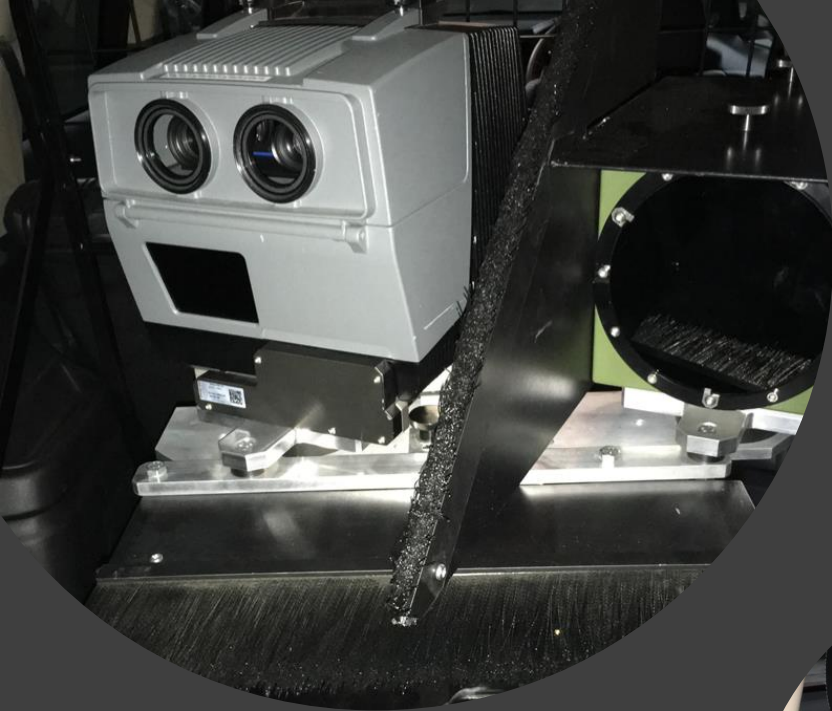
Time line

- MMAL offered vehicle to fleet for review for fit purpose for QPS activities
- Feb 2018 – first look at a vehicle by QPS RSCO
- RSCO undertook desktop proof of concept approach before introducing the vehicle for operational requirements
- Engage with stakeholders and clarify that the power supply is suitable to power VITRONIC; the height of the system is suitable; vehicle capable of being deployed over kerbs, table drains etc; factory rear wiper fitted; and air conditioning; suitable for operator comfort
- The rear pod housing the VITRONIC equipment was redesigned for rear VITRONIC deployments
- ‘Clear’ rear glass is able to be sourced for LIDAR based VITRONIC PDD



Time line cont.

- Sept 2018 – longer term loan vehicle secured to undertake approved operational trials
- Engage Mitsubishi Motors Aust, VITRONIC, Calibration Laboratory and PSBA light engineering for initial vehicle design and fit out
- Clarified continuous power source for sensitive speed camera (separate battery)
- POD limits vibrations and secures the VITRONIC for deployment and transport
- POD contains redesigned flash dividers to prevent reflections in images from the flash
- POD design includes secure laptop mount and camera controls on the rear of the front passenger seat
- Motorised mount fitted into rear with Mitsubishi supplied 'clear' glass
- Daytime running lights extinguished with camera power switch



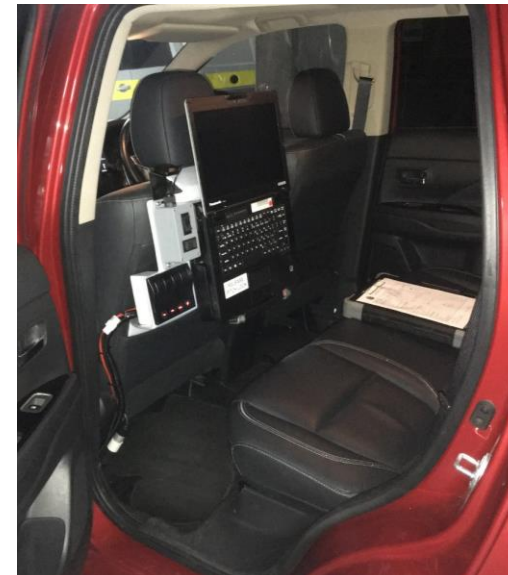
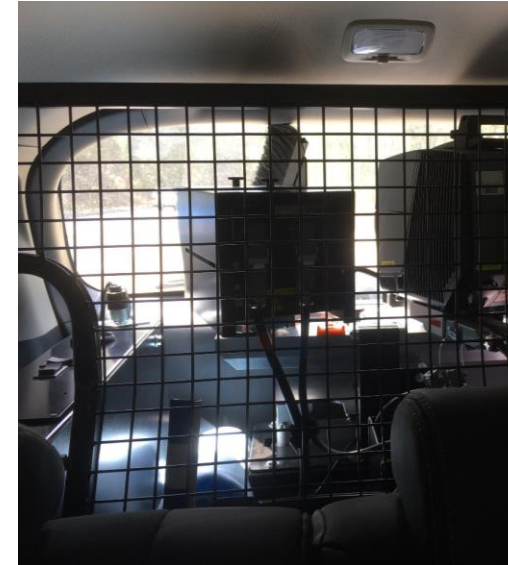
RV267 deployed

- RV267 deployed extensively throughout south east Queensland from November 2018 to February 2019
- 166 deployments for 645hrs of deployments
- 8hr continuous deployment conducted on the Bruce Highway, Murrumba Downs without the engine running
- When the batteries are flat the internal combustion engine runs for 2-3 minutes and provides 10 minutes of EV power
- Favourable responses from all operators for concept, comfort and design
- During the trial average fuel consumption for the PHEV is 12L/100km compared to 28L/100km for diesel powered speed camera vehicle operating in similar conditions
- QPS achieves a very economical rate to recharge the PHEV from flat
- Vehicle was deployed during exceptional periods of heat and humidity and the air-conditioning was satisfactory for officer comfort



Roll out

- Approval for expansion for the QPS speed camera fleet has been granted and presently the vehicle chosen is the Mitsubishi Outlander Plug-in Hybrid Electric Vehicle
- Vehicles require standard 240v power outlet to charge overnight. This is available at most Police stations due to legacy speed camera equipment requiring charging
- Vehicle is fitted with engine hour meter to determine servicing intervals. Current SCV (diesel and petrol) require servicing every 28 days plus mileage service. Plug-in Hybrid Electric Vehicle *should* only need servicing at 6 month intervals (approximately 200hrs of engine running)
- AWD capability to park off road and over gutters/table drains etc
- Silent operation allows vehicle to be deployed in built-up areas with minimal noise pollution and increases officer safety
- Reduction in cabin temperature and vibration with ICE inactive *should* encourage operators to optimise battery operation





Queensland Police Service
2019 Awards for Excellence



Sustainability – Silver Award

Next Generation Speed Camera Team

Mr Stephen Simons

KATARINA CARROLL APM
COMMISSIONER



ROAD POLICING COMMAND
ROAD SAFETY EVERYBODY EVERYDAY



The future of EV - concept

A New Smart New Energy Eco System

- **Generate**
- **Store**
- **Share**



- **EV/PHEV**
- **Solar Panel**
- **Home Battery Storage**
- **Bi-directional Charger**
- **Energy Management System**
- **Interactive Display**

Reduce Energy Costs



Independence From The Grid



Help Our World



Questions?

small things **BIG**
that make a **DIFFERENCE**

