‘What’s coming our way’

Dr Peter Hart

Chairman
ARTSA

Australian Context

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- Harmonization of rules with UN ECE Regulations is facilitation internationalization of vehicles.
- Technology push is mainly coming from Europe and is being driven by safety regulations.

Australian Context

- ‘Best practice’ requirements by prominent logistics users.

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- Australian innovation has mainly been with new types and shapes of vehicles.
- 'Best practice' requirements pushed by prominent logistics users.
- OH & S requirements are a significant

Indian Situation

Australian Situation

Fuel-Economy Rules

- Japan: has mandated fuel-economy standards for trucks and buses from 2015

Fuel-Economy Rules

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Table 3.3
2015 Fuel Efficiency Targets for Heavy-Duty Trucks (Excluding Tractors)

Category	GVW, t	Max Load (L), t	FE Target, km/L
1	3.5 < GVW ≤ 7.5	L ≤ 1.5	10.83
2		1.5 < L ≤ 2	10.35
3		2 < L ≤ 3	9.51
4		3 < L	8.12
5	7.5 < GVW ≤ 8		7.24
6	8 < GVW ≤ 10		6.52
7	10 < GVW ≤ 12		6.00
8	12 < GVW ≤ 14		5.69
9	14 < GVW ≤ 16		4.97

Fuel-Economy Rules

- Japan: has mandated fuel-economy standards for trucks and buses from 2015

Table 3.4
2015 Fuel Efficiency Targets for Heavy-Duty Tractors

Category	GVW, t	FE Target, km/L
1	GVW ≤ 20	3.09
2	GVW > 20	2.01

Fuel-Economy Rules

- USA: Mandated fuel economy standards for Class 8 trucks starting from 2014.

  Fully effective 2018, class 8 trucks are required to achieve 7 - 20 % economy improvements by 2018.

- Economy is measured in Gallons / 100 mile- tons.

- US EPA projects a 1 year payback period.

Fuel-Economy Rules

- US EPA projects a 1 year payback period.
- California has legislated to reduce its greenhouse emissions to 1990 levels by 2020. California is a significant political force.
- PACCAR has a corporate engine based on DAF technology. Being trialed in Australia.

Fuel-Economy Rules

Fuel-Economy Rules

- Incremental engine improvements –
  Electrical driving of auxiliaries (5%)
  - Water & oil pumps & compressors…
  - Air conditioner & Air compressor
  - Steering pump
  - Electric cooling fans

- Improved NOX reduction in SCR reactors allowing engine performance optimization

Fuel-Economy Rules

EPA engine standards:

npression-Ignition Engines (g/hp-hr):

lodel Years	Light Heavy-Duty	Medium Heavy-Duty – Vocational	Heavy Heavy-Duty –Vocational	Medium Heavy-Duty –Tractor	Heavy Heav Duty – Trac
14-2016	600	600	567	502	475
17 and ter	576	576	555	487	460

Fuel-Economy Rules

- Turbo compounding
- Waste heat recovery from engines ?
- Reporting requirements for vehicle manufacturers.
- Wide base tyres.
- Low rolling resistance tyres.
- Aerodynamic developments.
- Weight reduction projects.

US Smartway Project

- US EPA Sponsored Program
- Accredited OEM Smartway Models

US Smartway Project

re EPA-designated SmartWay Tractors and Trailers?

are long-haul truck components which significantly lower emissions and fuel consumption. EPA and lead
freight equipment-manufacturing industry worked together to develop these performance specifications.

n manufacturers equip long-haul tractors and trailers with these specifications, they are designated and la
JS EPA Designated SmartWay." The US EPA Designated SmartWay label may be used at point-of-sale and ap
nterior of the tractors and trailers by the equipment manufacturers.

re the basic specifications for an EPA-designated SmartWay Tractor?
re the basic specifications for an EPA-designated SmartWay Trailer?

US Smartway Project

re the basic specifications for an EPA-designated SmartWay Tractor?

im requirements for designated SmartWay Tractors, and interim guidance and an interim test method for veri

tWay components are available. Basic qualifications for a designated SmartWay Tractor include:

Model Year 2007 or later engine;
ntegrated sleeper cab high roof fairing;
Tractor-mounted side fairing gap reducers;
Tractor fuel-tank side fairings;
Aerodynamic bumper and mirrors;
Options for reducing periods of extended engine idling (auxiliary power units, generator sets, direct fired
heaters, battery powered HVAC system, and automatic engine start/stop system); and
Options for low-rolling resistance tires (single wide or dual), with aluminum wheels encouraged but optional

US Smartway Project

re EPA-designated SmartWay Tractors and Trailers?
re the basic specifications for an EPA-designated SmartWay Tractor?
re the basic specifications for an EPA-designated SmartWay Trailer?
long-haul van trailers can be ordered, and existing trailers can be upgraded, to qualify as an EPA-designat
tWay Trailer provided that they are equipped with:

ide skirts;
Veight-saving technologies;
Gap reducer on the front or trailer tails (either extenders or boat tails); and
Options for low-rolling resistance tires (single wide or dual), with aluminum wheels encouraged but option

res are approved for EPA-designated SmartWay Tractors and Trailers?

»»Click here to expand all hidden content for printing»»

US Smartway Project

fied Aerodynamic Technologies

ynamic technologies minimize drag and improve air flow over the entire tractor-trailer vehicle. Aerodynamic
logies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind
the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer. Using fairings in
nation with one another (or, in a few cases, when used alone) have the potential to provide an estimated 5 percent
ater reduction in fuel use relative to the truck's baseline, when used in conjunction with an aerodynamic tractor on
aul Class 8 trucks, in highway type operation. This reduces NOx emissions, saves up to 800 gallons of fuel, and
ates over nine metric tons of greenhouse gas emissions per year.

s verified the following categories of aerodynamic technologies:

ailer Gap Reducer and Trailer Side Skirts (used in combination with one another); Trailer Boat Tail and Trailer
de Skirts (used in combination with one another);
vanced Trailer End Fairing; and,
vanced Trailer Skirts.

eligible for DERA funding, aerodynamic technologies must be on EPA's SmartWay verified technology list

he links below to view the trailer aerodynamic technologies that are SmartWay verified:

»»Click here to expand all hidden content for printing««

Gap Reducers

European Trailers

- UN ECE Regulation 73 requires a side under-run protection device on heavy trailers and rigid trucks.

European Trailers

- UN ECE Regulation 73 requires a side under-run protection device on heavy trailers and rigid trucks.
- Australia also has a significant problem with vulnerable road users getting tangled with trailers.


D-TEC PORTMASTER S-line


Mercedes-Benz
Trucks you can trust


SCHMITZ


Aerodynamik Trailer
SCHMITZ


ACTROS
TRUCK OF THE YEAR

Aerodynamics Trailer

18% less aerodynamic drag lowers fuel consumption by 4.5 %

Spoiler

1 % Reduces the distance to the tractor unit and lowers aerodynamic drag by one percent.

Side trim panels

8 % Slightly drawn in at the front and characterised by an opening at the rear.

Rear diffuser

1-2 % The parallelogram form links neatly with the underbody panelling.

Rear taper

7 % Its elements can be folded away in order to ensure the usual easy access to the cargo compartment.

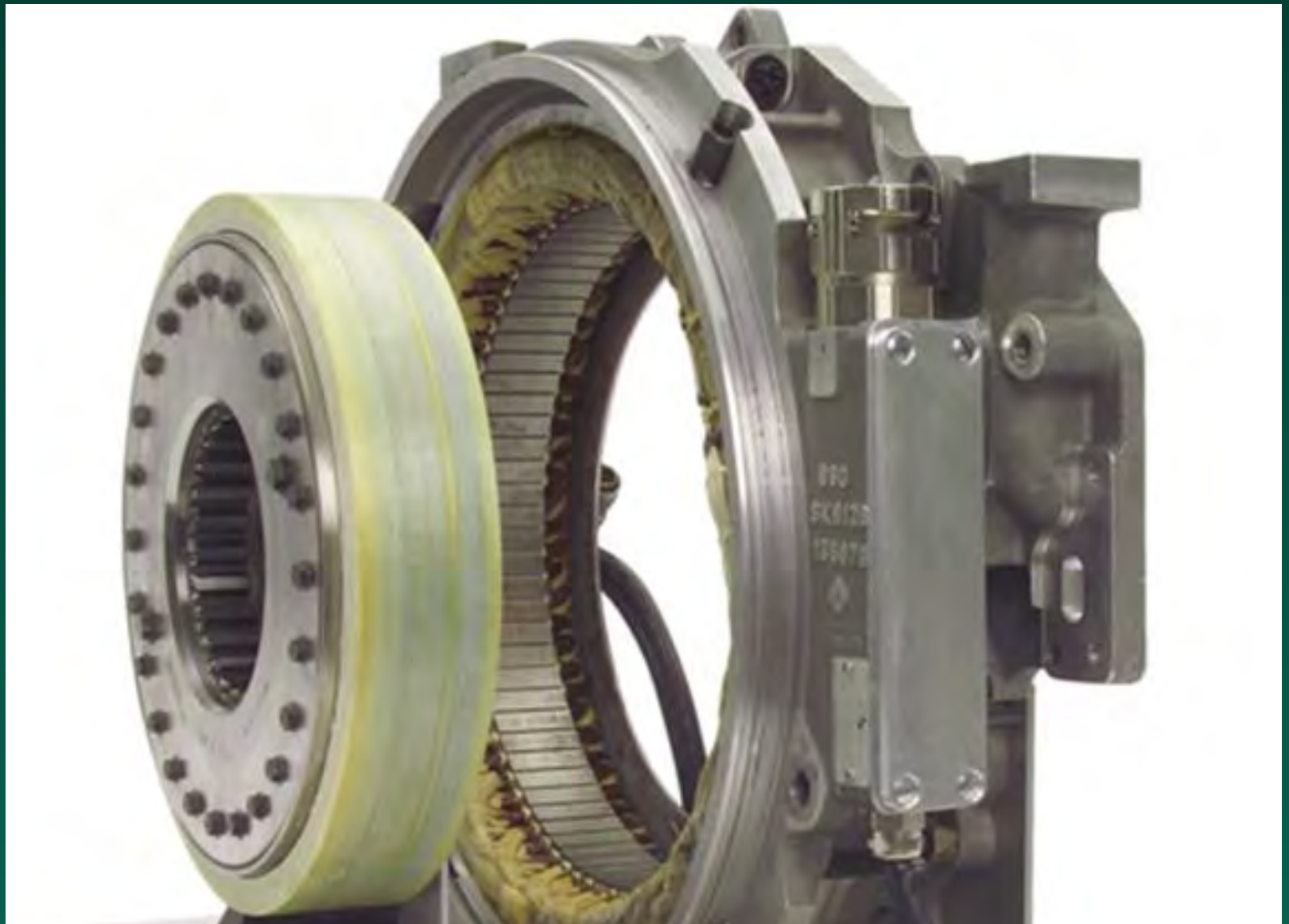
Integrated Starter Generator

- Developments being driven by Electric Vehicle Developments

Integrated Starter Generator

- Developments being driven by Electric Vehicle Developments
- Now adopted by the US military as a battleground emergency drive system.

Integrated Starter Generator



Battery Developments

- Battery developments for hybrids will eventually flow to heavy trucks

Battery Developments

- Battery developments for hybrids will eventually flow to heavy trucks.
- Additional voltages will be introduced.


AKASOL
AIBAS 15M-4S3P-010A

FMVSS 205 - Glazing

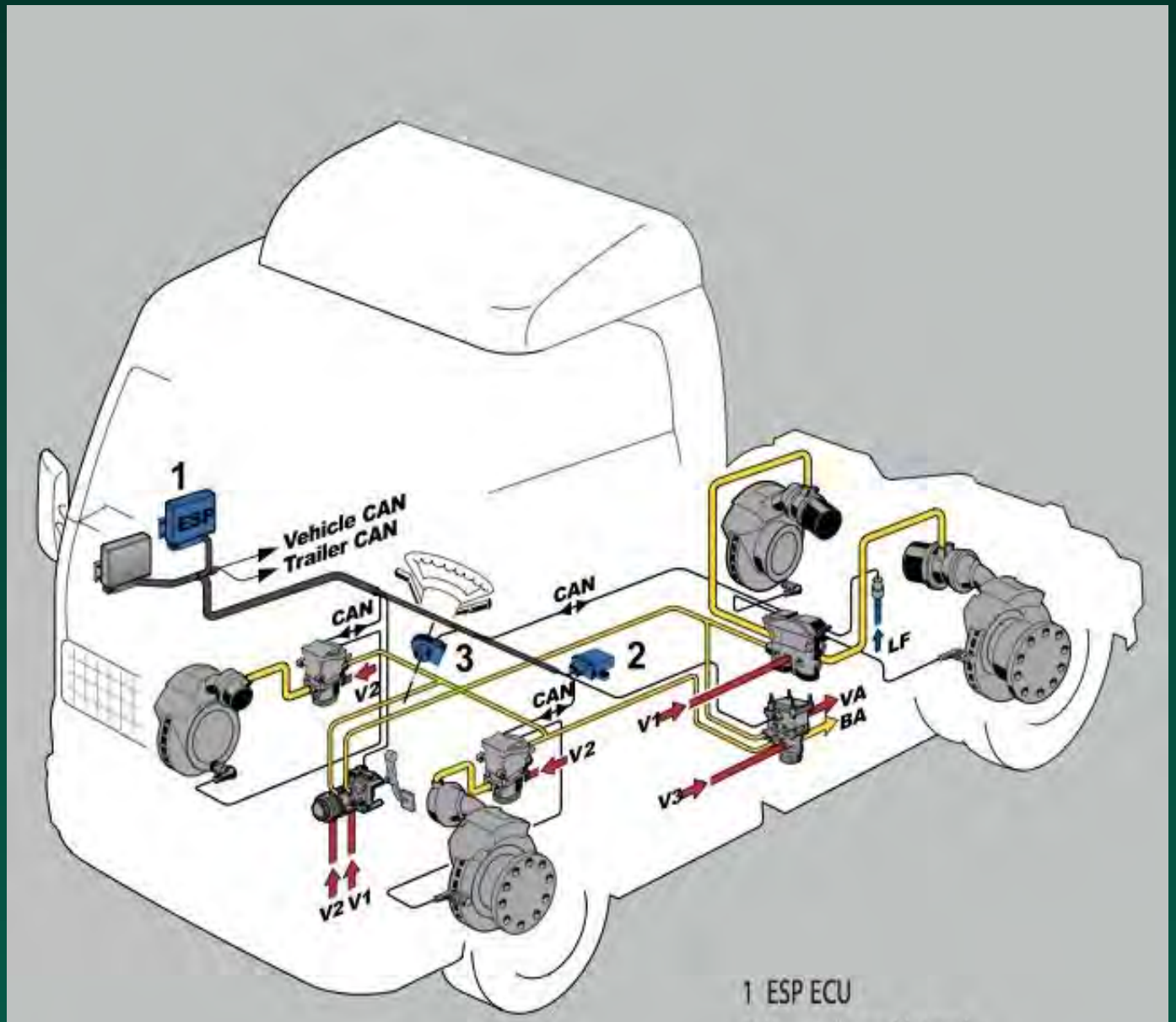
- USA has adopted GTR 205

FMVSS 126 – ESC trucks < 10,000lb

- USA has adopted GTR 8

ESC Mandates

- USA (NHTSA) proposes to mandate ESC (including RSP) on some new heavy trucks from 2015+.
- Applicable to truck-tractors and passenger buses with a GVM > 11,793 kg.
- USA has concluded that trailer roll-overs can be avoided by putting RSP on prime-movers.



2 axle semi-trailer tractor with EBS and ESP, 4S/4C configuration

1 ESP ECU
2 Yaw rate and lateral acceleration sensor
3 Steering angle sensor
V1...V3 Air supply
LF Air suspension
VA Trailer supply line

ESC Mandates

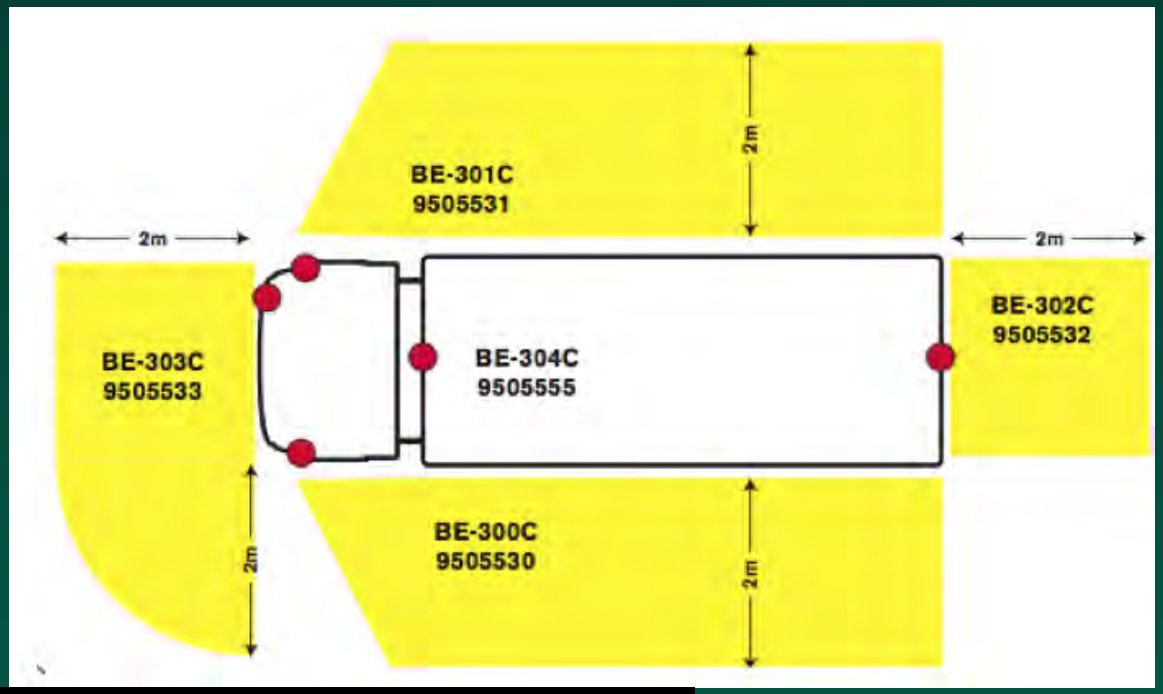
- Europe has mandated ESC (not EBS) on new heavy trucks from 2011 and RPS on new heavy trailers from 2013.
- Japan is generally aligned with UN ECE Regulations.

Improved Driver Vision

- USA has mandated improved rear vision for medium duty vehicles (< 10,000 lb).
- Act of Congress has directed rule development in response to a high-publicity incident.
- NFPA recommendations applies to fire trucks.
- Great potential in Australia.

Improved Driver Vision

- Europe



FMVSS 138

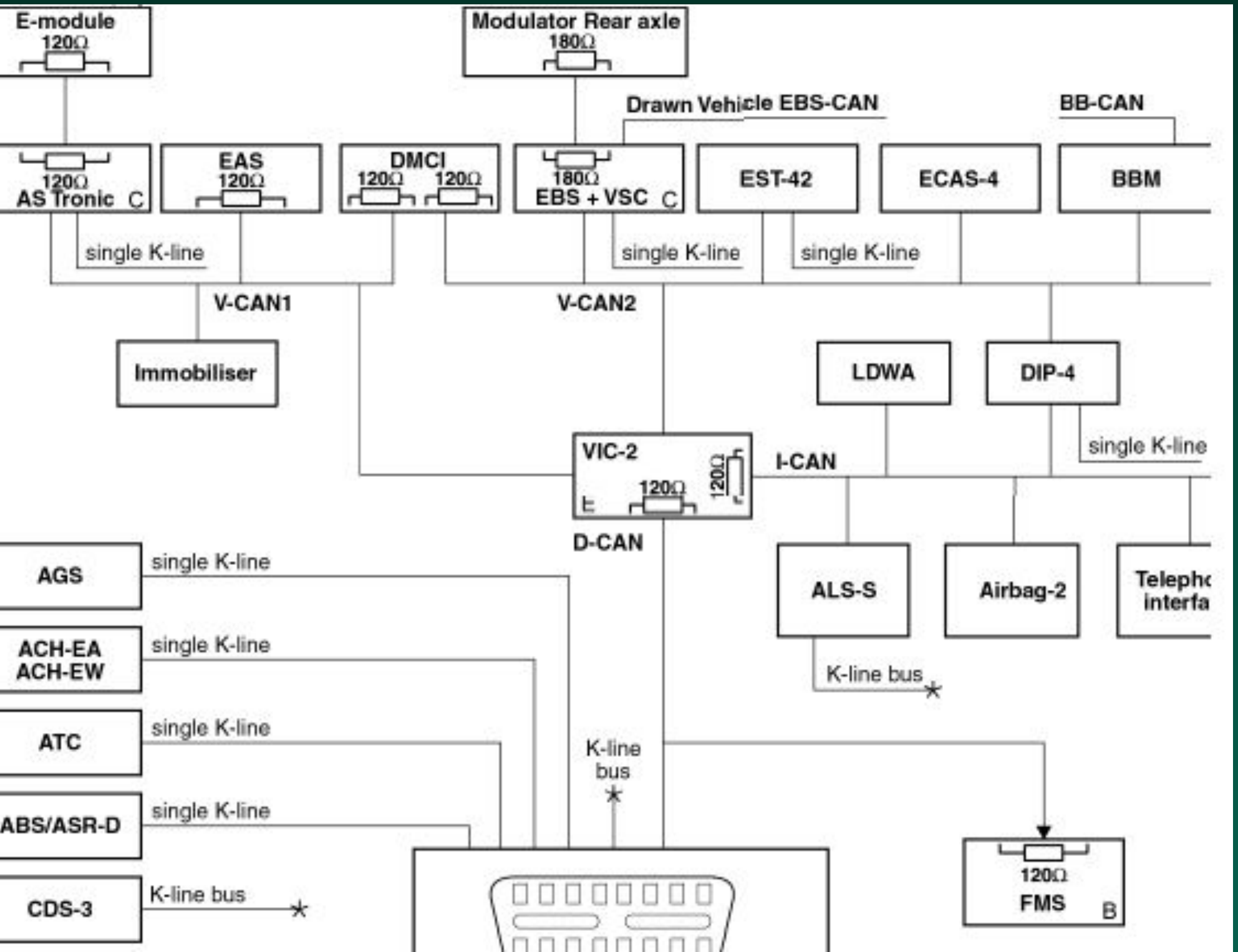
- Mandates tyre pressure monitoring on vehicles with a GVW < 10,000 lb (4537 kg)

NFPA 1901

- Recommends tyre inflation practice for fire trucks.
- Predicts a payback of 2 – 3 years.
- Improves stopping distance performance.

CAN Bus Applications

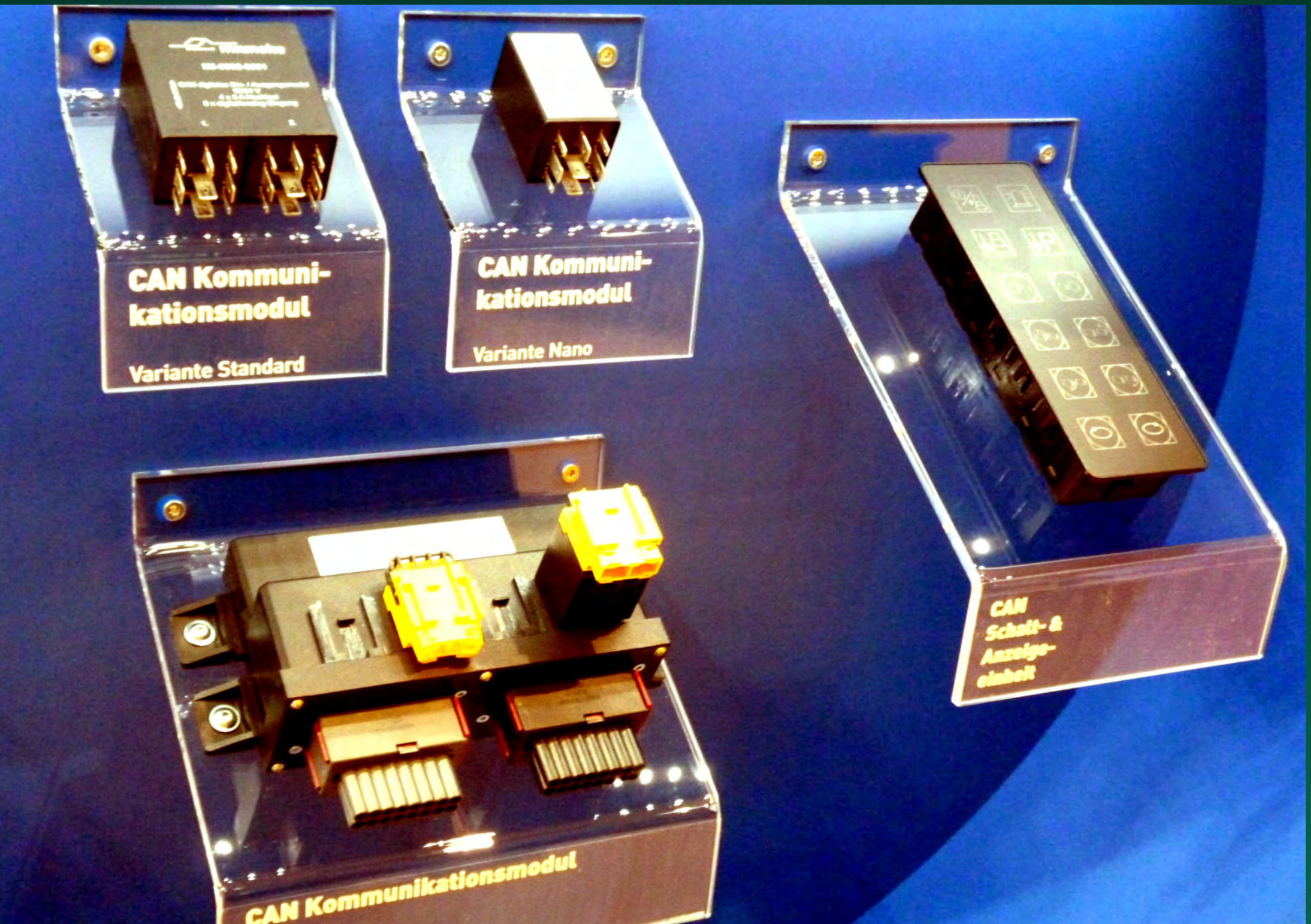
- Basis of compatibility between USA and Europe.
- Voltage compatibility problems.
- USA Protocol is J1939. International protocol is ISO 11992.


E-module
120Ω
Modulator Rear axle
180Ω
Drawn Vehicle EBS-CAN
BB-CAN
120Ω
AS Tronic C
EAS
120Ω
DMCI
120Ω
120Ω
180Ω
EBS + VSC C
EST-42
ECAS-4
BBM
single K-line
single K-line
single K-line
V-CAN1
V-CAN2
Immobiliser
LDWA
DIP-4
single K-line
VIC-2
120Ω
120Ω
I-CAN
D-CAN
AGS
single K-line
ALS-S
Airbag-2
Telepho
interfa
ACH-EA
ACH-EW
single K-line
K-line bus
ATC
single K-line
K-line
bus
ABS/ASR-D
single K-line
CDS-3
K-line bus
120Ω
FMS
B

CAN Bus Applications

- Australia is at the centre of USA and European CAN implementations.
- Need to develop generic service tools.
- Opportunity to use CAN for control applications on specialist vehicles.
- Third party CAN devices are now readily available.

CAN Bus


CAN Kommuni-
kationsmodul
Variante Standard
CAN Kommuni-
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Variante Nano
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einheit
CAN Kommunikationsmodul

Hannover Show

Hannover Show

Hannover Show


ROHR
die TUNNELZUG-SYSTEM Vorteile
GOBLOCK

‘What’s coming our way’

Rob Di Cristoforo
Director
Advantia Transport Consulting Pty Ltd
www.advantia.com.au

Topics

- Prime mover cab dimensions
- Steer axle mass
- Connected vehicles and beyond

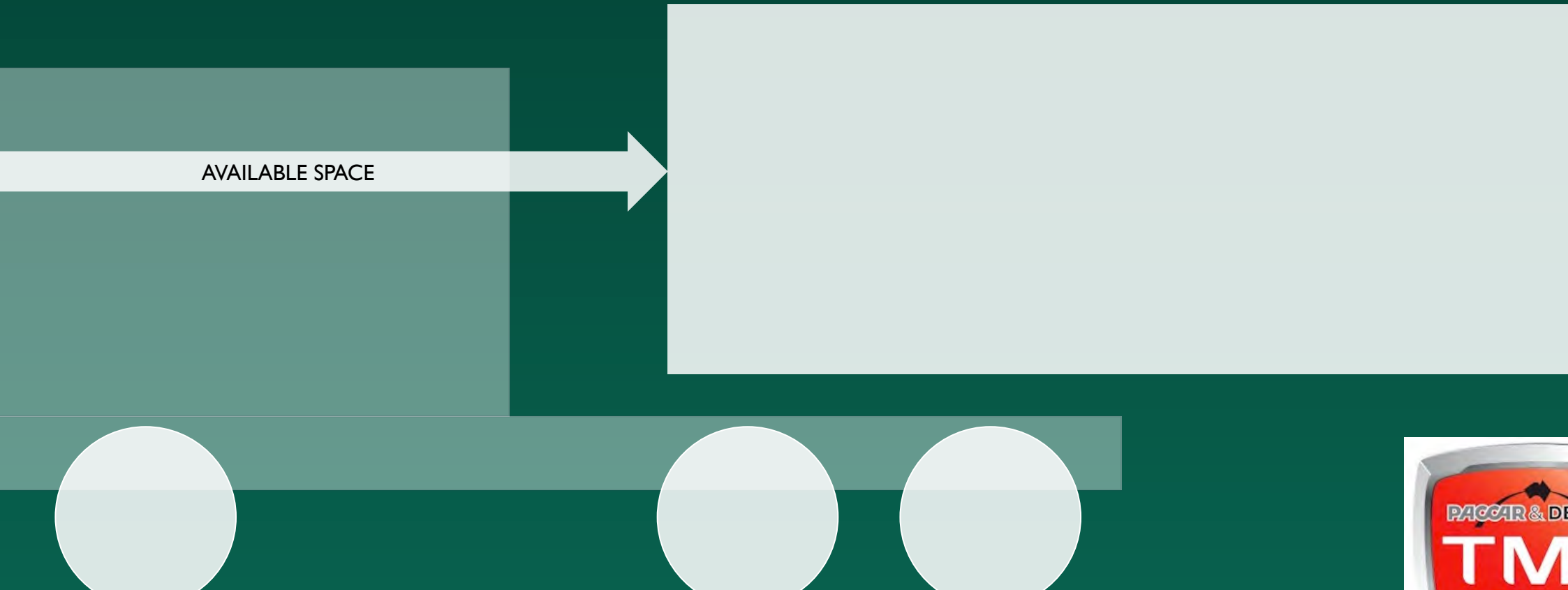
Prime mover cab dimensions

The US experience

- Trailer length limit
- No overall length limit
- Prime movers are ‘free’ and can get quite long

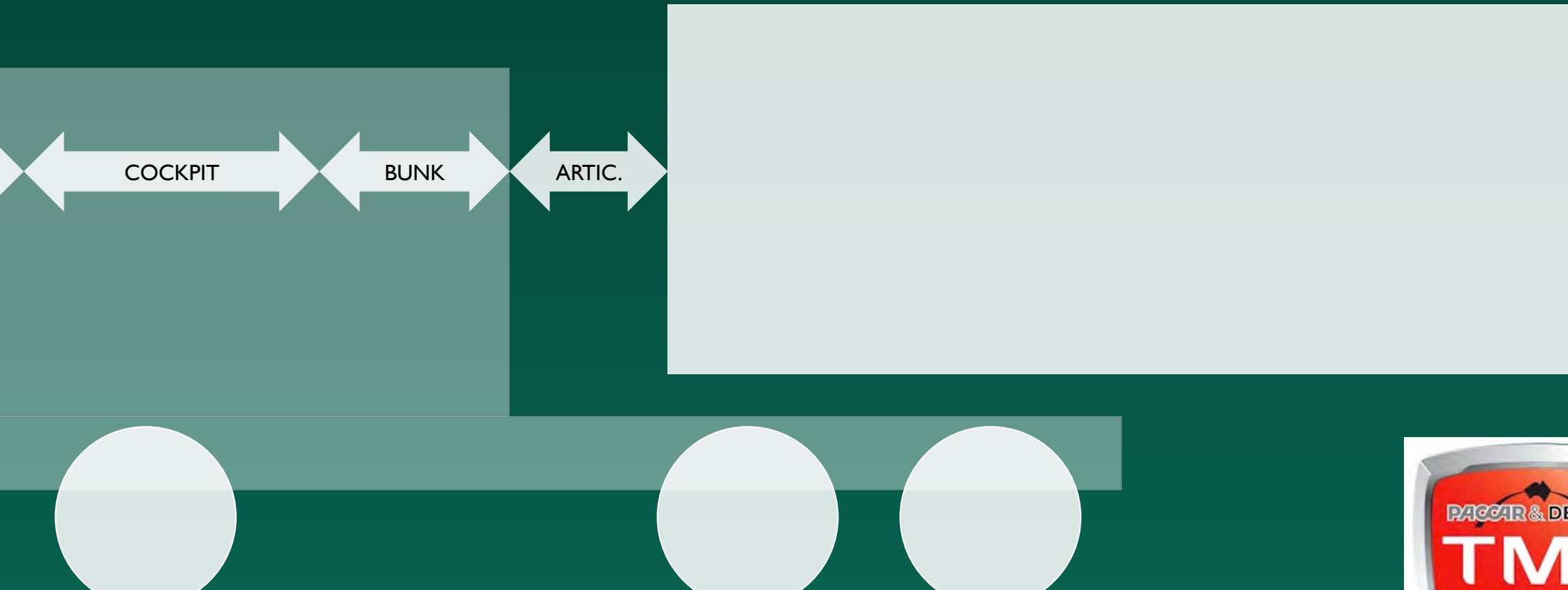
Europe & Australia

- Trailer length limit
- Overall length limit
- Difference between these: space for prime mover cab



erything needs more spa

- Drivers getting taller
- Need better sleeping quarters for fatigue
- FUPS may get bigger



Aerodynamics

- Cabs should be more “bullet shaped”
- This takes space, particularly driver legroom

European action

- European Automobile Manufacturers Association currently working with industry to identify future needs and directions for truck design

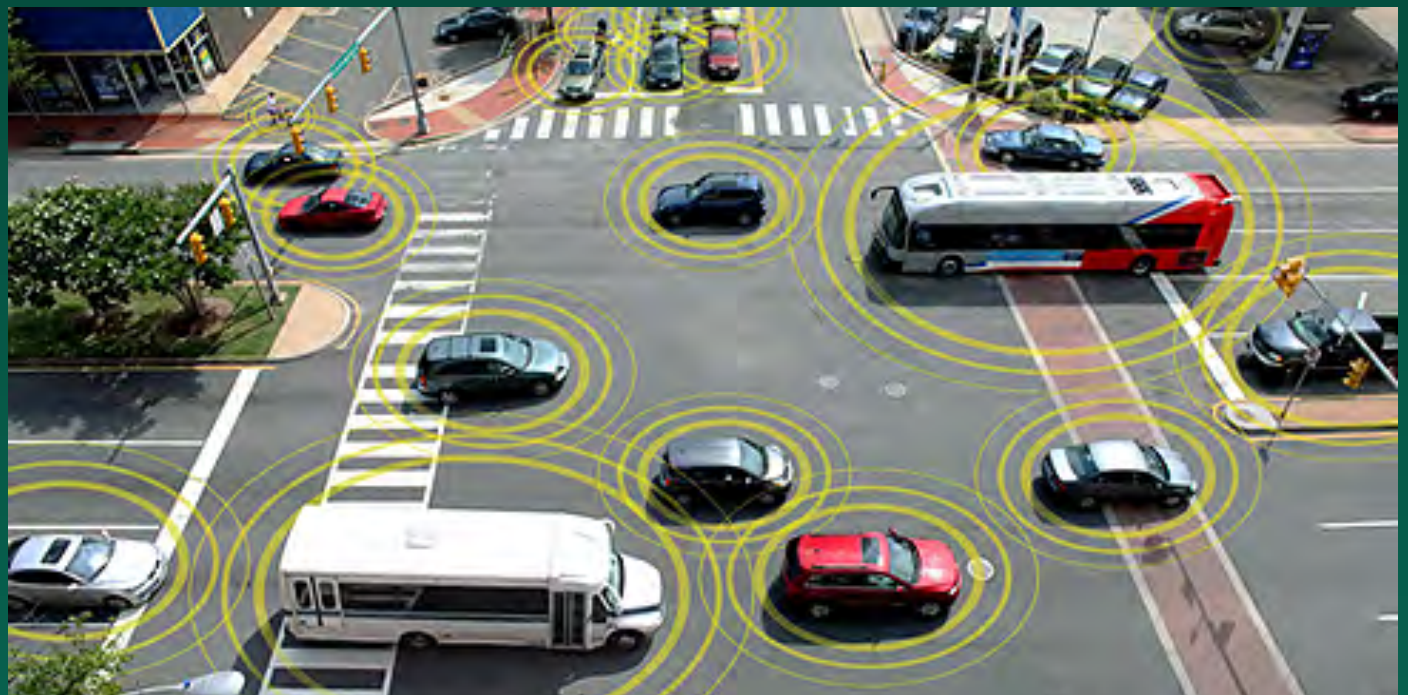
- “Watch This Space”

Steer axle mass

Upward pressure?

- No steer axle mass limit in Europe
- Practical measures and gross mass limits indirectly control steer axle mass
- Potential for undesirable outcomes in Australia if truck design evolution continues to add tare mass to steer axles

Connected vehicles and beyond



What is connected vehicle technology?

The use of wireless communications to share basic information about:

Vehicles:

- Position (GPS-based location, lat/long)
- Speed
- Heading (i.e., direction of travel)

Infrastructure

- Signal phase, surface conditions

Like Wi-Fi, but a dedicated, optimized channel,

What is connected vehicle technology?

Vehicle to Vehicle Communication (V2V) examples

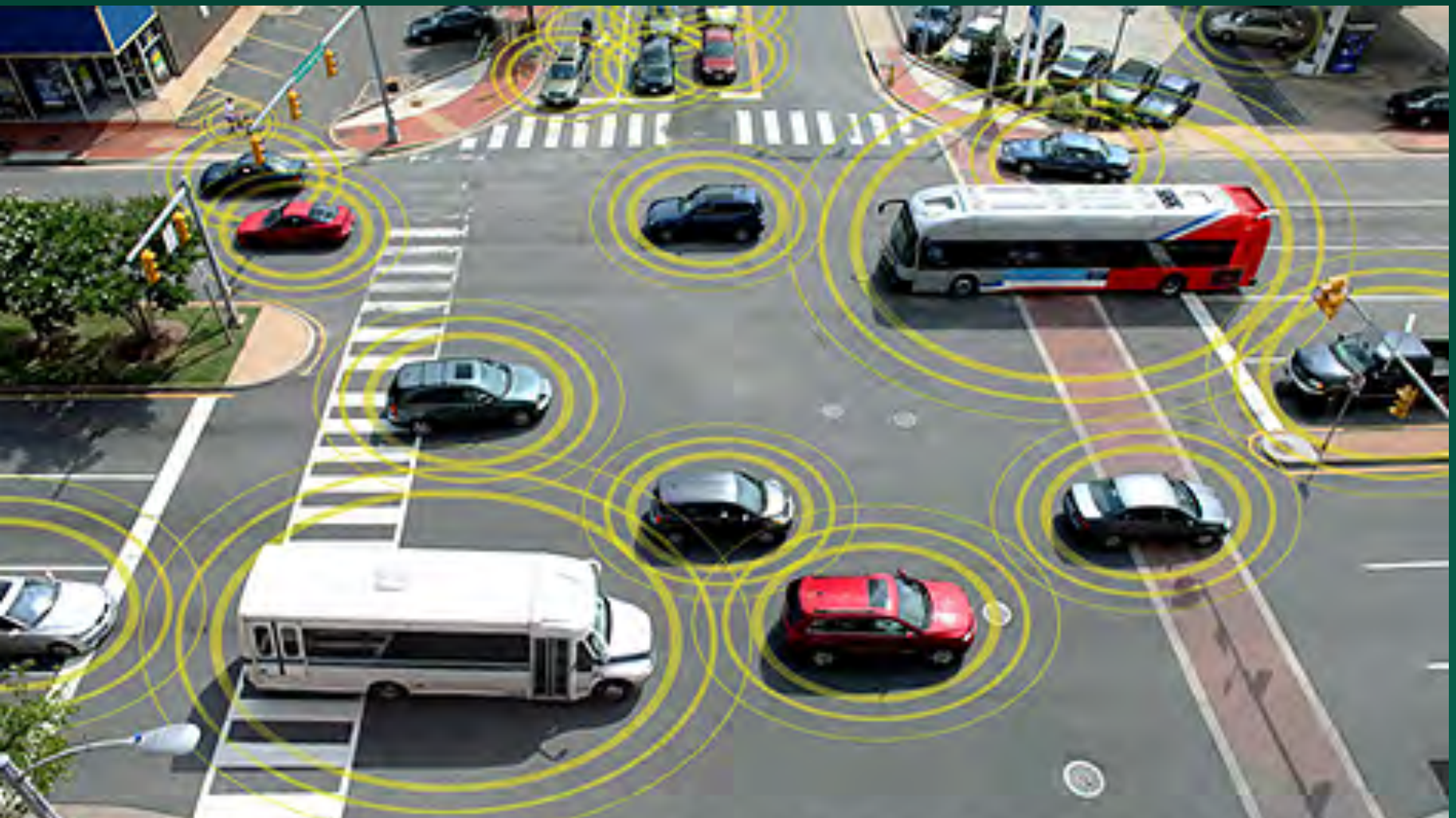
- Forward crash warning
- Electronic emergency brake lamps
- Intersection movement assist

Vehicle to Infrastructure Communication (V2I) examples

- Curve speed warning
- Emergency vehicle signal preemption
- Road surface condition

Vehicle to Everything Else (V2X) examples

A connected traffic environment



Trial now underway in Ann Arbor, Michigan

- US$26M over 2½ years
- 2,800 cars, trucks and buses
- 73 lane-miles of roadway with 29 roadside equipment installations
- 3,800 local people signed up to participate

Ann Arbor trial network

Final note: Autonomous vehicles

- We have the technology
- "Autonomous Car Bill" approved by California for certification of autonomous vehicles from 2015
- This stuff is NOT FAR AWAY!