

Challenges of Innovation & Technology on Infrastructure Design & Delivery

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**Auckland
Transport** 

An Auckland Council Organisation



AT manages Infrastructure assets worth \$16.1 billion



7,368 km roads, of which 6,468 are sealed



7,178 km footpaths



1,233 bridges and major culverts



4,149 retaining walls and sea walls



108,097 streetlights



697 signalised intersections and mid-block crossings



Parking buildings and assets including 895 pay and display units



41 rail stations with scheduled services



57 electric trains (EMUs), 10 diesel trains



21 ferry wharves



6 busway stations and 2,342 bus shelters

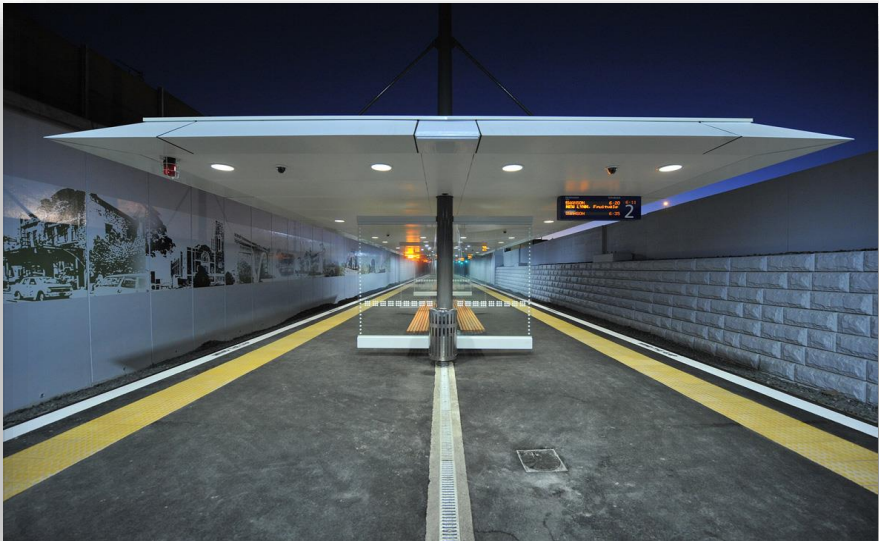


The AT Hop ticketing system



46 lifts and 23 escalators

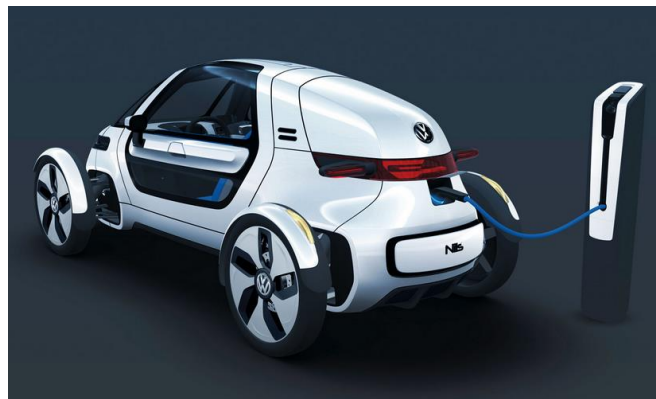
The Old and the New



What impact does this improvement have on AT?



EV's – what impact on our Infrastructure?

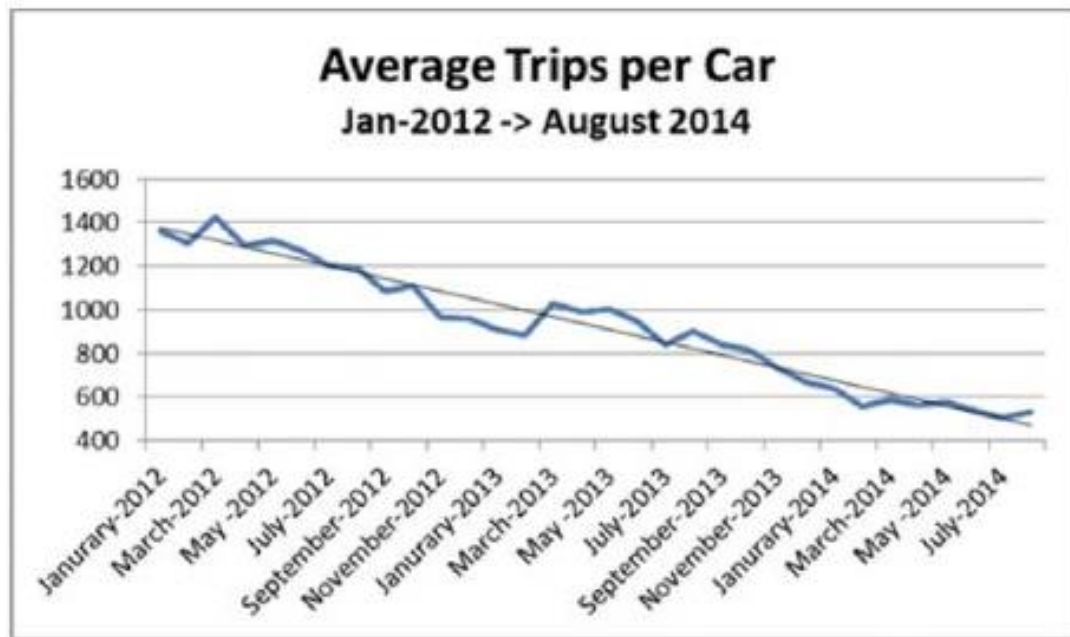


New Technologies are changing our behaviour!

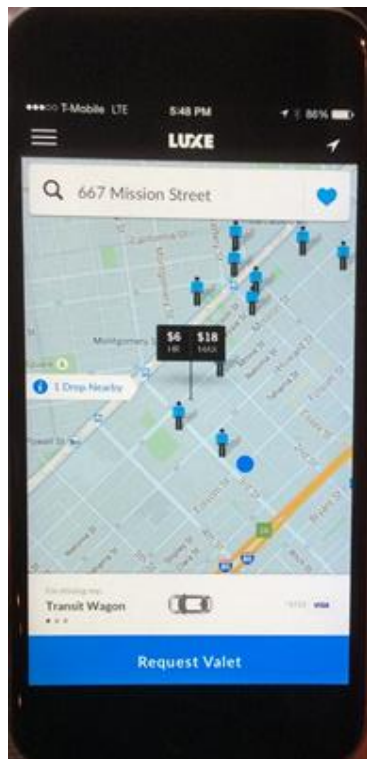


Impacts of TNCs

- Major impact on overall taxi industry



Impact of Apps on Infrastructure



Will we use this in Design?



Will these impact on our Infrastructure?



How will Autonomous Vehicles impact on Infrastructure?

ETHICAL PROGRAMMING OF AUTOMATED VEHICLES

Dynamic Design Laboratory Daimler und Benz Stiftung RE

SAFETY

HOW DO WE BALANCE THESE OBJECTIVES?

MOBILITY **LEGALITY**

Sensor Uncertainty

Sensor vision **Human vision**

Sarah M. Thornton, Selina Park, Stephen M. Erlen, J. Christian Gerdes
Mechanical Engineering Department, Stanford University

Consequentialism vs. Deontology

Optimize outcome:
Minimize potential harm to bicyclists

Follow rules:
Maintain 3 ft gap around bicyclists

Algorithm

minimize *consequential costs*
action
subject to *deontological constraints*

Occupant comfort
Path following

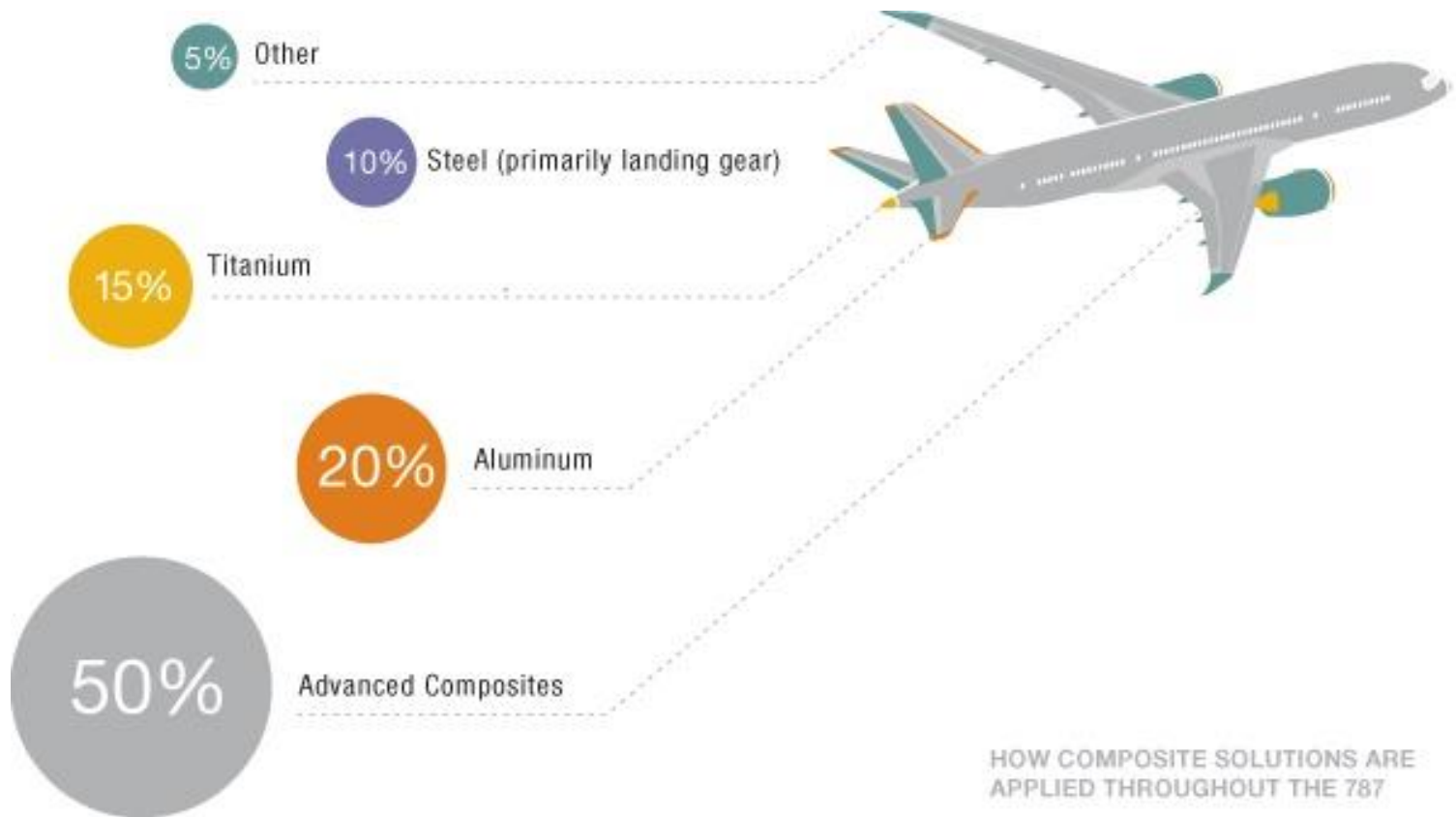
Collision avoidance

REFERENCE: J. C. Gerdes and S. M. Thornton, "Implementable ethics for autonomous vehicles: Autonomes Fahren: Technische, rechtliche und gesellschaftliche Aspekte, M. Maurer, J. C. Gerdes, B.



What can we learn from the 787?





HOW COMPOSITE SOLUTIONS ARE APPLIED THROUGHOUT THE 787

How do we use emerging technologies to lower build and opex costs?



Thank you

AT....Delivering you transport choices to get you where you want, when you want.

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