

The Future of Autonomous Vehicles

An Initial View for Global Debate and Challenge

8 October 2018



Review
existing
research

Map the
emerging
landscape

Explore gaps
via global
dialogue

Identify the
key priority
opportunities

Prepare
global
synthesis

Support hosts
with core
implications

Project Scope

This project is identifying where and what are the key opportunities for AV, as well as the pivotal drivers of change across a number of major locations.

**Key Questions Include:**

- Where will be the key hot-spots for AV development and deployment?
- Where is advanced regulation most likely to act as a catalyst for AV deployment?
- What level of safety (crashes) is acceptable for the full launch of AV in the next decade?
- Will AV increase or decrease total traffic flow and congestion?
- Will automated mobility services replace, reduce or extend the reach of public transport?
- Of all the technologies in the mix, which are in greatest need of further development before the benefits of AV can be realised?
- What are the distinct benefits from AV that are not already coming from current and future-connected ADAS?
- How important will international standards and commonly shared technologies be for AV adoption?
- Which will be the pivotal organisations, cities and governments that control adoption rates?
- Who will lead on integrating all the varied systems needed to enable AV to operate?
- Who will customers trust most to deliver a safe, reliable and comfortable AV experience?

Initial Perspective

An initial view on some of the key options and challenges ahead has been prepared. This is the starting point of the global dialogue.



Time to Full Conversion

Despite growing investment and technology availability, it is going to take time to change the whole vehicle fleet - maybe up to 25 to 30 years.



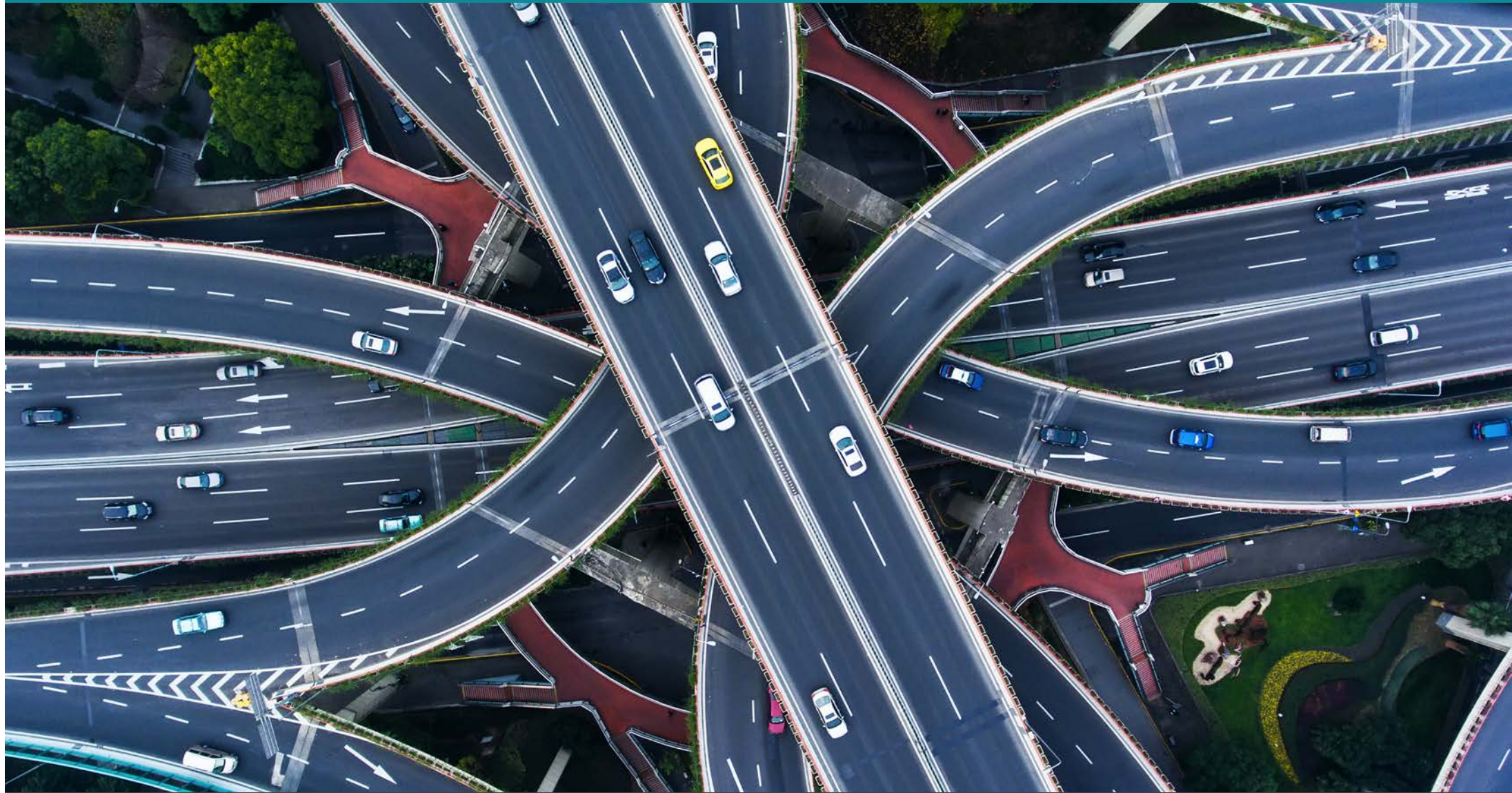
Multiple Benefits

AV will eliminate congestion, reduce injuries, free time, reduce energy consumption, improve air quality, drive social inclusion and create new jobs.



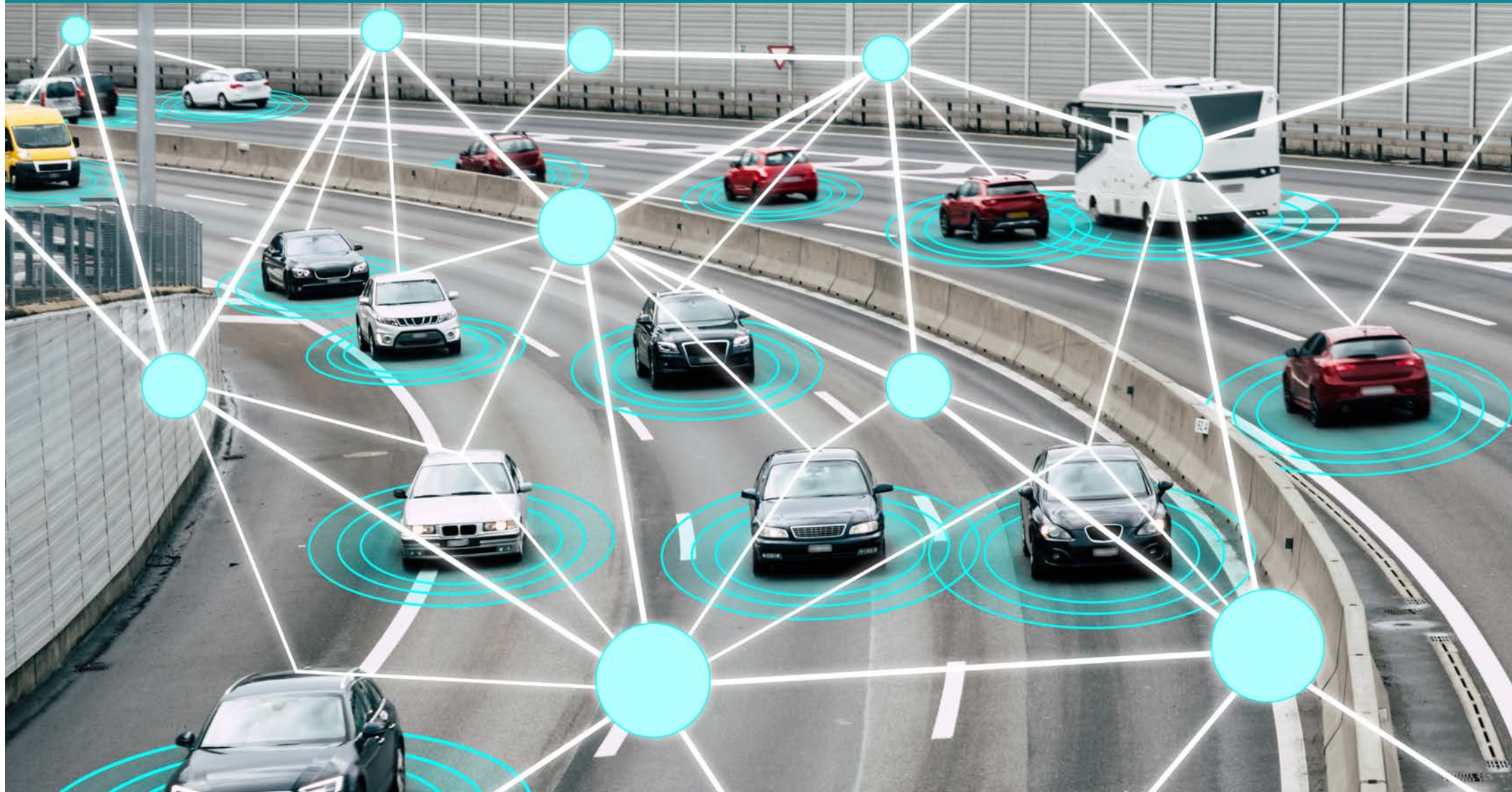
Controlled Environments

While controlled environments have demonstrated some early steps for AV, there are more complex challenges to be addressed on the open road.



Rethinking Planning

For AV to get real traction it may be necessary to turn transport planning on its head and for cities to deliver new visions which in turn will drive demand.



Connected vs. Autonomous Vehicles

Connectivity and autonomy are complementary technologies but connected vehicles are not necessarily autonomous nor are AVs inevitably connected.



Alternative Sources of Safety Benefits

Many advocating AV claim huge safety benefits, but the majority of these benefits may well come from ADAS (advanced driver-assistance systems).



Non-safety Benefits

Many of non-safety benefits from AV will come from reducing the cost of travel and saving time due to significant drops in congestion.



Resistance to Sharing

As many people enjoy their personal space, some see that public interest in a significant rise in sharing vehicles may not be as high as expected.



People vs. Goods

The use of AV to move people could scale in parallel with the movement of goods - and not follow in their wake as was previously thought.



Support for Platooning

There is no real opposition to level 1 truck automation and regulators are supportive of platooning since it offers societal as well as business benefits.



Full Truck Automation

The significant automation (level 4) of highway trucks is of huge commercial interest to the freight community and will transform long-haul journeys.



First and Last Mile

Improving the inefficient 'first mile' and 'last mile' is a major opportunity for innovation with multiple health, energy and efficiency benefits.



Mobility as a Service

Mobility will be delivered as a service that will not only increase vehicle utilisation but correspondingly also reduce the cost-per-mile.



Cost of AVs

Personal AVs will cost more than human-operated vehicles, but access to a shared AV will be cheaper than today's ride-hailing and taxi services.



Fleet Deployment

Many initial deployments of the 'fleet' phase of AVs will focus on city streets where speed and therefore risk is lower than elsewhere.



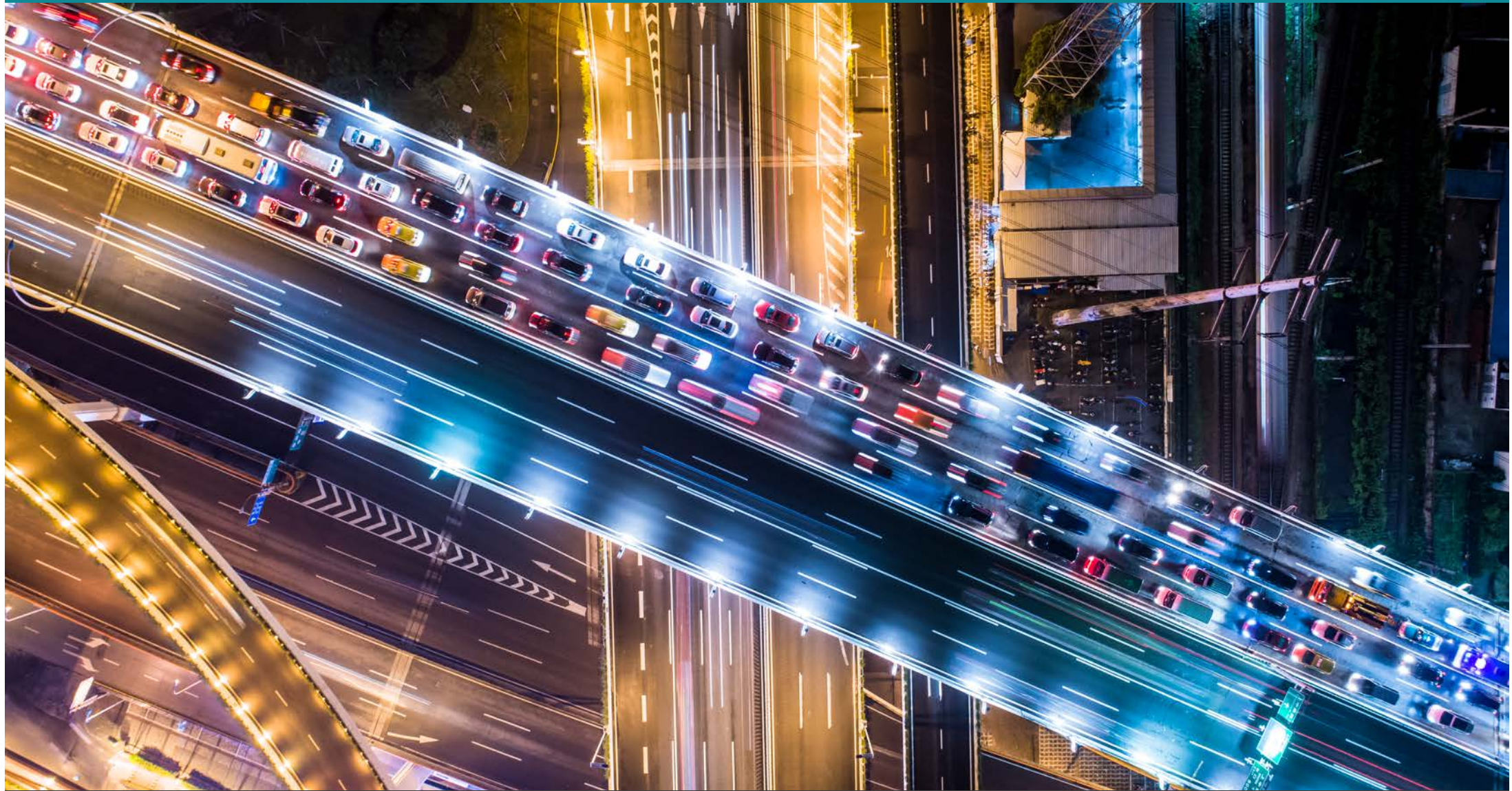
Support for the Fleet Model

Fleet is increasingly seen as the way forward for passenger vehicles and could change both travel patterns and car ownership decisions.



Public Transport Solutions

The operational design of autonomous buses will not cover all current service areas, so robo-taxis will have to fill transportation gaps.



Inadequate Harmonisation

Poor coordination between transit systems, urban planning and little planning of long-term transit solutions may delay the benefits of AVs.



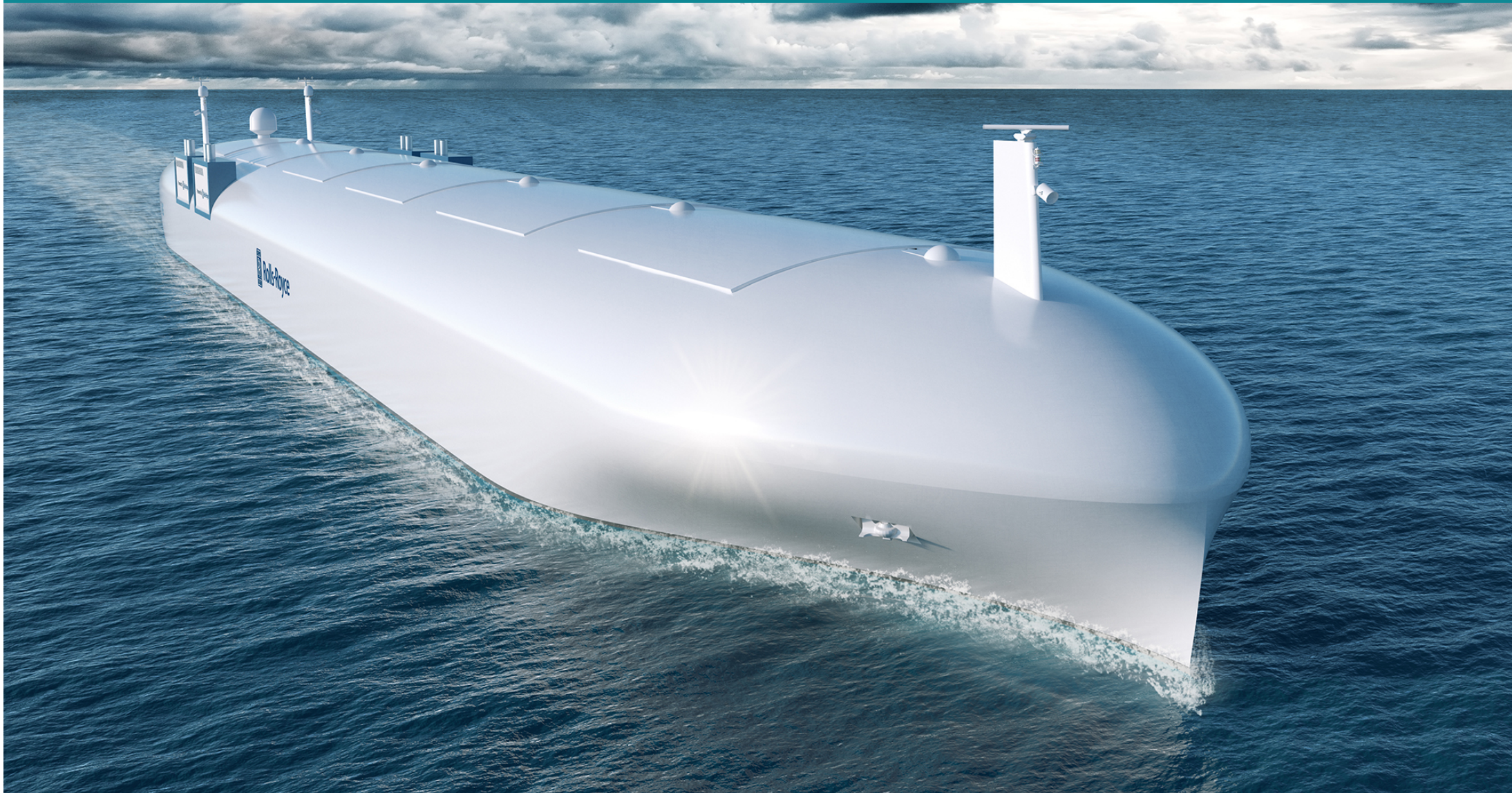
Who we Trust

Most of us will prefer to trust traditional car brands more than big-tech to deliver a safe, reliable and comfortable AV experience.



Initial Users

AV will have greatest appeal for those without access to affordable mobility or who are uncomfortable about driving - the young, old and disabled.



Seaborne AV Ambition

The maritime industry's goal is not removing humans from decision-making processes completely but to eliminate the need for crew on board vessels.



Confidence in Seaborne AV

With rapidly advancing technologies and compelling investment cases, the trajectory for seaborne AVs is more predictable than others.



Military UAV Remit

The limiting factor for autonomous weapons is not the technology but the political will to produce, or admit to having, such capabilities.



Air Traffic for Drones

Drones do not have the same level of collision avoidance systems as planes, so need a flight control network able to self-manage UAV air routing.



Access to Air-Taxis

Although initially only for the wealthy, as they evolve air taxis could compete with ground transport as a more flexible option for personal mobility.



Pilotless Planes

Pilotless passenger flights are a natural progression as planes already fly on autopilot and airports are equipped for fully automated take-off / landing.



Impact of Regulation

The regions that gain most initially will be those where there is advanced regulation to act as a catalyst for AV deployment.



Common Standards

International standards and commonly-shared technologies will be essential for driving global rather than regional AV adoption.

FUTURE AGENDA

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