Vehicle Automation Scenarios and Challenges

cause for reflection

AMAA 2014

Smart Systems for Safe, Clean and Automated Vehicles

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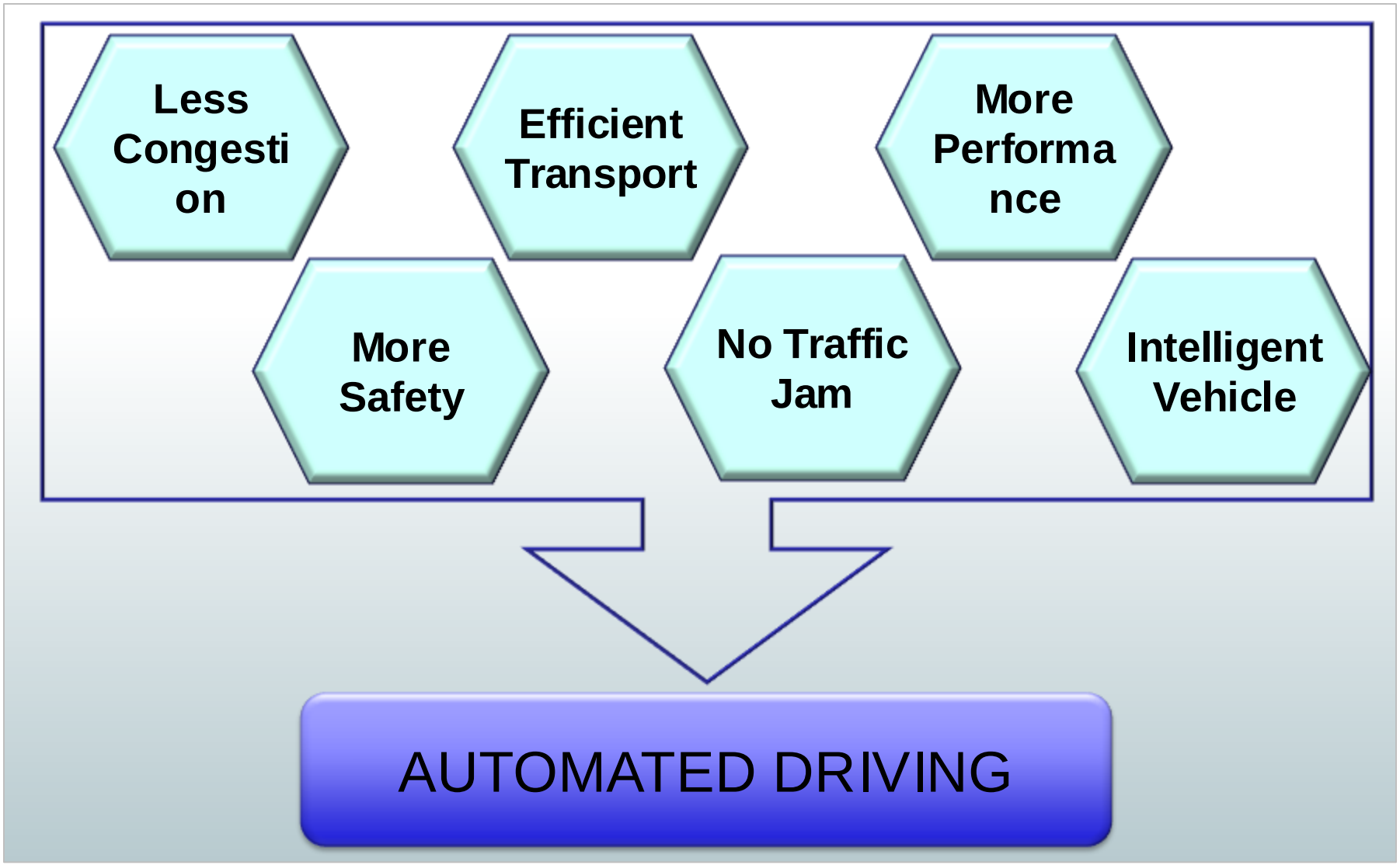
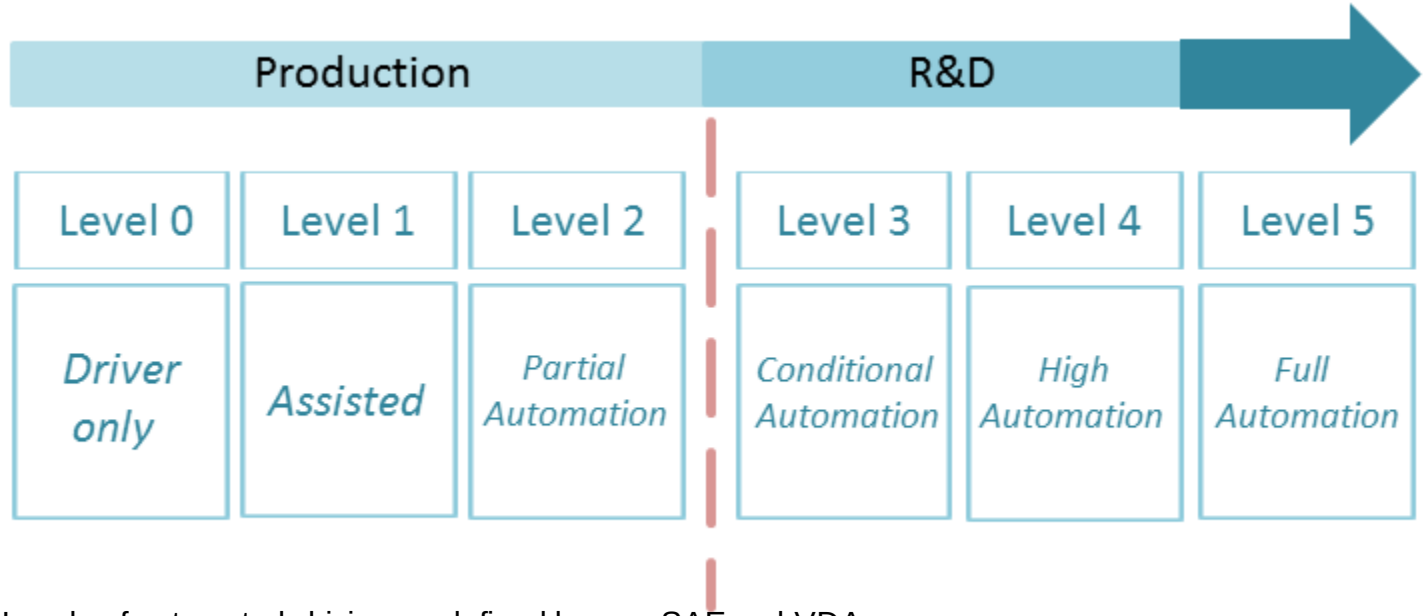
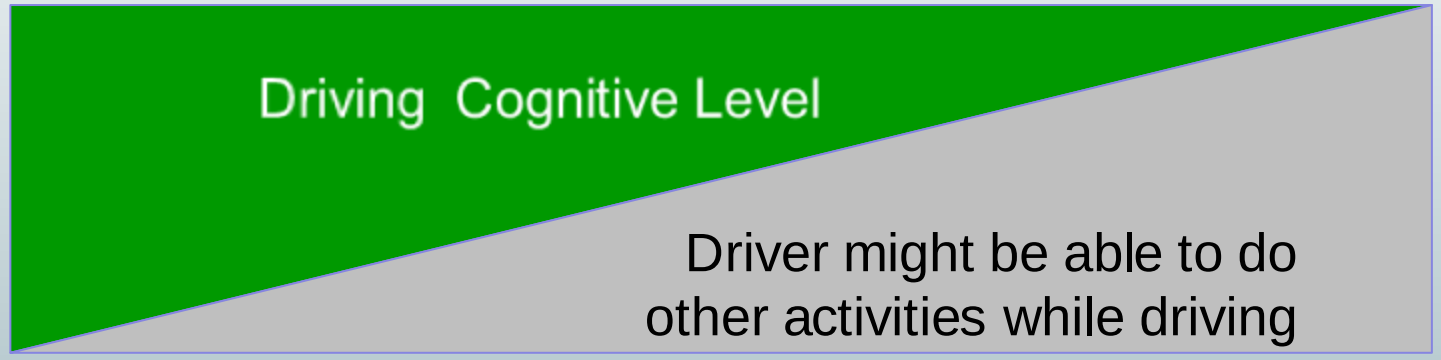
Smart Mobility



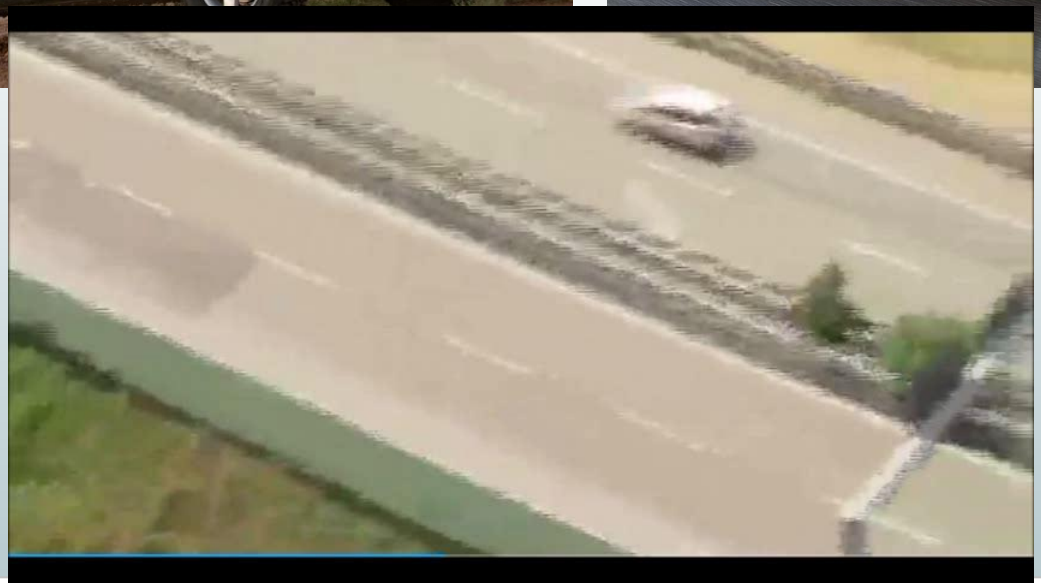
Levels of Automated Driving



Levels of automated driving as defined by e.g. SAE and VDA.



Where We Are?

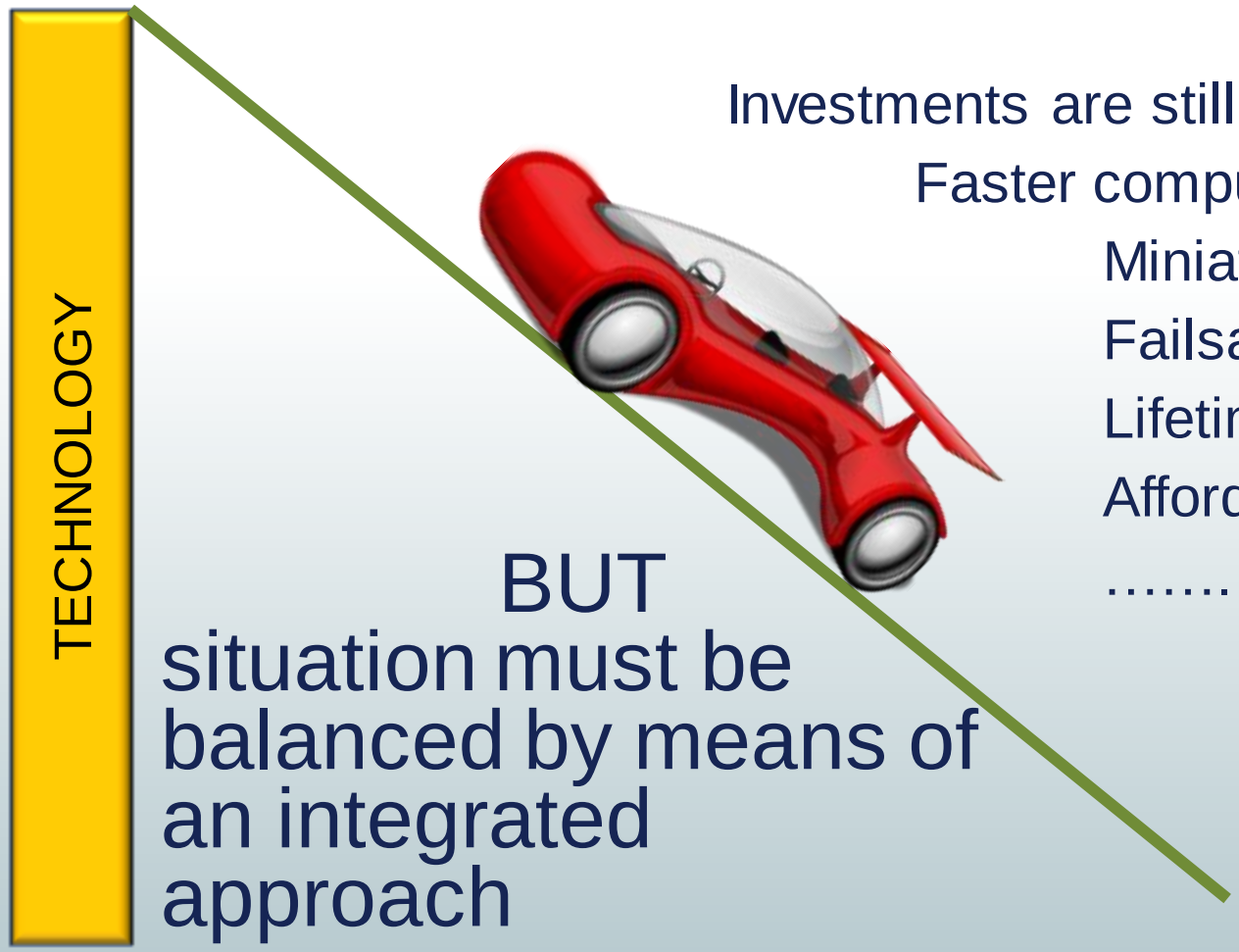


How We Are Progressing?

Huge investments on technology

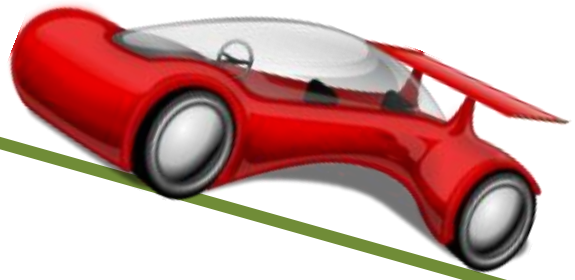
Investments are still needed for:

- Faster computation
- Miniaturisation
- Failsafe
- Lifetime
- Affordable cost
- …….



BUT situation must be balanced by means of an integrated approach

Integrated Approach



TECHNOLOGY

Communication at roadside and data backbone

Enhanced and collaborative services

Data security

System integration on the car: i.e. sensor fusion

System integration in the environment: i.e. traffic flow control

System Integration

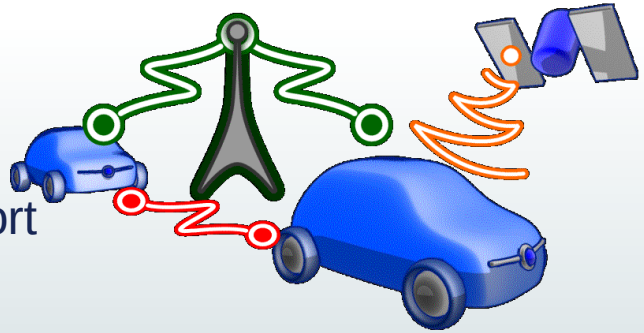
Vehicle in the cloud

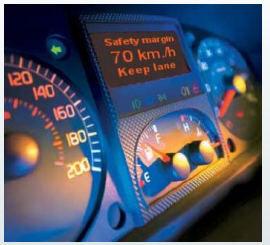
Infrastructure

Infrastructure

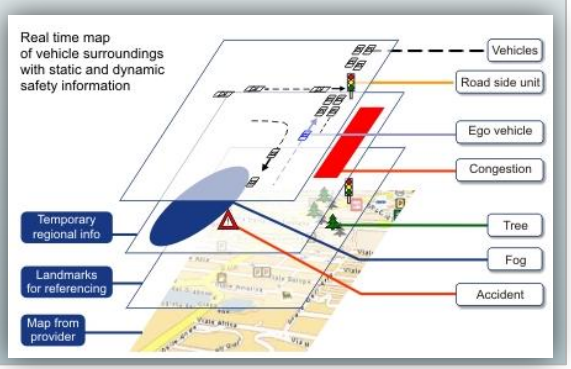
- Functions and services for more eco-friendly and safer driving

- **Intelligent Transportation Systems** based on Car-to-car and car to infrastructure communication, enabling
  - Preventive safety apps
  - Traffic efficiency apps
  - Automated driving support





- **Vehicle in the cloud**, enabling
  - Enhanced services: connected navigation and dynamic maps, connected eco-driving
  - Collaborative services based on drivers' communities: serious gaming, pro-active traffic notifications, car sharing,etc.



Intelligent Transportation Systems based on V2X

Status

- Pan-European Field Operational Tests have proven potential benefits
- Commitment by industry R&D, first prototypes are functional
- First projects on V2X for automated driving have started

Gaps

- There are still technical challenges, e.g. Scalability of communication in congested areas
- Deployment on next generation vehicles has several question marks
  - First set of applications, leveraging on business use cases (e.g. insurance, commercial/advertisement)
  - Embedded vs aftermarket solution
  - Link to Ecall platform integration
  - DSRC/802.11p and/or 4G/LTE
  - Security aspects

Vehicle in the cloud

Status

- Cloud based mobility services are becoming more and more popular
- Alternative mobility based on social interaction and real time information (e.g. car pooling, car sharing, multi-modality) is growing especially in metropolitan areas

Gaps

- Large sw companies are already supplying commercial solutions both on the smartphone and embedded platform market. Integration of public R&D results with proprietary solutions is still not solved.
- Deployment of smart mobility services depends on the availability of data and interoperability with all possible information sources
  - Public Services and Public Data (public transport, traffic etc.)
  - Users' Community data (Privacy Policies of single users)
  - Proprietary data (vehicles, private infrastructure, service providers, etc.)

Integrated Approach

TECHNOLOGY

Standardisation still open especially in Europe

Interoperability (e.g.EU, US,) will impact on OEM and user

common, interoperable and standardised platforms and interfaces, for vehicle-cloud communication

Legal framework for testing and operability

Legal

Standard

System Integration

Vehicle in the cloud

infrastructure

The Ethics of Autonomous Cars

- Sometimes good judgment can oblige us to act illegally. Should a self-driving vehicle get to make that same decision?

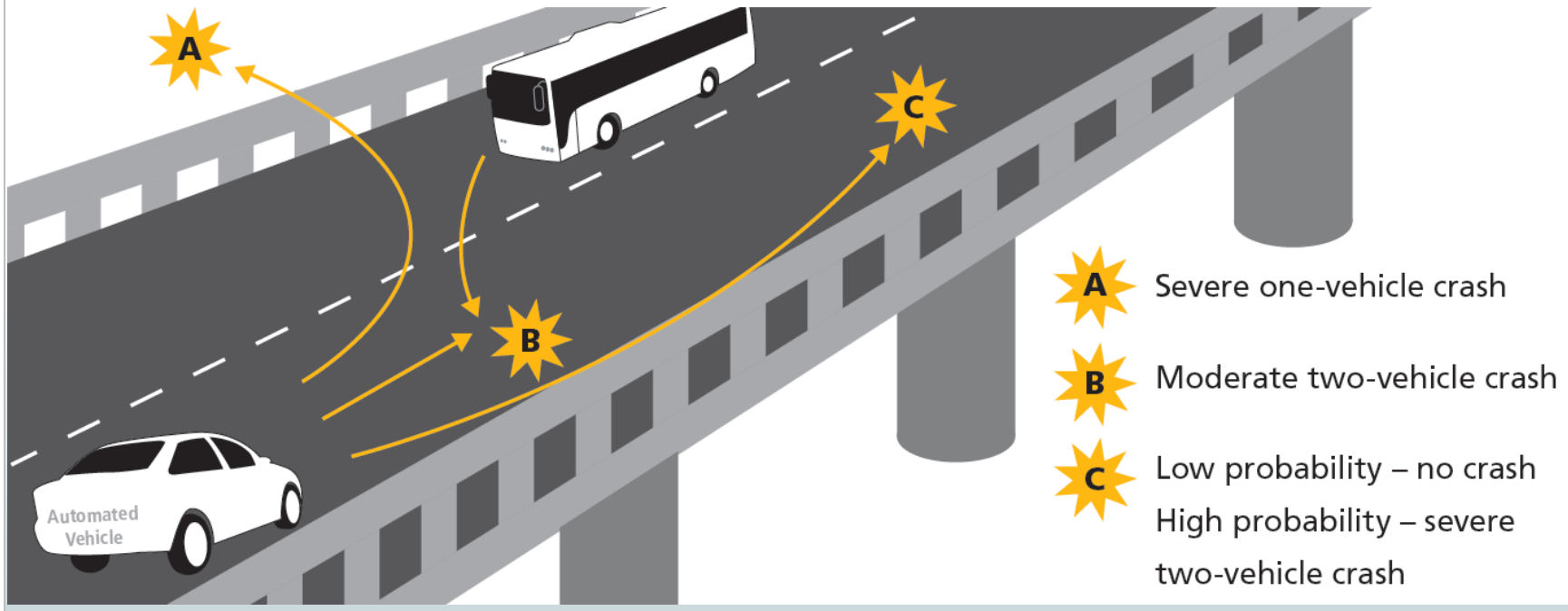


Diagram of three alternative trajectories for an automated vehicle when an oncoming bus suddenly enters its lane. **(** Noah J. Goodall **)**

Thank you for your attention

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