REAL WORLD BENEFITS OF AUTONOMOUS VEHICLE SAFETY SYSTEMS

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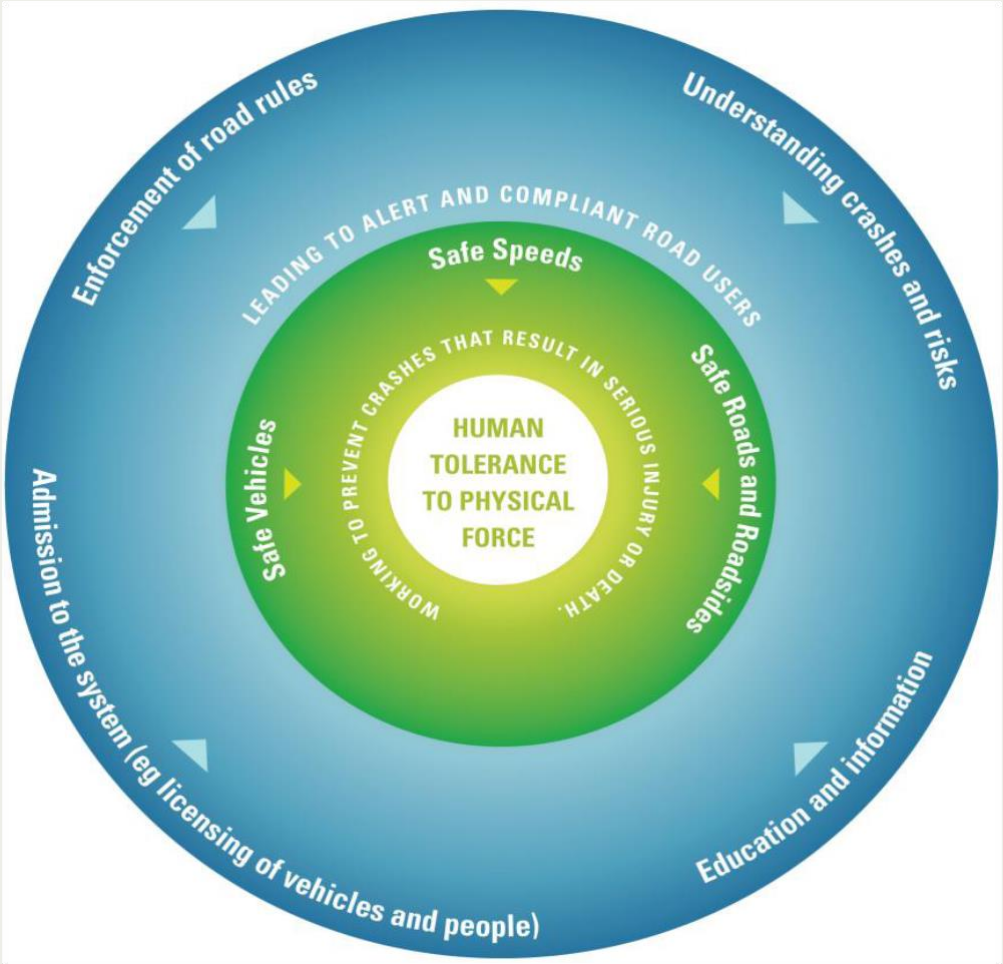
The Safe System



The Safe System

At its heart is the tolerance of the human body to crash forces

Safer cars

Safer speeds

Safer roads and roadsides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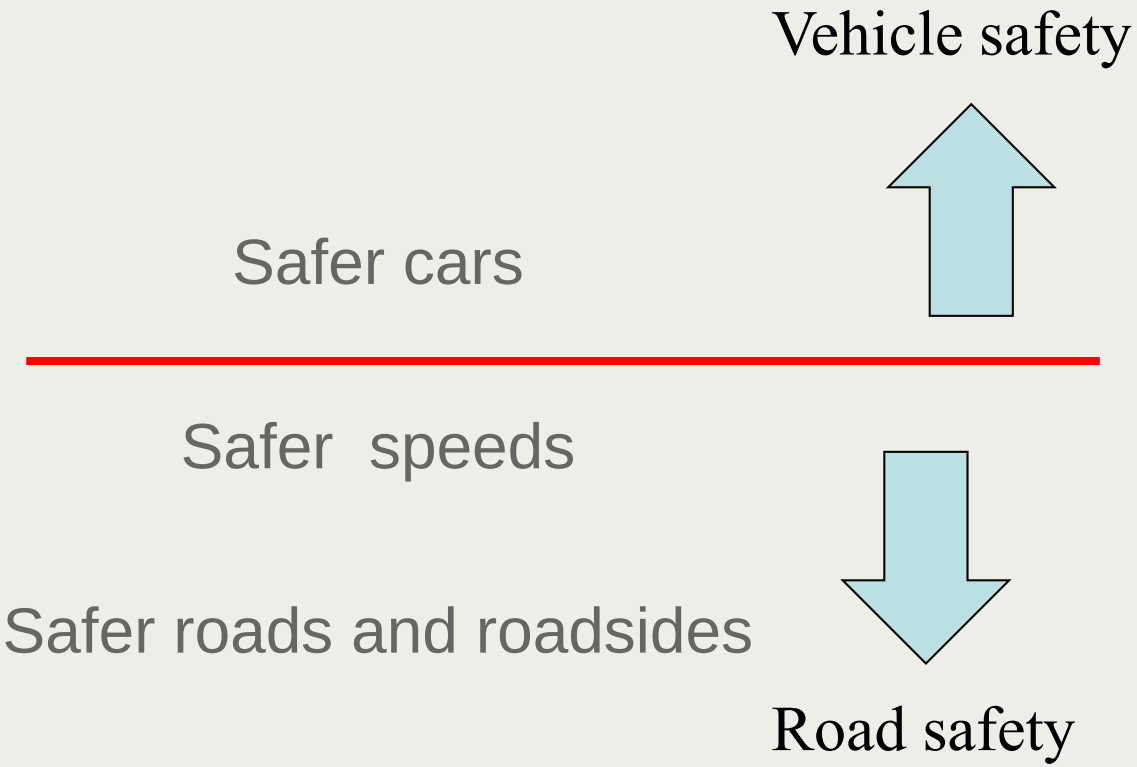
Crash testing for safety

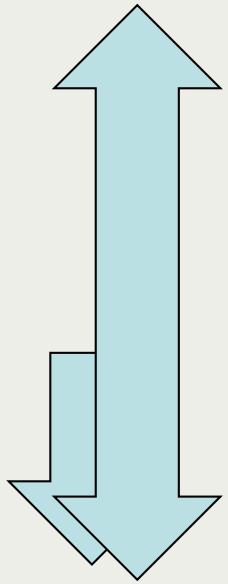

Vehicle safety
Safer cars
Safer speeds
Safer roads and roadsides
Road safety

Autonomous vehicle systems

Safer cars

Safer speeds

Safer roads and roadsides



Road safety

Example: using autonomous system to avoid pedestrian conflicts

Definition of a pedestrian conflict: The risk of collision is acute and high

Severity of the impact depends crucially on two things

The energy in the impact

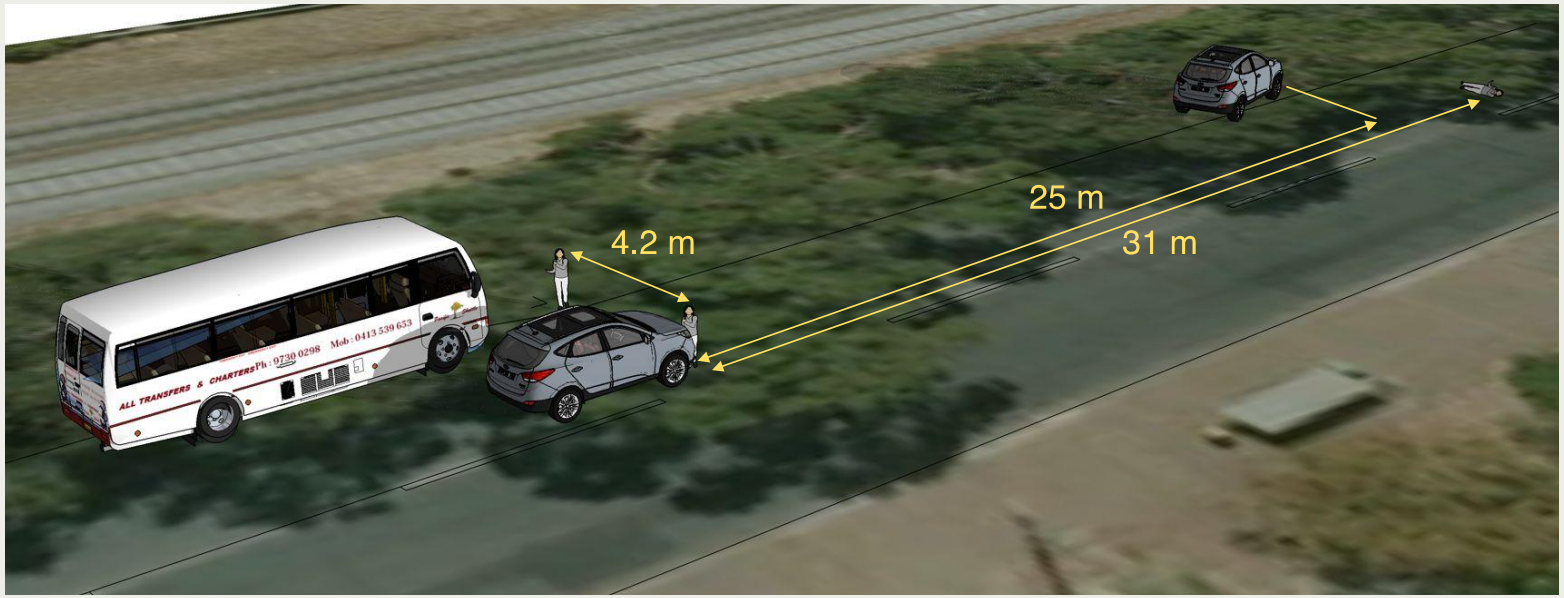
How that energy is transferred between the vehicle and the pedestrian

Approaches to mitigating conflicts

	Travelling speed	Reaction time	Braking	Vehicle impact safety
Speed control				
Human factors				
Vehicle design				

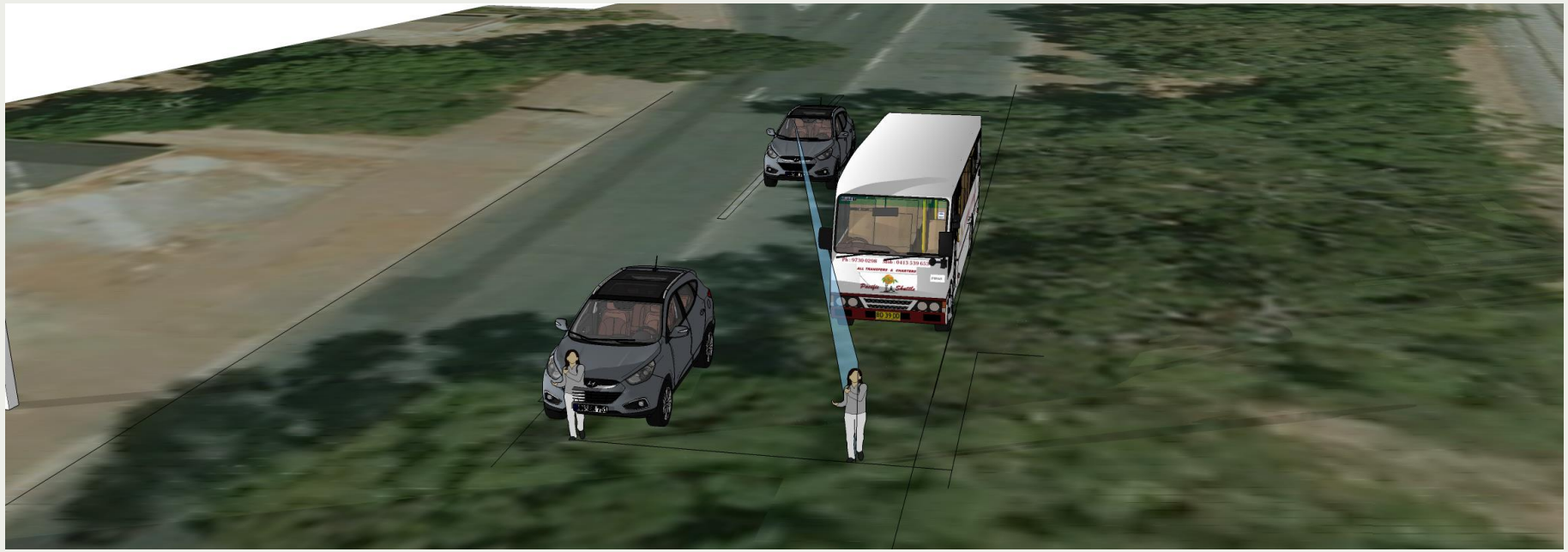
Understanding real-world benefits

Step 1: Understand real world safety conflicts!



Reaction times and braking are very important

Autonomous emergency braking systems “see” the pedestrian conflict before the driver does and brakes earlier than the driver can.

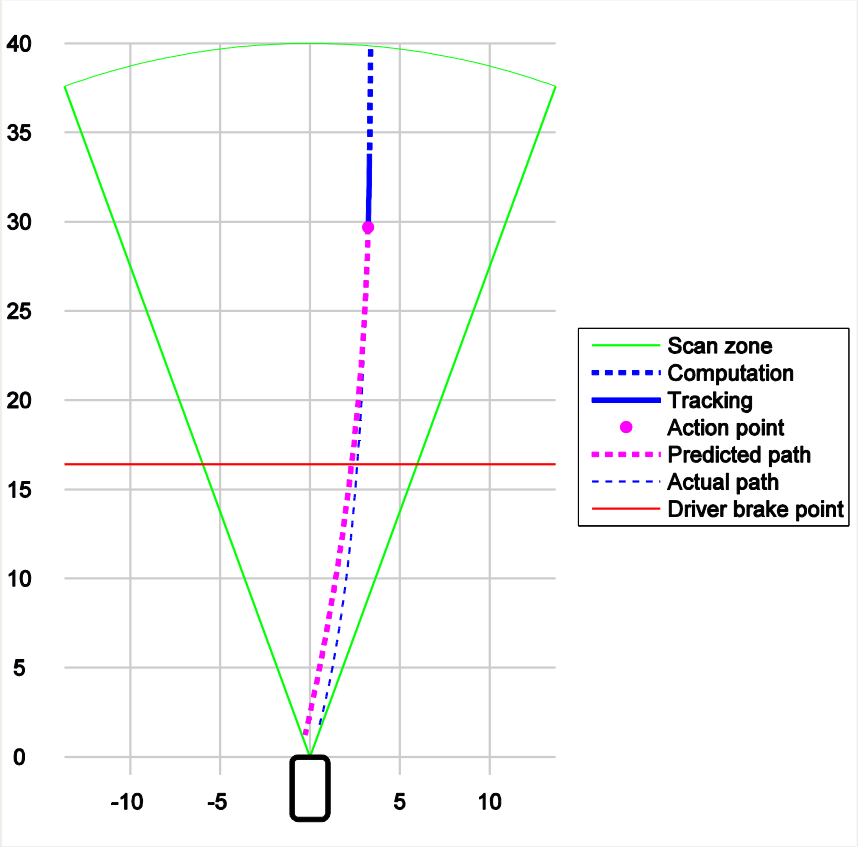


Evaluation through simulation of actual crashes

Combining information about real crashes to examine what characteristics of such systems should be measured

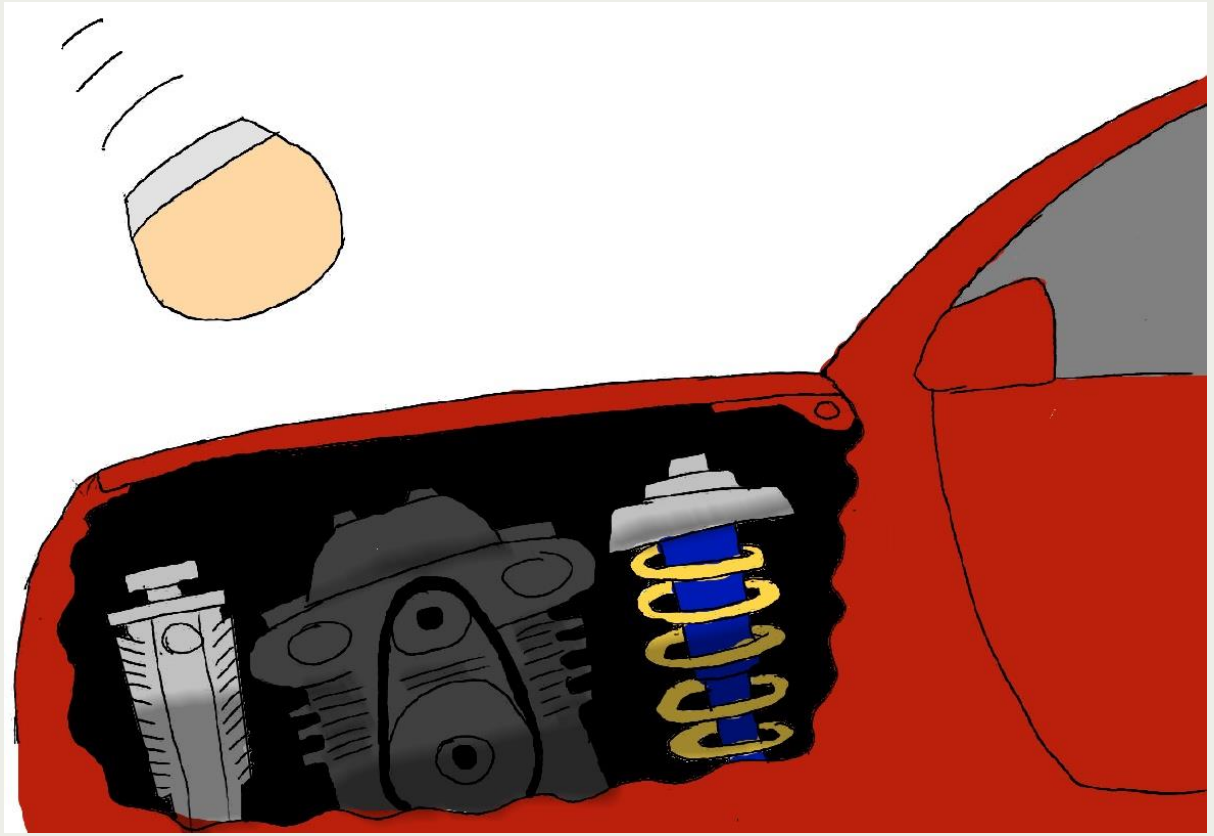
In depth crash investigation

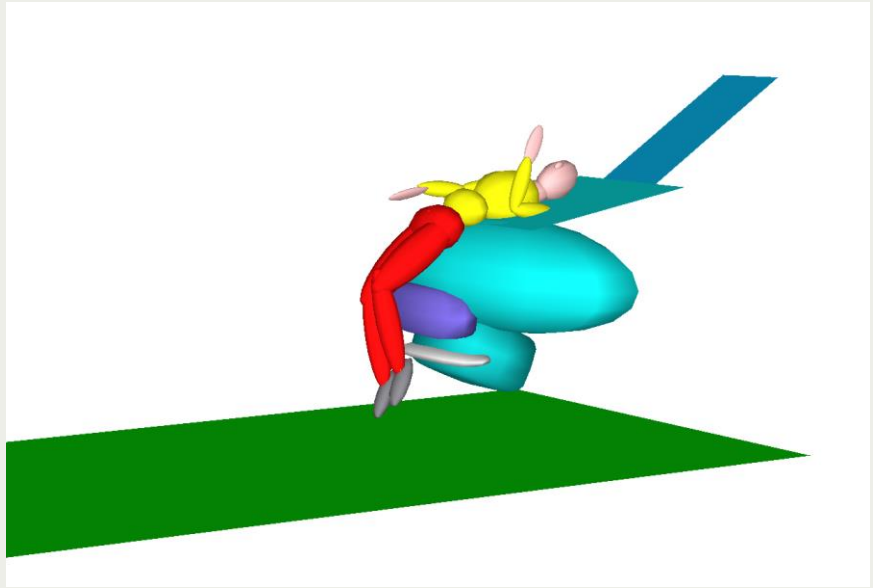
Reconstruction and simulation of autonomous systems



Development of testing capability

Cushioning the impact is still important





Understanding real world benefits: integrated assessment

	Travelling speed	Reaction time	Braking	Vehicle impact safety
Vehicle design				

AUTONOMOUS SYSTEM ASSESSMENT

IMPACT TEST

INFORMATION ABOUT REAL CONFLICTS

Summary

The benefits of autonomous systems will be significant, but understanding benefits is challenging

Autonomous systems assume functions within the safe system that are normally thought of as road safety

Safety benefits can no longer be measured with a crash test

Integration of several components of assessment will be needed

CASR’s contribution

Areas

Safer roads – infrastructure treatments

Safer vehicles – trends in the fleet, testing primary and secondary safety, modelling, injury biomechanics

Safer people – human factors in road safety: age, impairment

Information – policy support, literature reviews

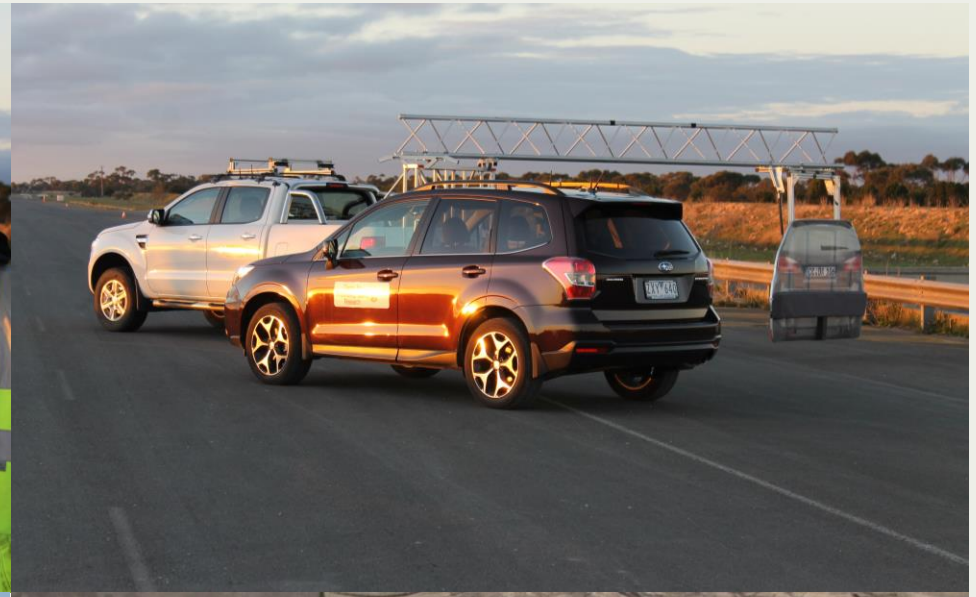
National and international focus.

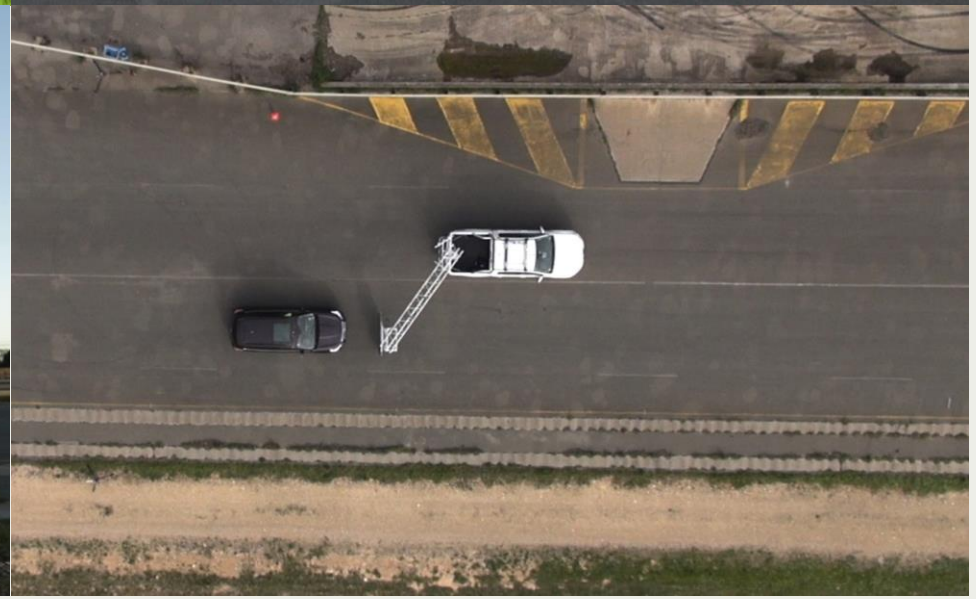
At-scene in-depth crash investigation

Laboratory

Autonomous systems testing facility


CASR
CASR





Other research

Analysis of large crash datasets

Human factors research (young drivers, drug impairment, phone use)

Simulation

autonomous emergency braking effects

Crash simulation

Occupant and pedestrian simulation