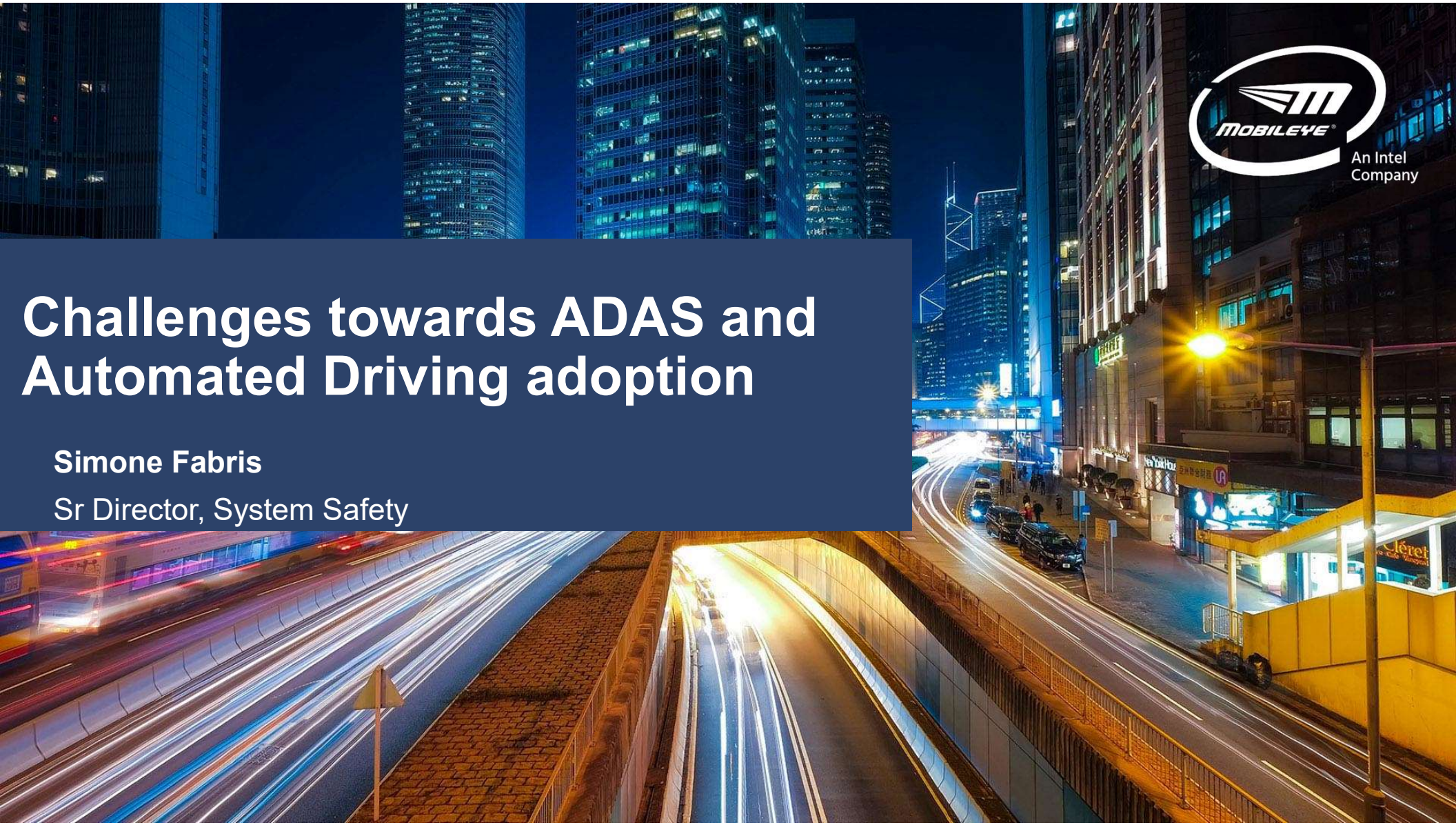
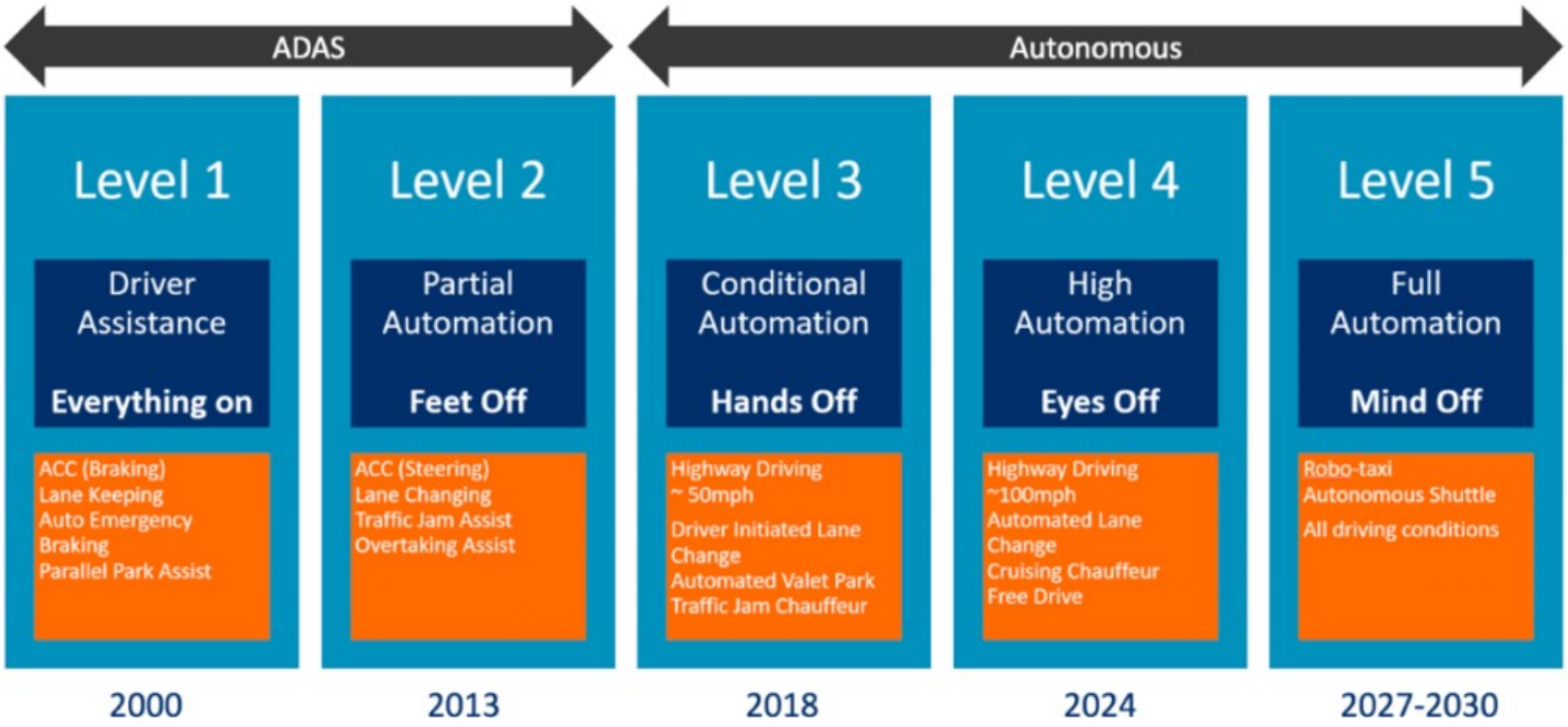


Challenges towards ADAS and Automated Driving adoption

Simone Fabris

Sr Director, System Safety

Five technological levels for automated driving



MOBILEYE
An Intel Company

Regulatory status

Every driver shall always be able to control his vehicle or to guide his animals

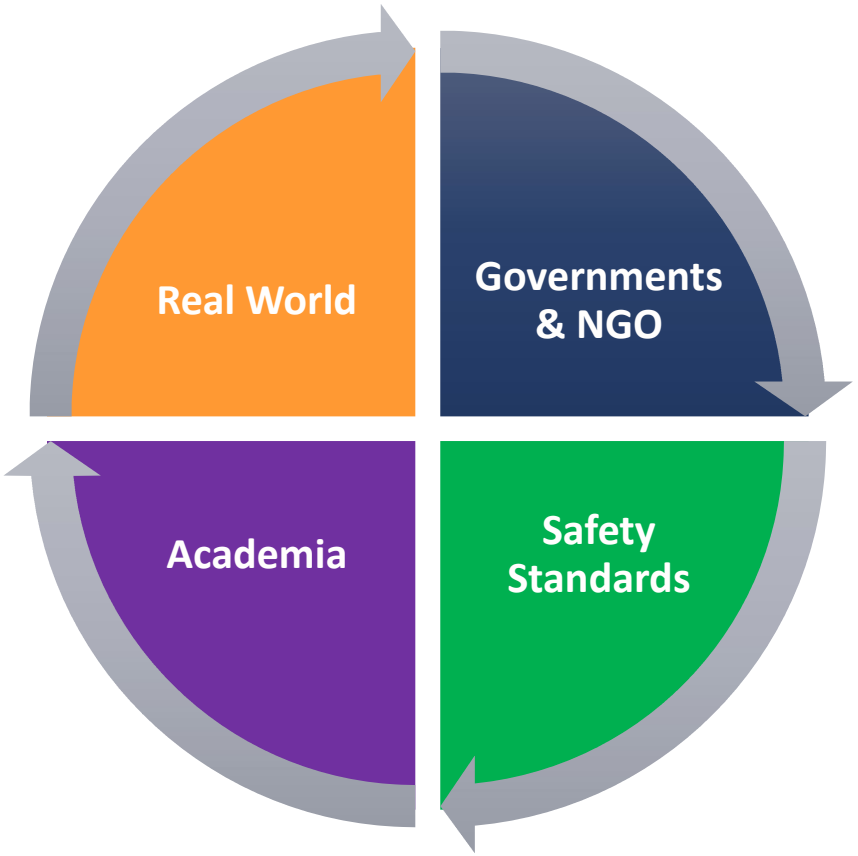
Vienna convention on road traffic

MOBILEYE
An Intel Company

Larger than one company

The Automated driving revolution will impact the way products are conceived and brought to market.

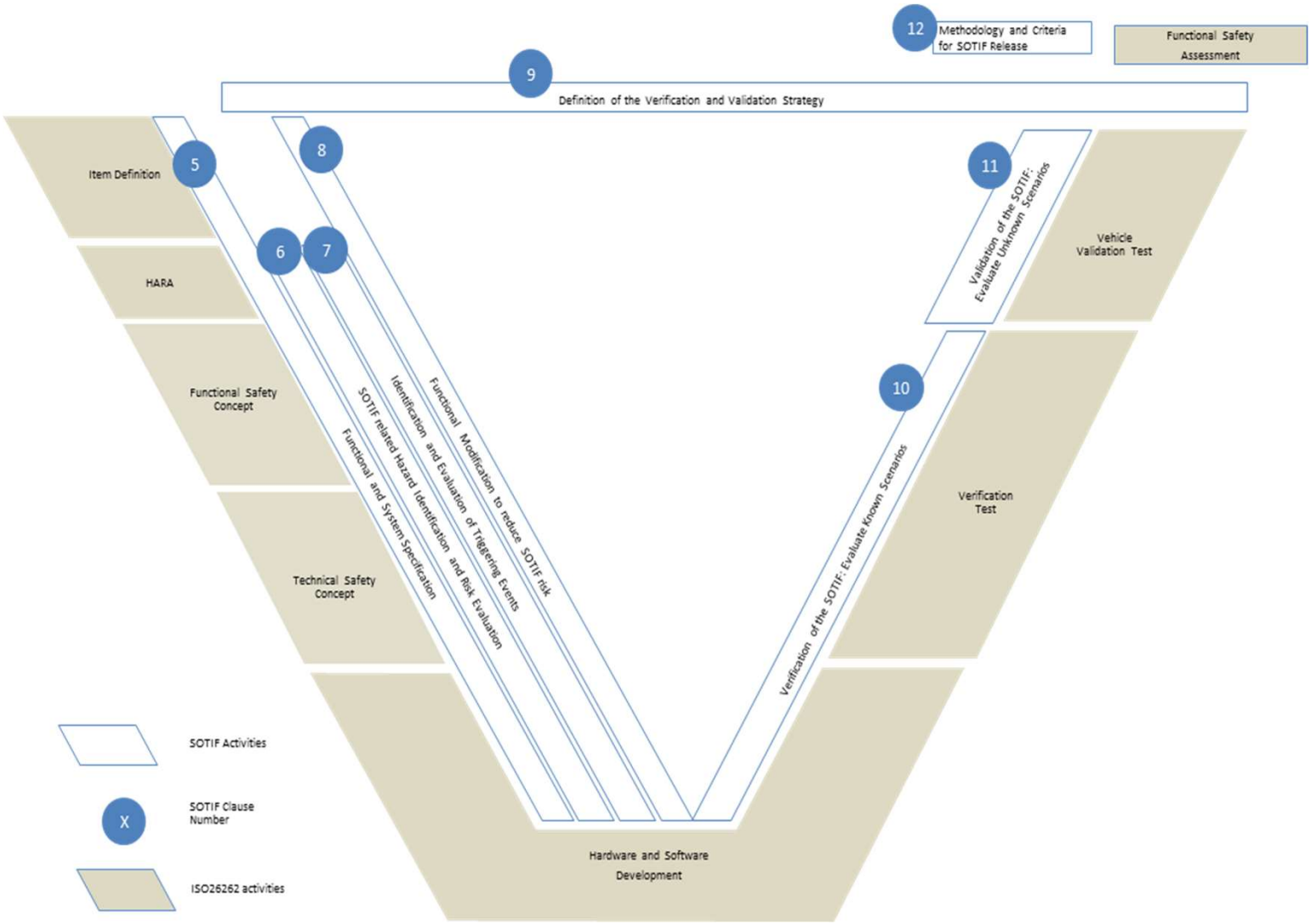
Only through a coordinated strategy across these four areas can we as society and as an industry truly say we are comfortable and confident in the safety of Automated Vehicles.



MOBILEYE
An Intel Company

Safety Standards

The development of a unique safety argument including ISO26262 and ISO21448 is key in resolving this debate.

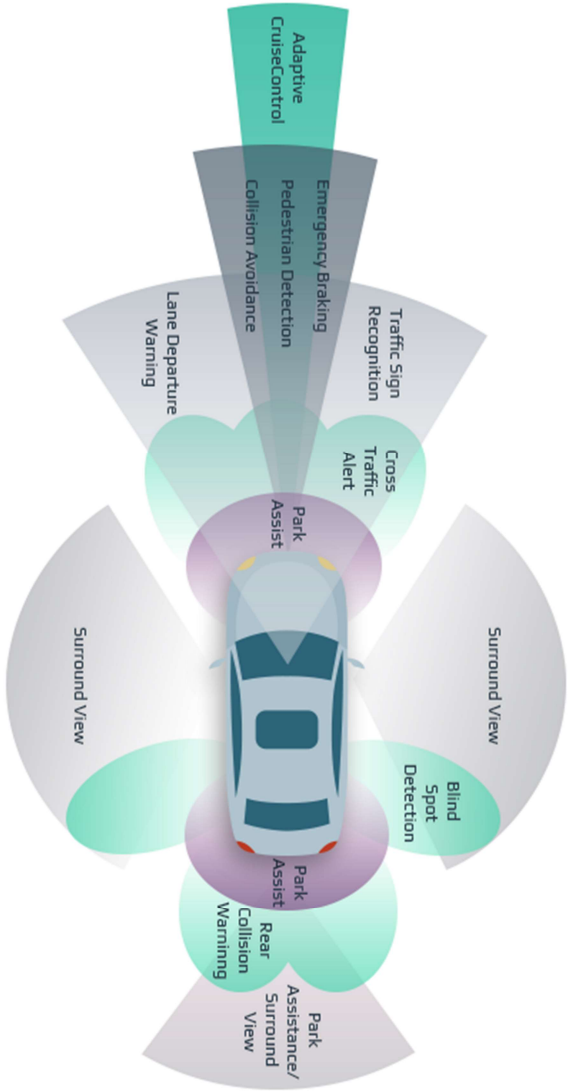


MOBILEYE
An Intel Company

Integrating standards

Integration between safety strategies for ISO26262 and ISO21448 is key to achieve vehicle level reliability targets.

How to achieve ASIL-D targets for HW architectural metrics in case of automated driving?



MOBILEYE
An Intel Company

Integrating standards

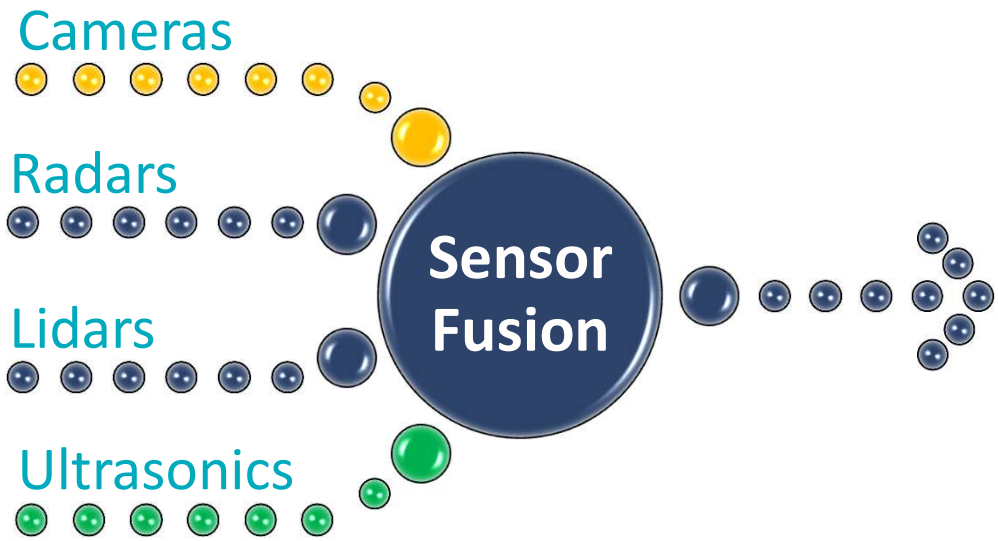
Integration between ISO26262 and ISO21448:

Functional safety meets performance.

Fusion algorithms as main diagnostic coverage for achieving ISO26262 targets for HW architectural metrics.

The better the performance, the better the diagnostic coverage.

MOBILEYE
An Intel Company



Human Driving Today

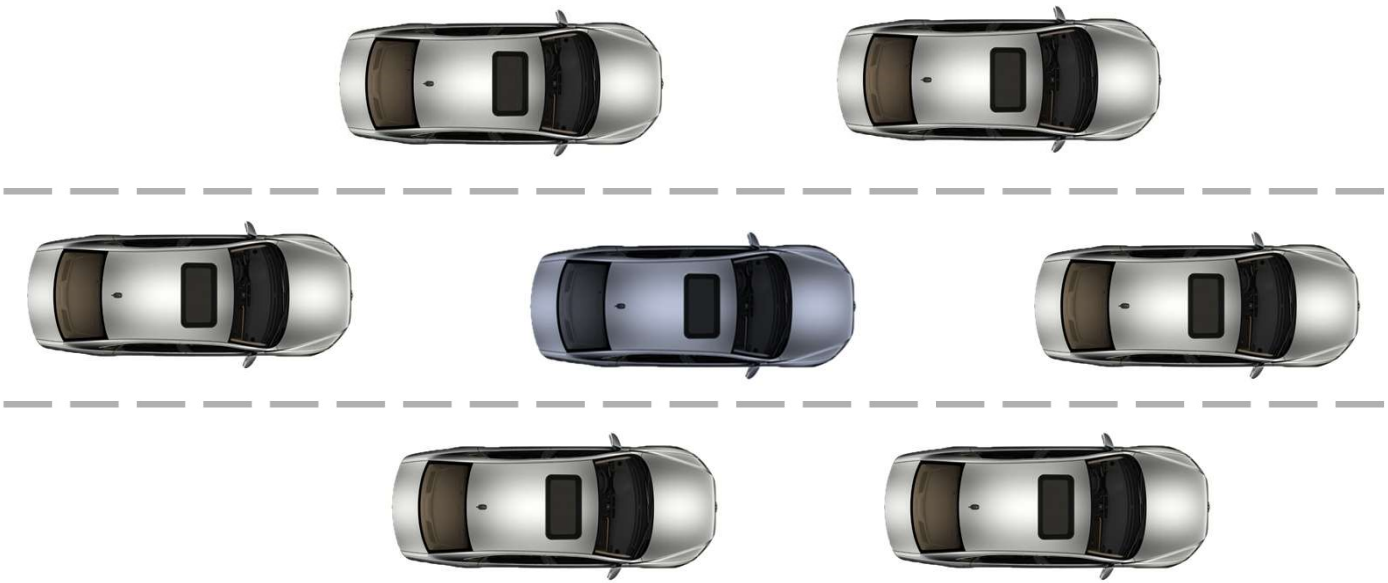
The balance between safety & efficiency

How would you define “driving safely” for an AV?

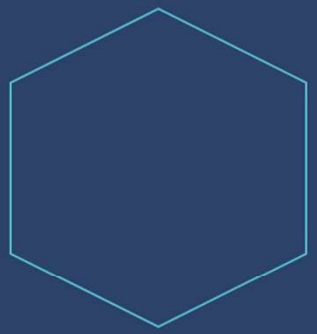
A catch-all

Avoid collisions at all costs

The AV Must Avoid Collisions at all Costs



MOBILEYE
An Intel Company



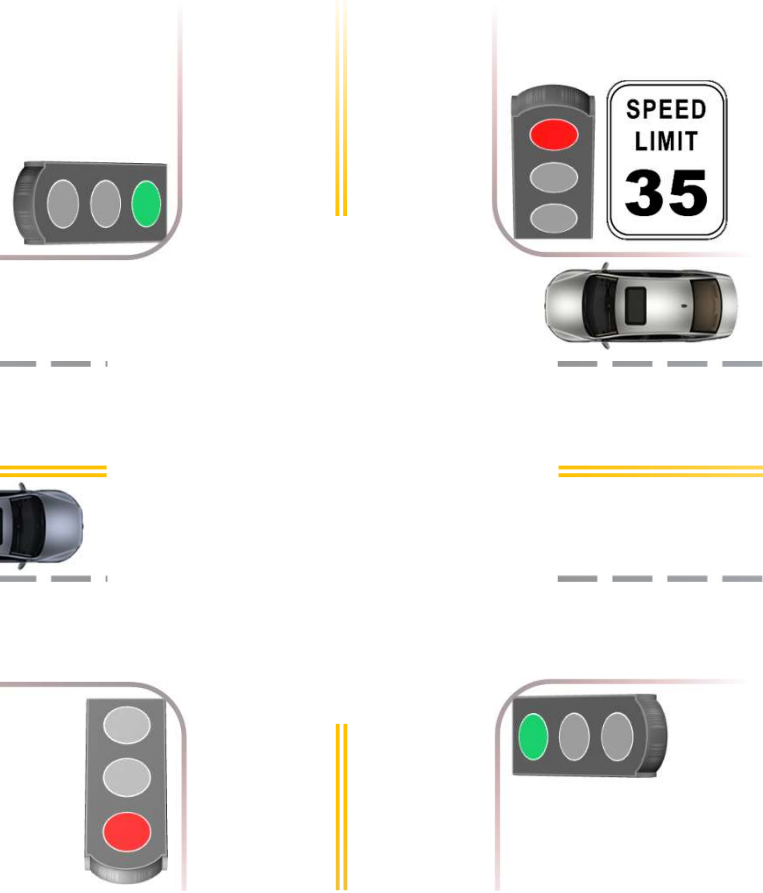
What do humans do?

Explicit Traffic Rules

Establish **priority of road agent interests** to avoid collisions

- Come to complete stop at red lights
- Don’t cross a double-yellow line
- Obey posted speed limits
- Yield to other road users when posted

Set limits on vehicle operation



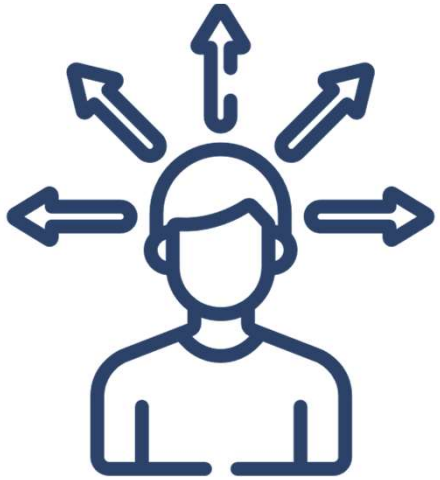
MOBILEYE
An Intel Company

Implicit Rules of the road

A **general set of principles**

- Keep a safe distance from the car in front of you
- Drive cautiously under limited visibility
- Don’t drive slow in the fast lane
- Don’t cut off other drivers

Flexible, culturally dependent



Responsibility Sensitive Safety

An open, transparent, technology neutral **safety model** for autonomous driving

RSS digitizes the implicit rules of the road, providing a check on AV decision-making, and a technology-neutral performance benchmark for regulators

Responsibility Sensitive Safety

MOBILEYE An Intel Company

Formalize

Human notions of safe driving

Identify

A Dangerous Situation

Execute

The Appropriate Response

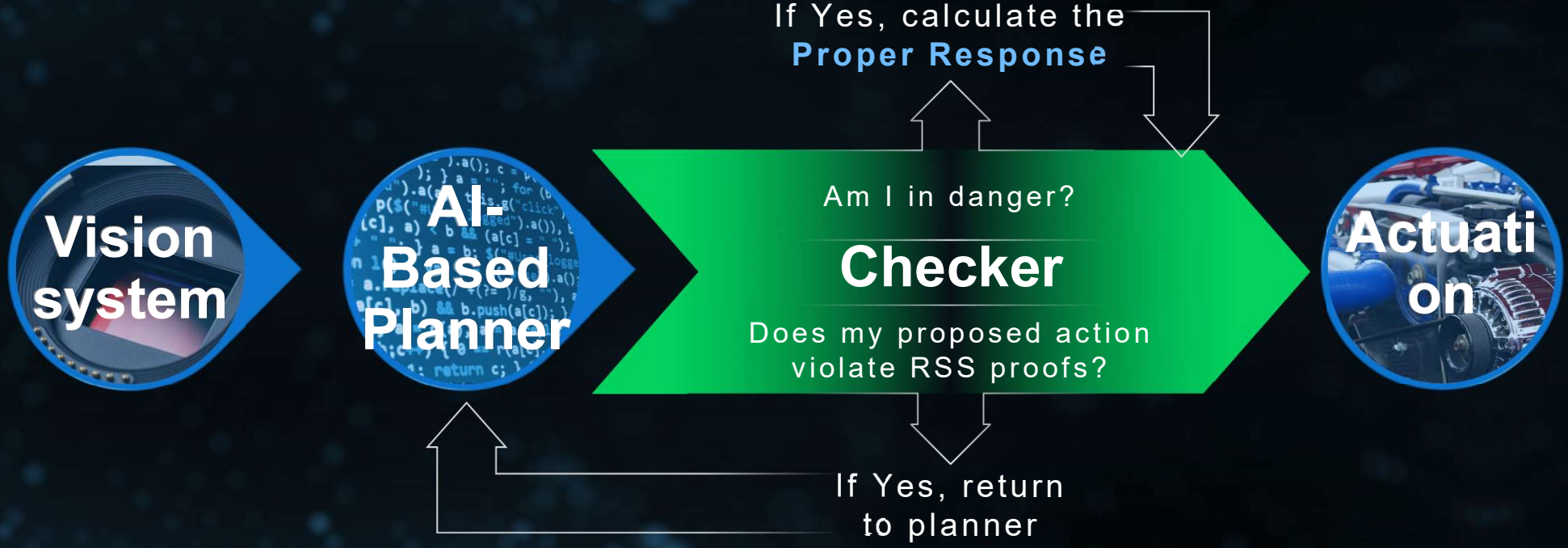
Keep a safe distance longitudinally & laterally

Safe distance compromised in both directions

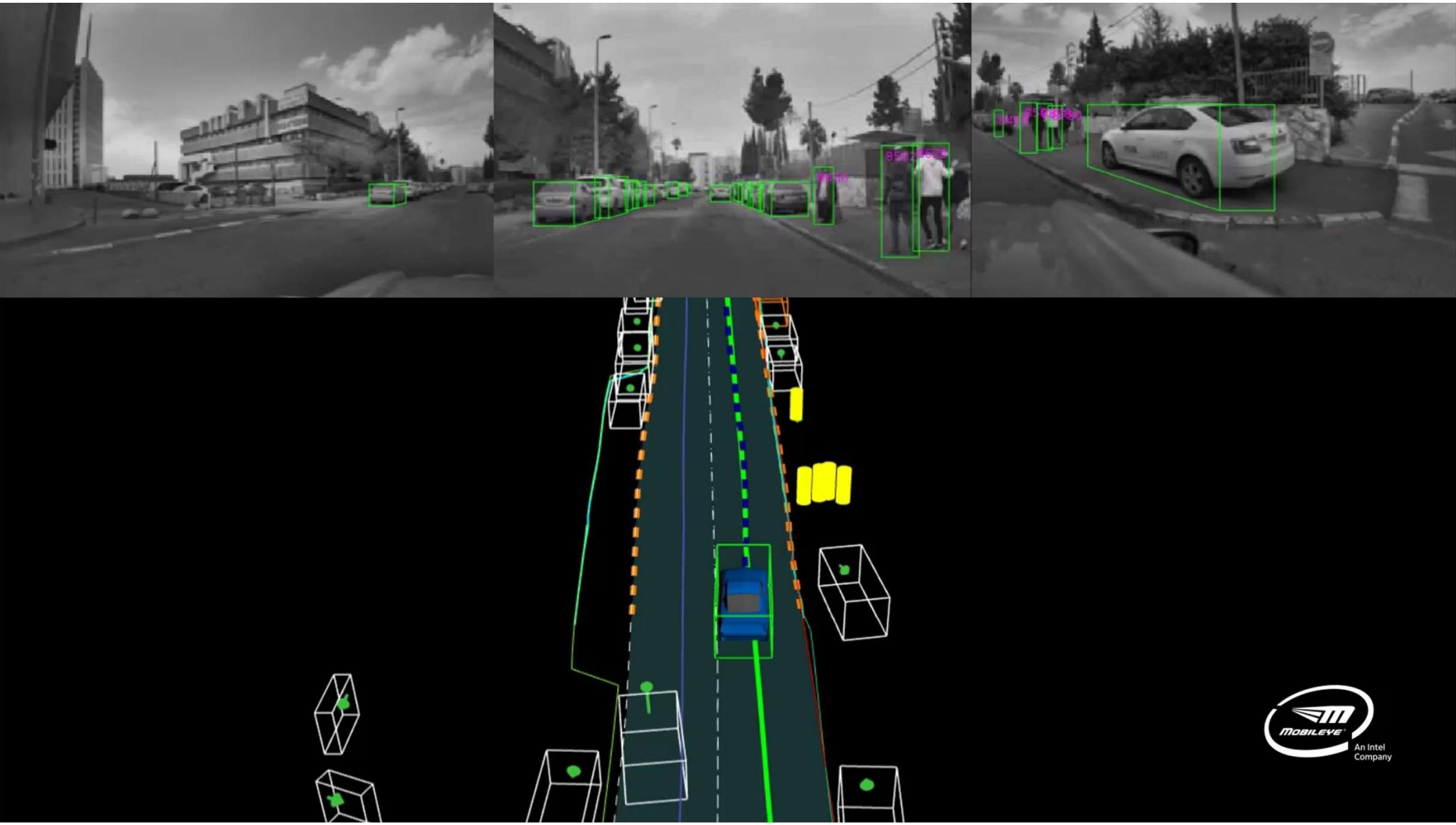
Brake to restore safe longitudinal distance

The doer-checker

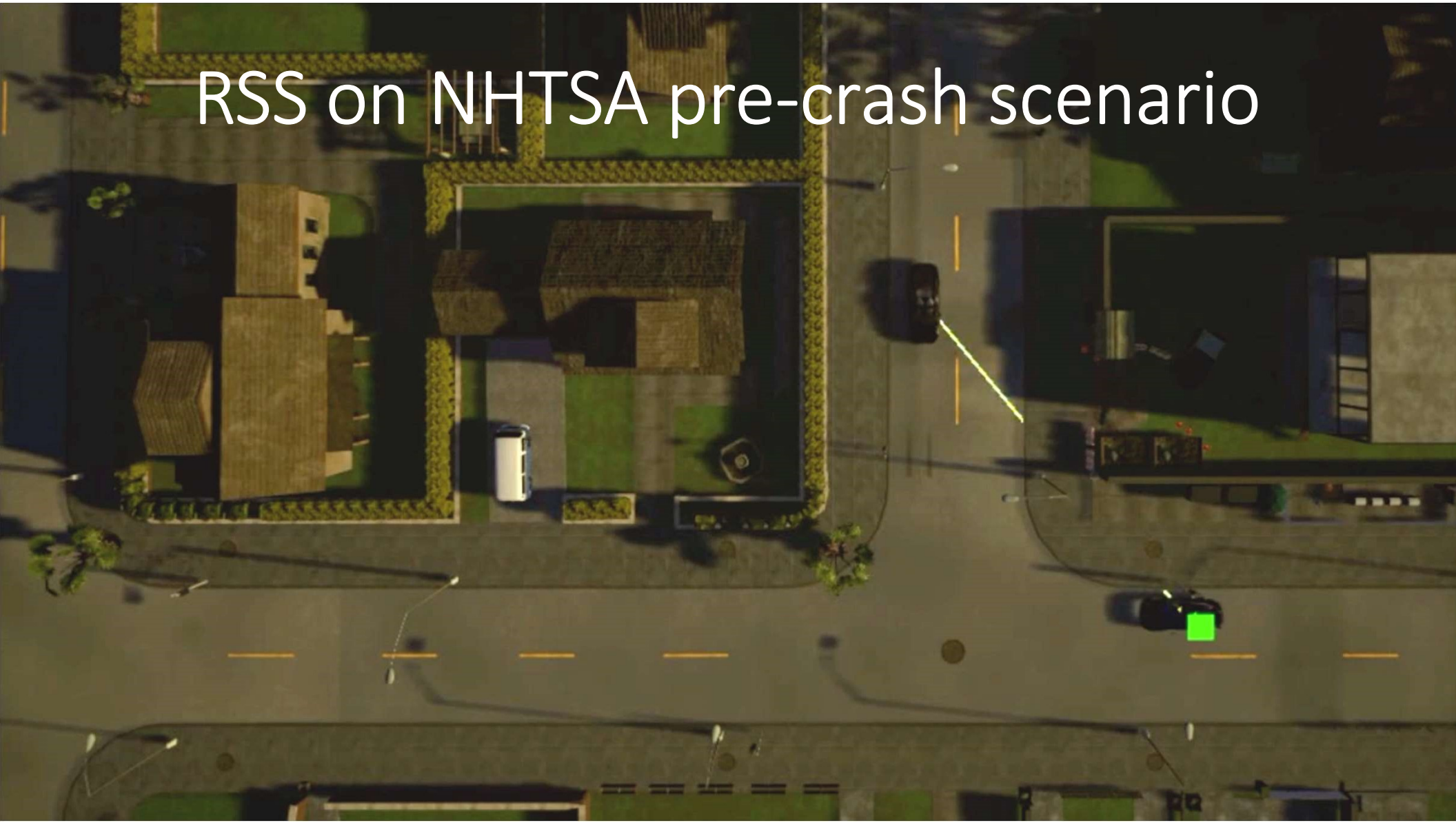
Assesses danger, validates planner's decisions, and triggers proper responses



Does it work?


MOBILEYE
An Intel Company

RSS on NHTSA pre-crash scenario



Summary

- AV safety is not a one company effort: society, academics, governments and industry need to establish the ecosystem for it to prosper
- For automated driving and ADAS, better performance equal more safety
- Safety of automated driving can't be judged only on a statistical level: it has to include a formal and deterministic set of rules
- RSS is an example of a safety concept that relies on the combination of robust perception algorithms and a set of deterministic rules


intel
MOBILEYE
An Intel
Company

Rules of RSS

Rules to verify AV safety & performance

1. Do not hit someone from behind
2. Do not cut-in recklessly
3. Right-of-Way is given, not taken
4. Be careful in areas with limited visibility
5. If you can avoid a crash without causing another, you must