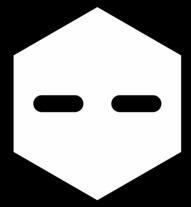


ROBORACE

the past

©

1894… the world’s first “horseless carriages” race,
Paris to Rouen.

the present

1/12 LAPS
13B
FIA GT WORLD CUP
FIA

the future

Robocar - the world’s first autonomous racing car

©

competitions in the most extreme environments

©

SMART CITIES

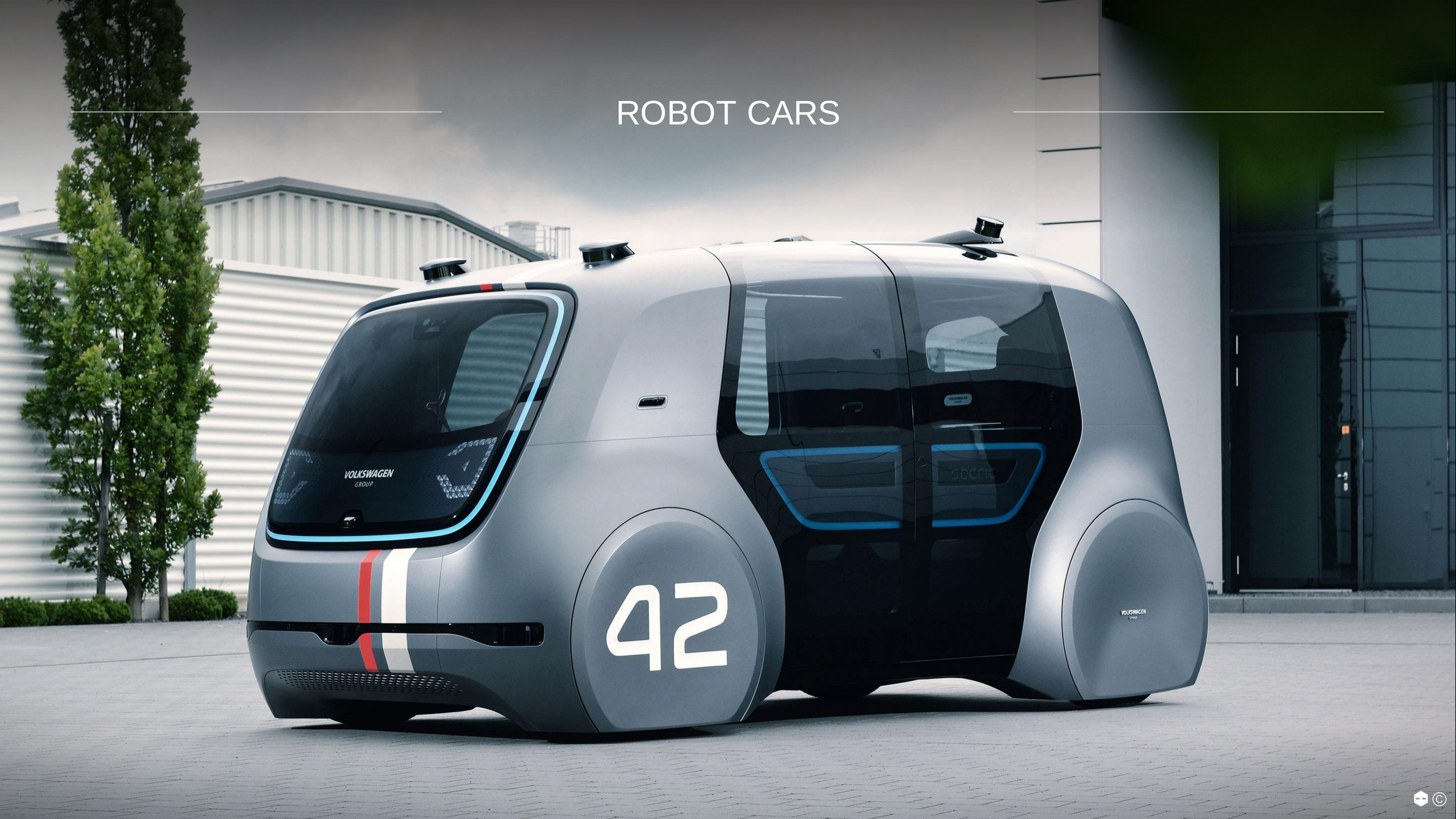
MOUNTAIN ROADS

RACE TRACKS & FREEWAYS

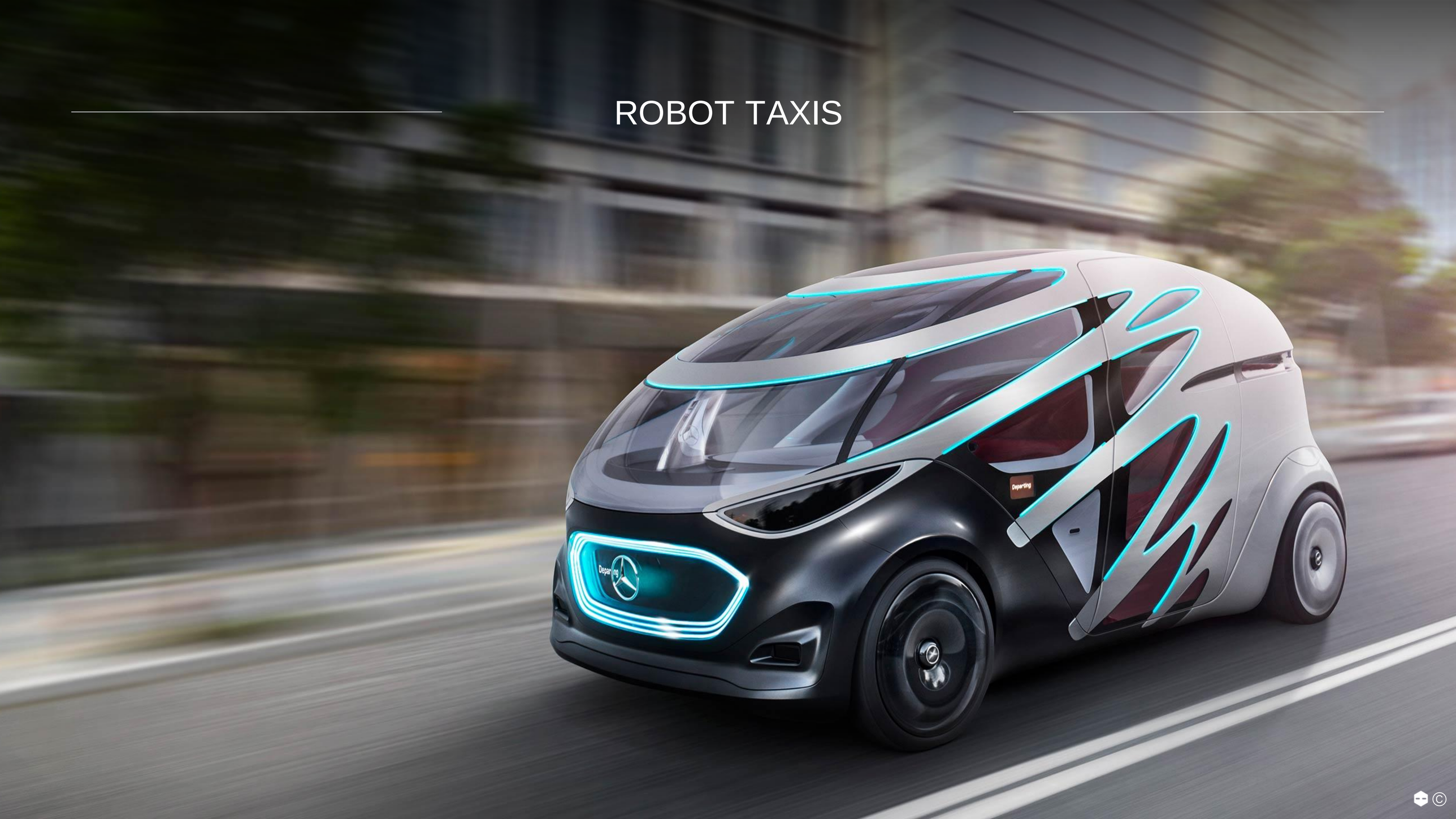
EXTREME TEST TRACKS

competitions for all vehicle classes

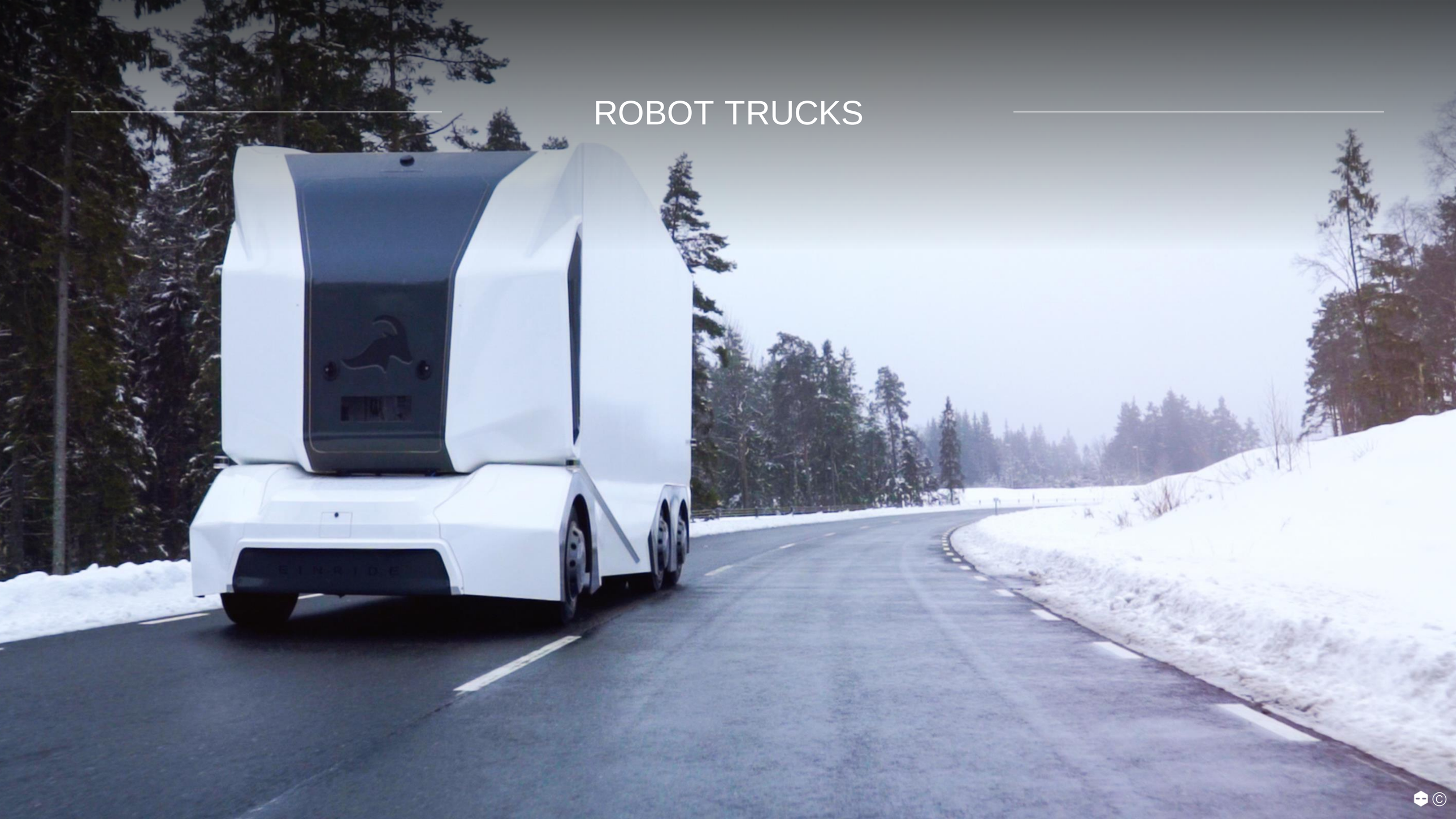
ROBOT CARS



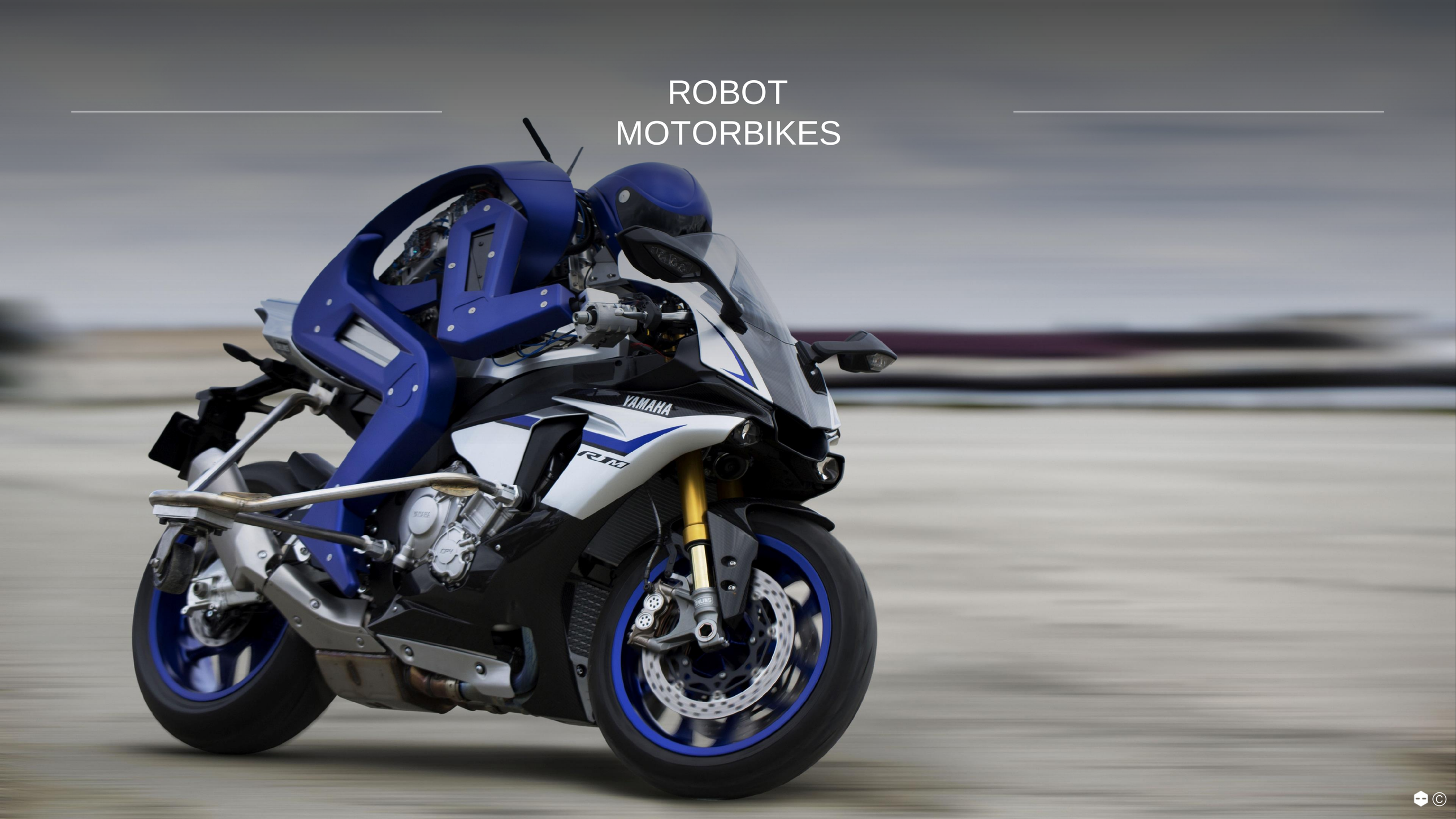
ROBOT TAXIS



ROBOT TRUCKS



ROBOT MOTORBIKES



competitions that fuse the real and virtual together

©

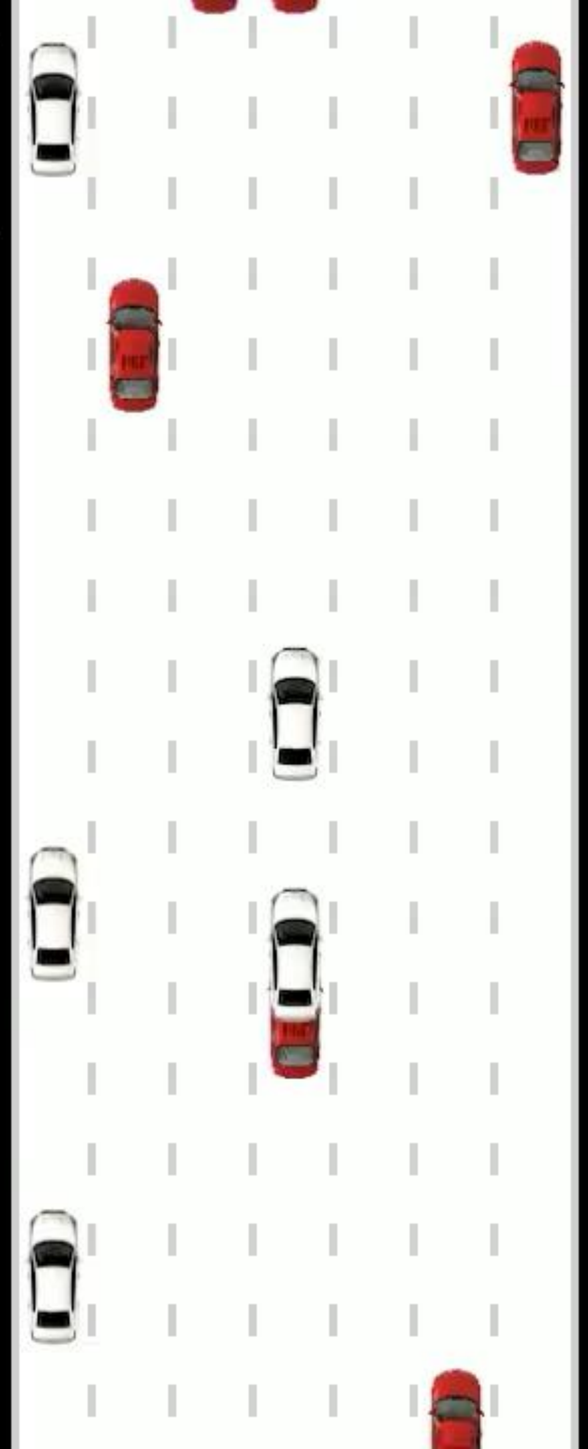
eSPORTS ARENAS

PLACE 11 OF 24
VIRTUAL GAMES
00:48.432
CURRENT LAP 00:45.578
LAPS 1 OF 2
2
055 MPH
PRESS Ⓨ TO REWIND

IN REAL-LIFE GAMES

rethinking MIT’s DeepTraffic & Risk Level Sets

©



DeepTraffic

Deep Reinforcement Learning Competition

selfdrivingcars.mit.edu

Name:

Lex Fridman

Highest Average Speed:

69.38 mph

Highest Ranking:

5 out of 1,871

On Jan 19, 2017 with 68.97 mph

Current Ranking:

2,276 out of 22,687

On Jan 08, 2018 with 69.38 mph

Sensing:

Side Sensing: 3

Forward Sensing: 30

Backward Sensing: 10

Temporal Window: 0

Network Architecture:

Layers: 3

Parameters: 11,445

Learning Parameters:

Training Iteration: 10,000

Momentum: 0.0

Batch Size: 64

L2 Decay: 0.01

Learning Rate: 0.001

Reinforcement Learning:

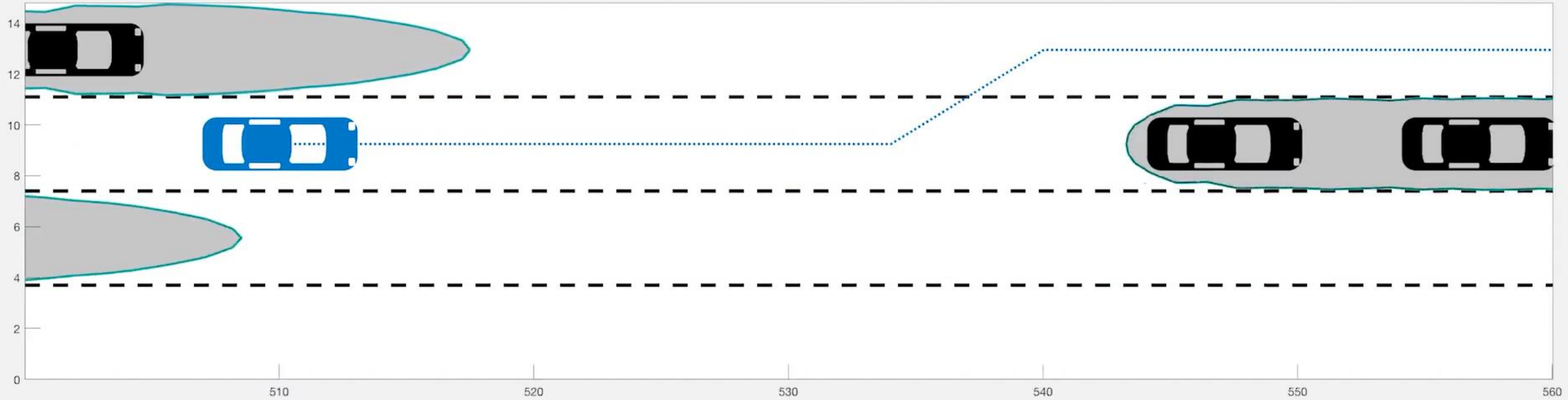
Experience Size: 3,000

Gamma: 0.7

Number of Intelligent Cars: 10

Navigating Congested Environments with Risk Level Sets

Alyssa Pierson, Wilko Schwarting, Sertac Karaman, and Daniela Rus



A more aggressive driver chooses a higher risk threshold, and has a larger planning space

artificial intelligence in motorsport

extreme environments that push technology beyond human limits

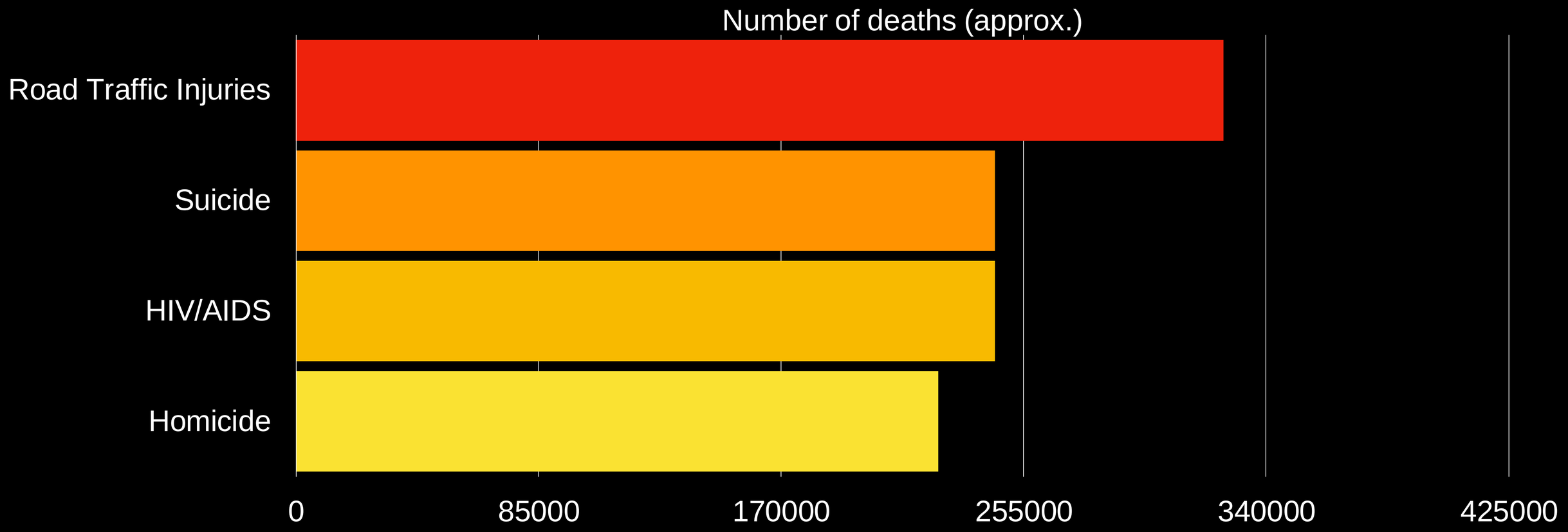
and then what?

transfer those innovations to human driven cars

©

why?

Top ten causes of death among people aged 15–29 years, 2012



WHO: GLOBAL STATUS REPORT ON ROAD SAFETY 2015

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“By 2030, on current trends, another 1.3 million global road deaths, this gives us another 14 million by 2030.”

–Matthew Baldwin, European Road Safety Coordinator

“By 2030, it will be the 5th largest cause of death,
up there with cancer, heart disease.”

–Matthew Baldwin, European Road Safety Coordinator

human + machine

L 4636 mm
l 1800 mm
h 950
W 605 kg Inc dr / tr7rv
en 2398 cm3
P > 700 hp
18000 tr/mn

R

L

CWD
128

DevBot 2.0 the world’s first human robotic prototype race car

©

automated, augmented, assisted, adapted

©

automated = beyond acceptable human risk

©

James Ward - Advanced Driving Instructor

augmented = parallel/shared autonomy

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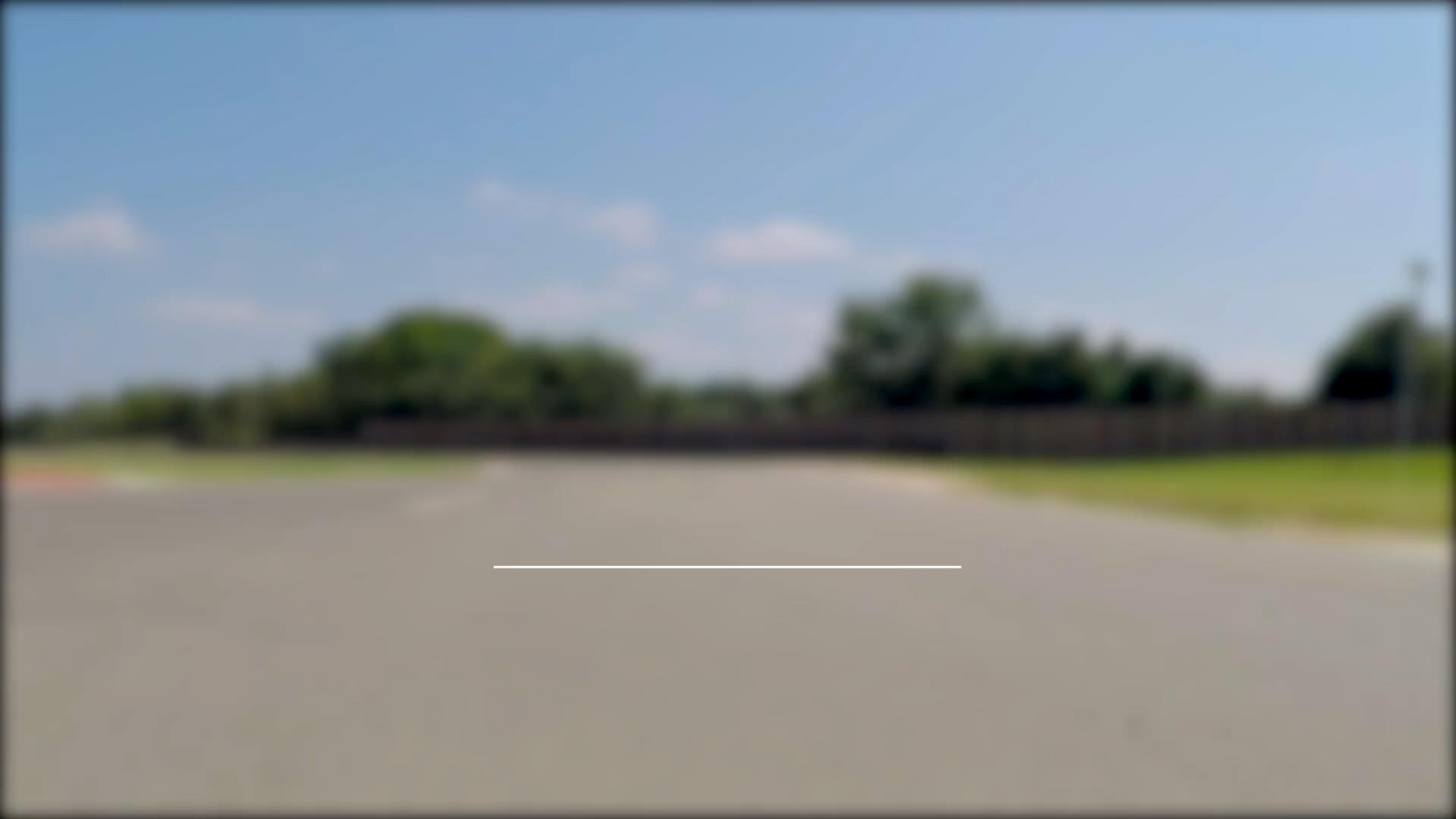


15:41

the greatest motorsport challenge?

©

24h
LE MANS

One of the most complex racing environments in the world;
60 cars, four performance categories, 180 drivers, four skill levels,
380 laps of 13.626km, 38 corners, day & night, wet & dry for 24hrs.

AI enhanced driving experiences

risk versus reward

©

23:09:17
JUST FOR MEN
IHARD 2
3 MCNISH 3
2 TRELUYER 4
8 MONTAGNY 5
SPEED
BEHIND LEADER
-0.332
-3.321
-17.597
-20.
one
IMSA
24

assisted = enhanced situational awareness

©

GTLM
4
BBS

assisted = augmmeted reality

©

THE AUGMENTED REALITY INTERFACE ILLUSTRATION IS SUBJECT TO CHANGE

adapted = reimagining human control

©

beyond mechanical control

©

99
Sprint PCS

superpowers

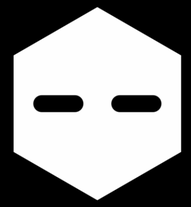
©

“When most people think about autonomous driving, they have a very impersonal vision of the future, where humans relinquish control to the machines. Yet B2V technology does the opposite”

– Nissan - Executive Vice President, Daniele Schillaci

automated, augmented, assisted, adapted

©



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