VIRTUALIZATION-DRIVEN DESIGN AND TESTING: THE CREATION OF FERRARI'S E-VORTEX TRACK

AGENDA OVERVIEW

- FERRARI AND VI-GRADE: A LONG COLLABORATION HISTORY
- AN OVERVIEW OF THE VIRTUAL DEVELOPMENT
- FROM VIRTUAL TRACK TEST TO VIRTUAL TRACK CHECKS
- E-VORTEX: REQUIREMENTS AND ACTIVITIES
  - WHY THE NEW TRACK
  - KEY AREA
  - VIRTUAL ANALYSIS & KEY ASSESSMENT
  - VIRTUAL TOUR

FERRARI AND VI-GRADE: LONG COLLABORATION EXPERIENCE

Up to 2008

High Performance Vehicles:
- Vehicle Dynamics Control Systems
- Computer Simulation Solutions

Control logic for semi-active dampers: a new approach from the ground up to the market

The Improvement of Performance gaining in Manoeuvrability

2013

DiM 150 INSTALLATION AT MARANELLO FERRARI FACILITY

The integrated approach for the next Ferrari: the evaluation and prediction of vehicle dynamics performance targets

- Emotional Development Ferrari experience on driving simulator

2019

From the Track to a Driving Simulator

A tire journey from a component to a model

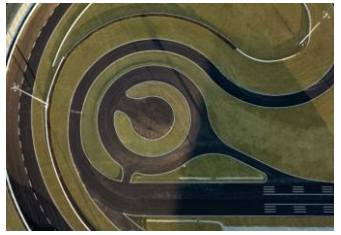
Simulator usage: increasing demand and NEW emerging "customers"

Modelling process: being with the "RIGHT TOOL" at "RIGHT TIME"

BREAKING NEWS

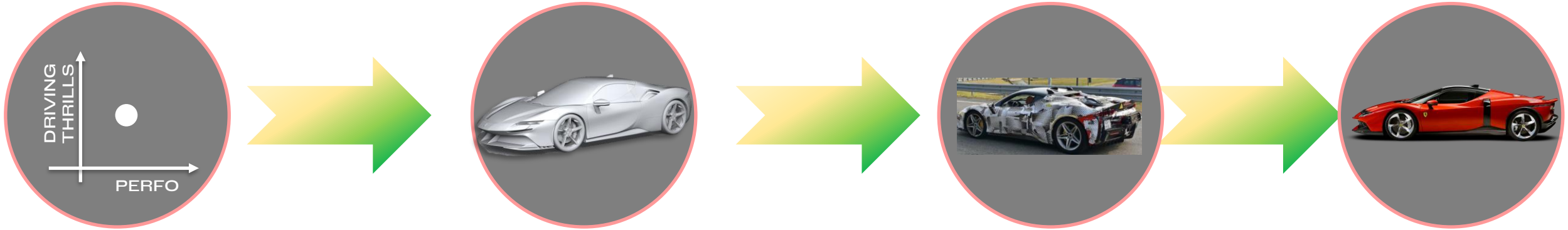
2026

E - Vortex Virtual Design



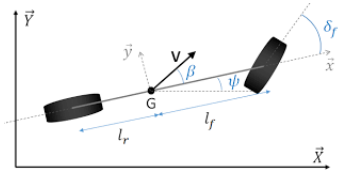
VIRTUAL DEVELOPMENT: FROM TGT SETTINGS TO TGT ACHIEVEMENTS

TGT SETTINGS & DEPLOYMENT | **TGT ACHIEVEMENTS**



« OFF-LINE » DEVELOPMENT | SIMULATOR DEVELOPMENT | EXPERIMENTAL TEST | ACHIEVEMENTS

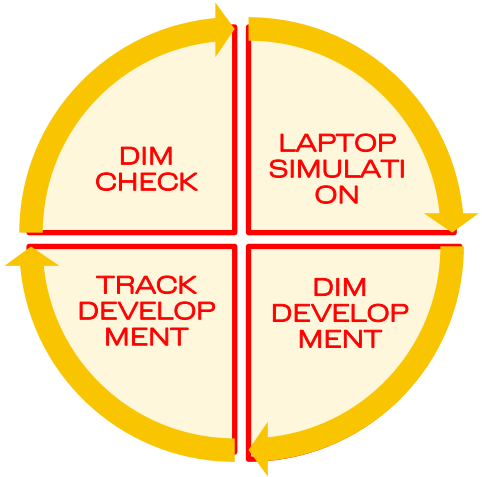
Analytical Model



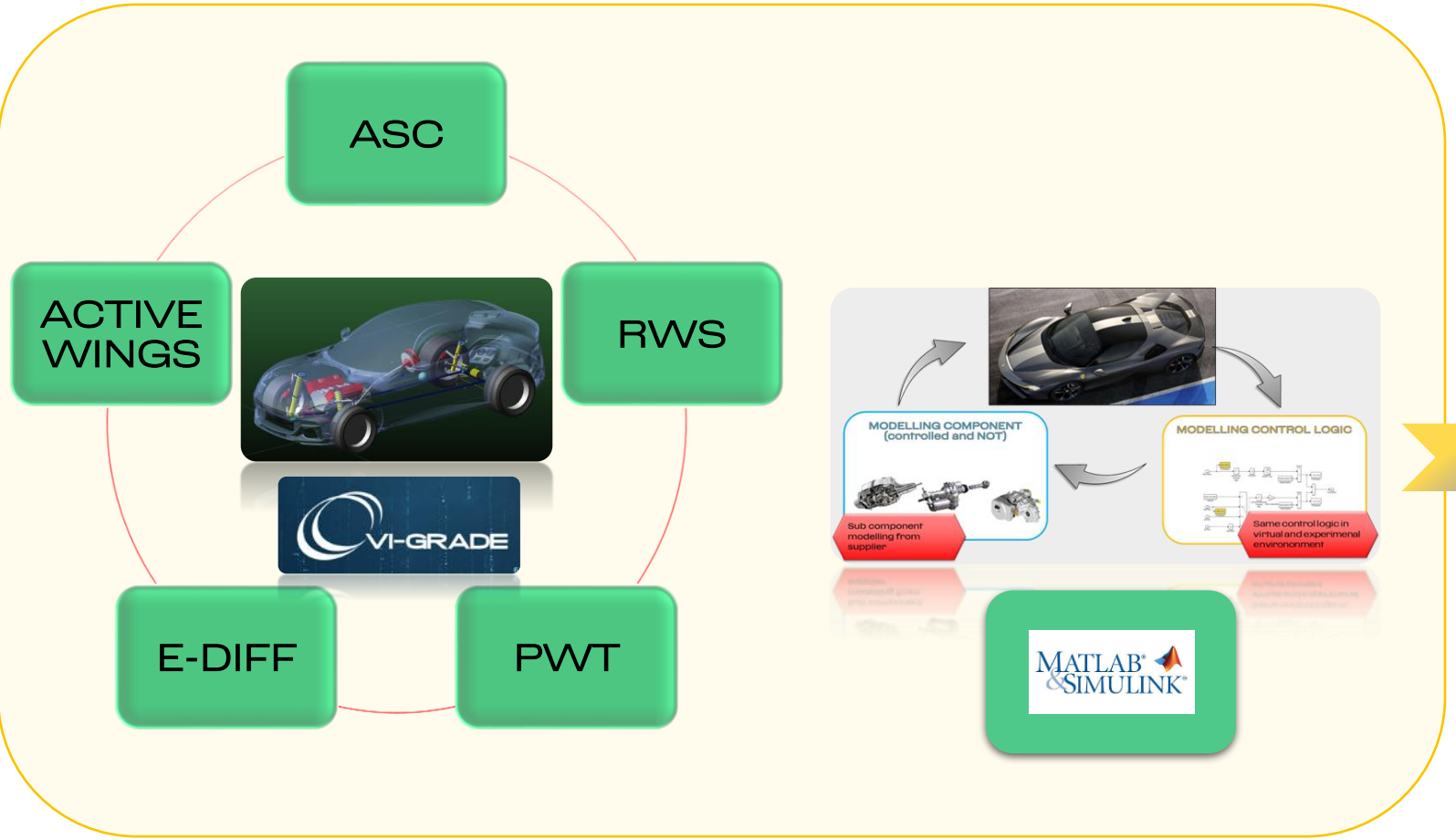
LAPTOP Simulations

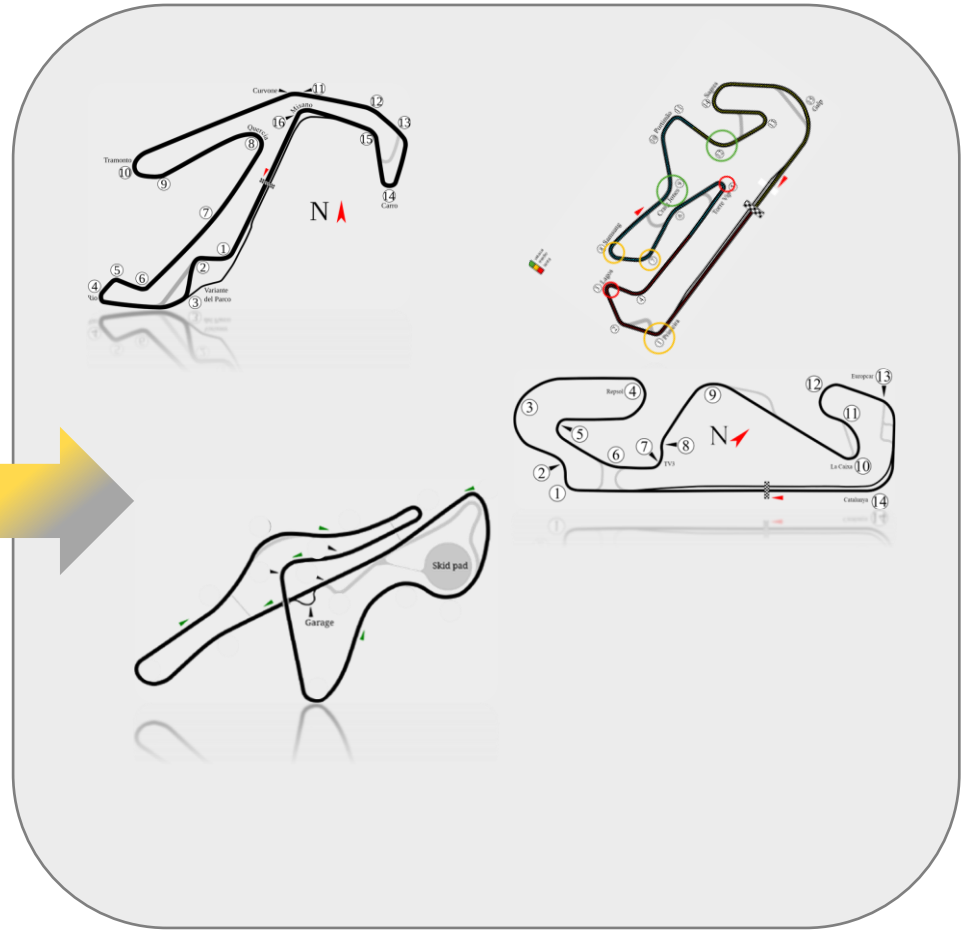
FIRST SETUP AT DRIVING SIMULATOR

PERFORMANCE MONITORING



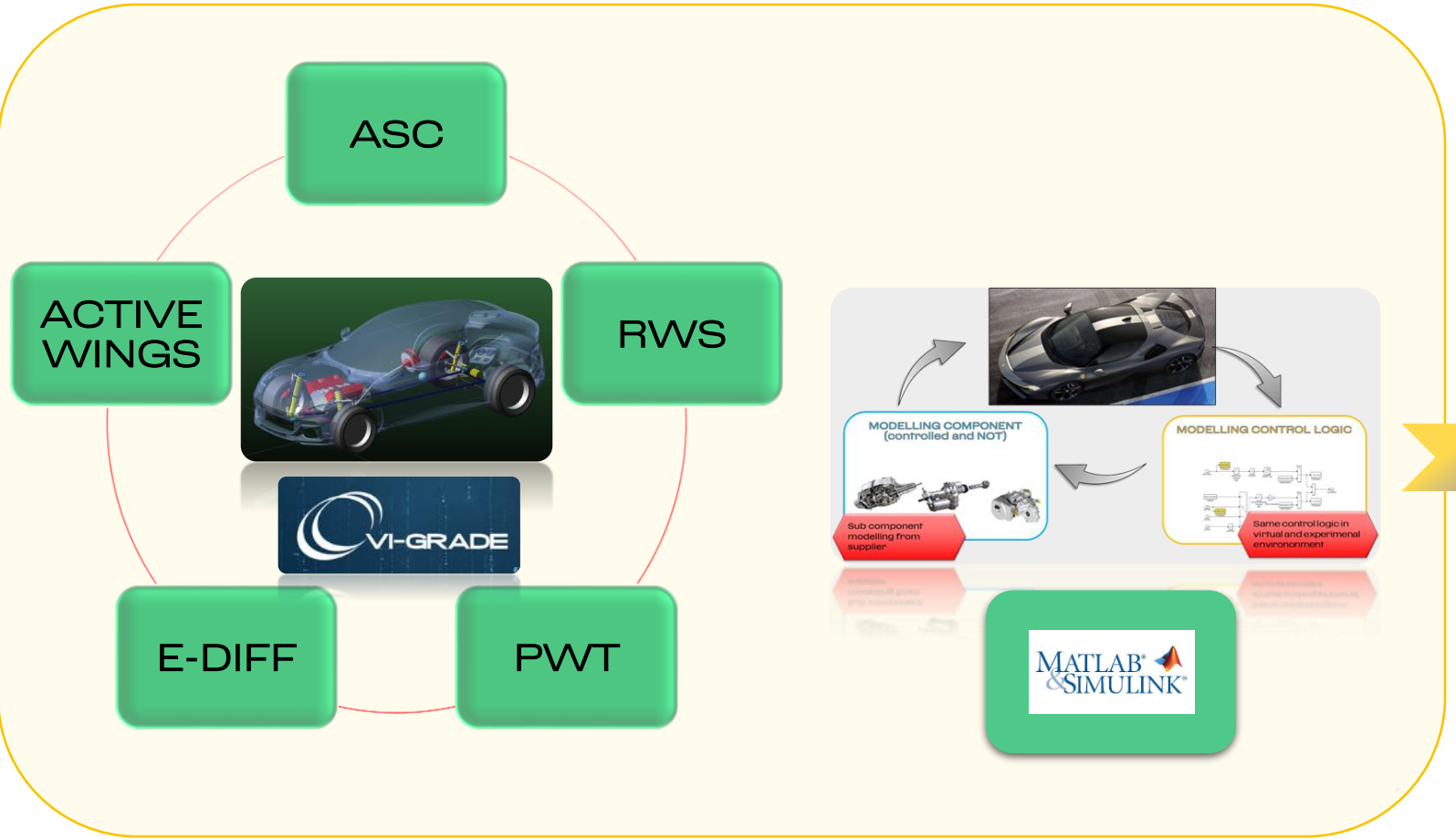
FROM VIRTUAL TRACK TESTS TO VIRTUAL TRACK CHECKS

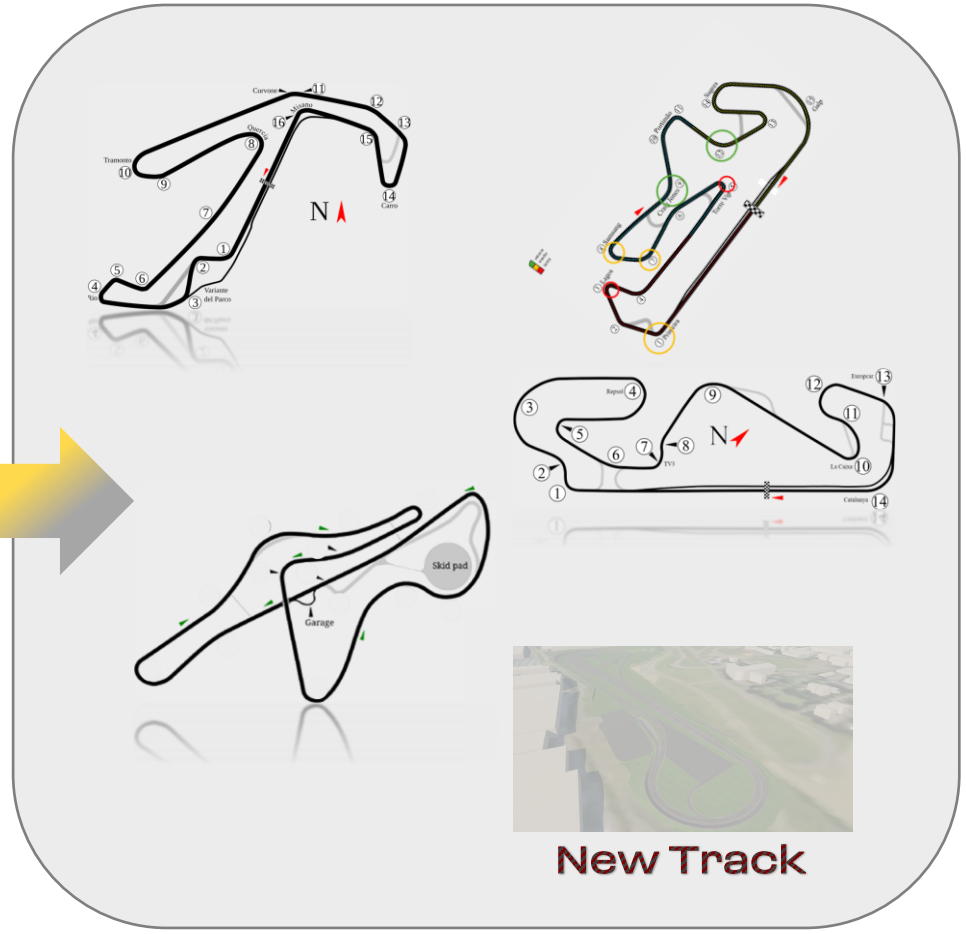




Performance analysis on test tracks and correlation with experimental data

FROM VIRTUAL TRACK TESTS TO VIRTUAL TRACK CHECKS





Performance analysis on test tracks and correlation with experimental data

HIGHLIGHTING POTENTIAL CRITICAL ISSUES OF A NEW TRCK DESIGN

E - VORTEX

WHY THE NEW TRACK

WHY THE NEW TRACK?

- To improve the functional testing of vehicles fresh off the production line
- To reduce road testing, thereby enabling greater repeatability of the tests

- Taking into account the spatial constraints of the Fiorano circuit, a project has been developed to maximize the available capacity

E - VORTEX

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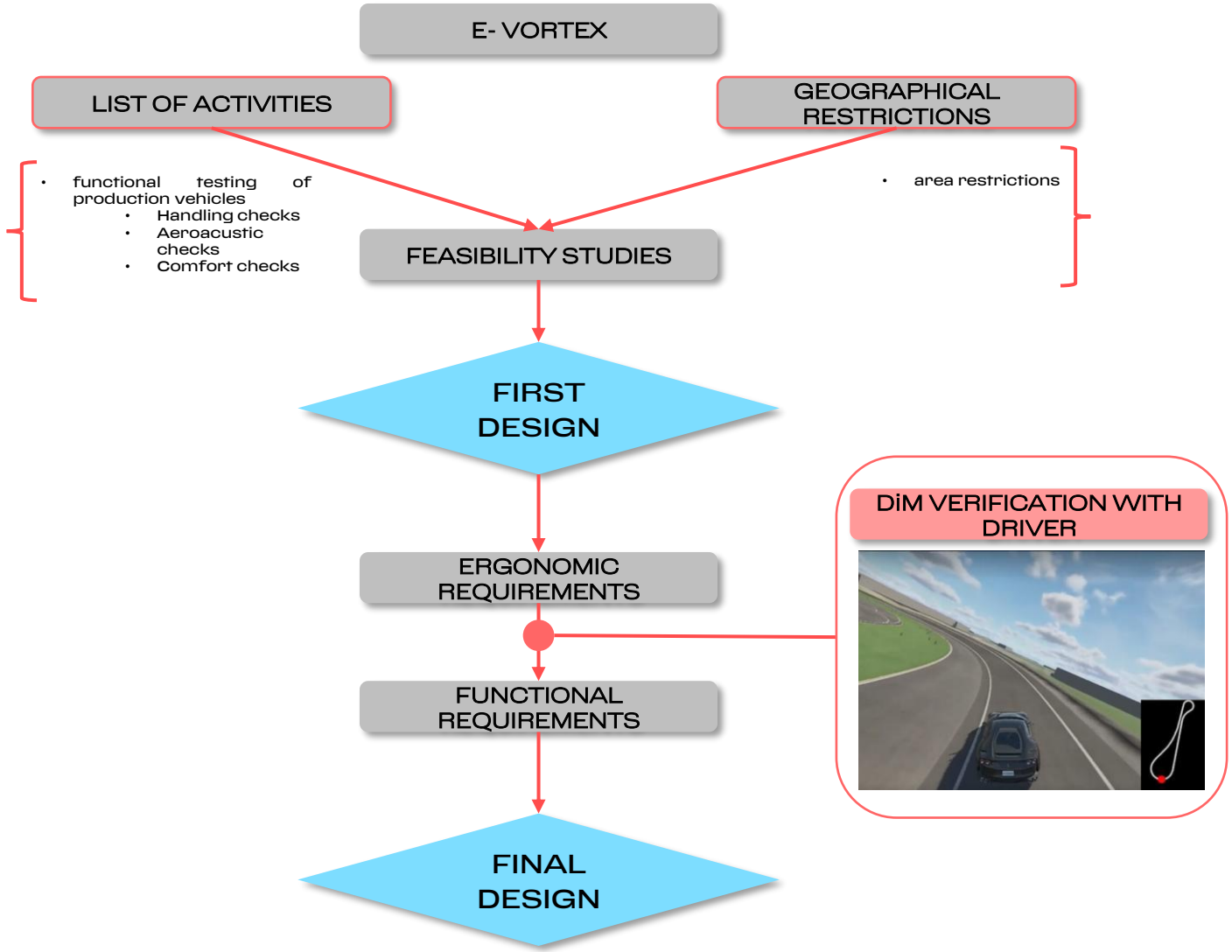
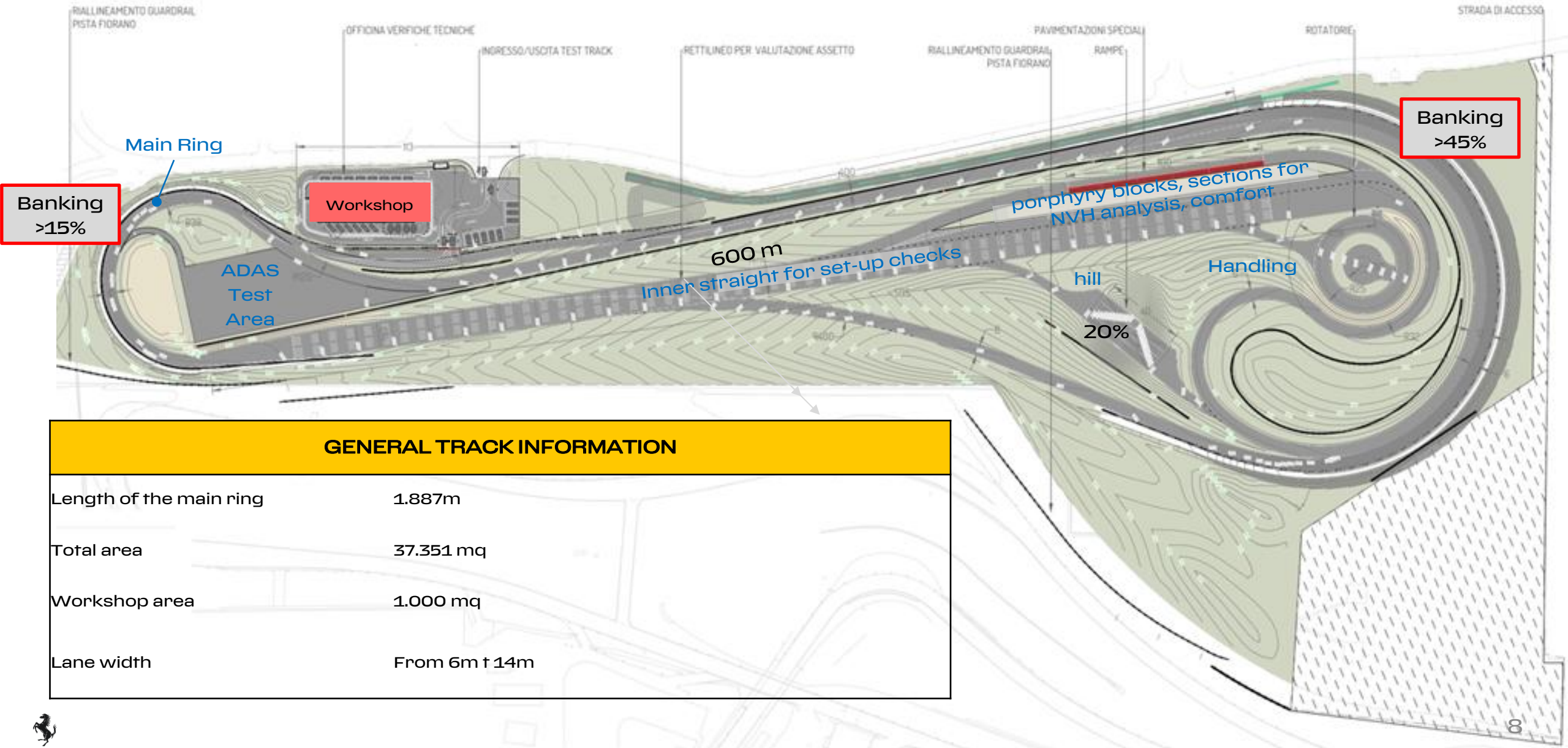


E - VORTEX

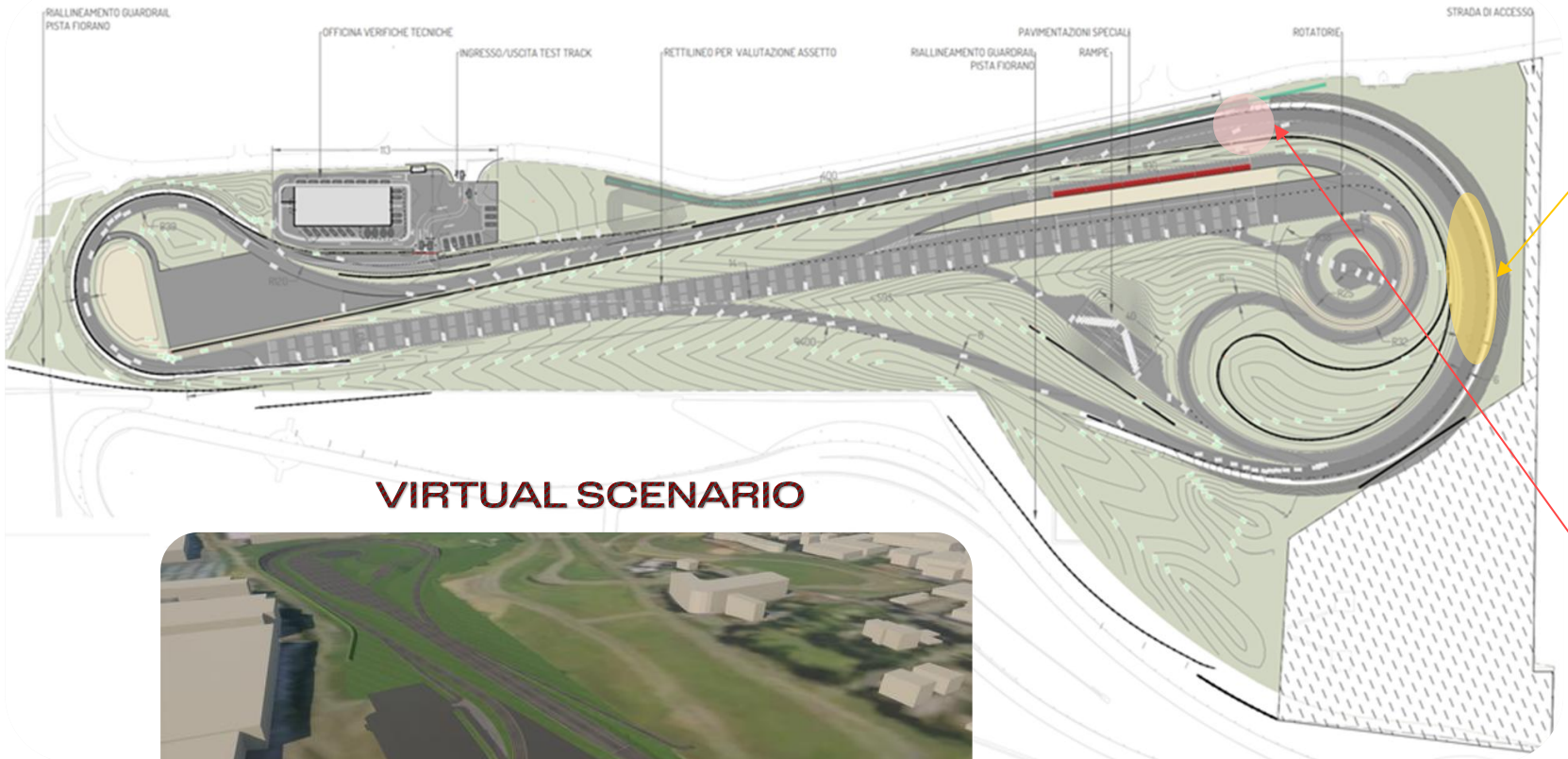
KEY AREA



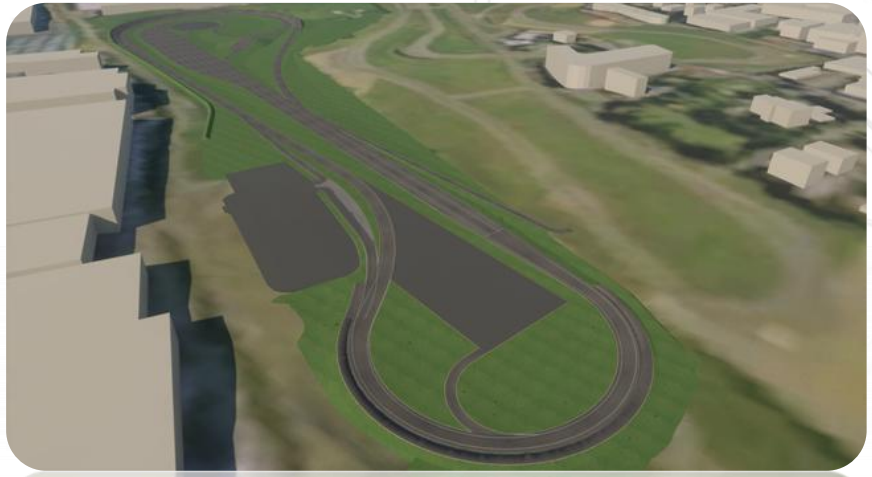
GENERAL TRACK INFORMATION	
Length of the main ring	1.887m
Total area	37.351 mq
Workshop area	1.000 mq
Lane width	From 6m t 14m

E - VORTEX

FOCUS FOR VIRTUAL ANALYSIS



VIRTUAL SCENARIO



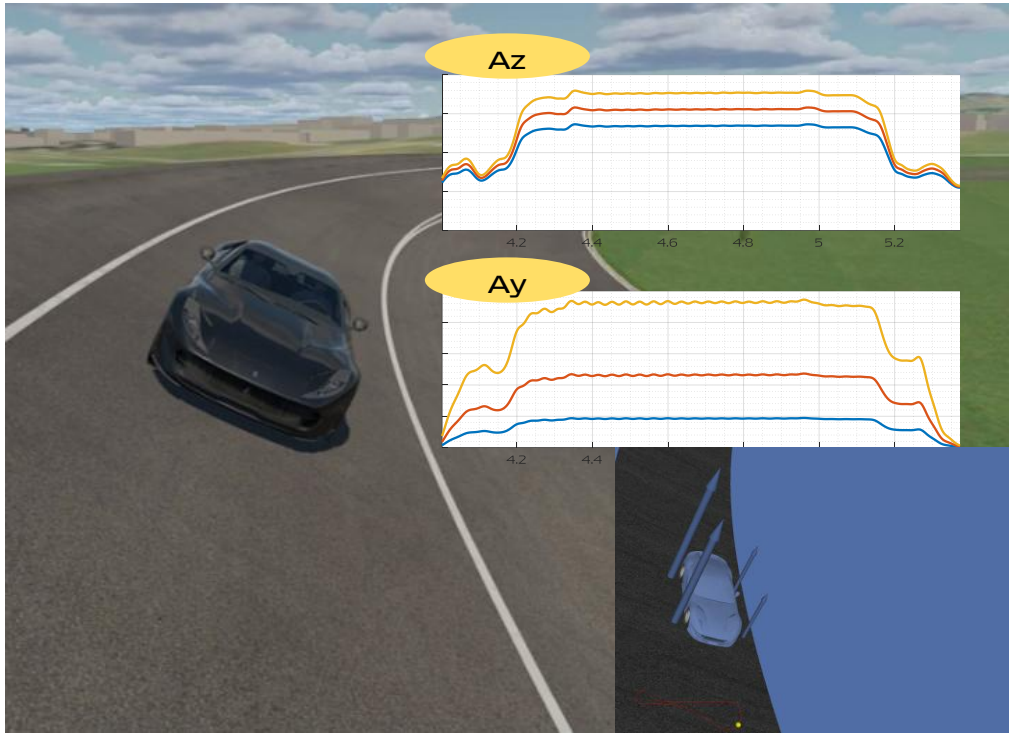
FOCUS FOR VIRTUAL ANALYSIS

- Maximum Banking for perceived acceleration and associated physical stress
  - During the tests, 12 repetitions are carried out
- Transition curve between the banking and the straight
  - the vehicle must maintain its stability during the transition

E - VORTEX

KEY ASSESSMENTS

Maximum Banking for perceived acceleration and associated physical stress

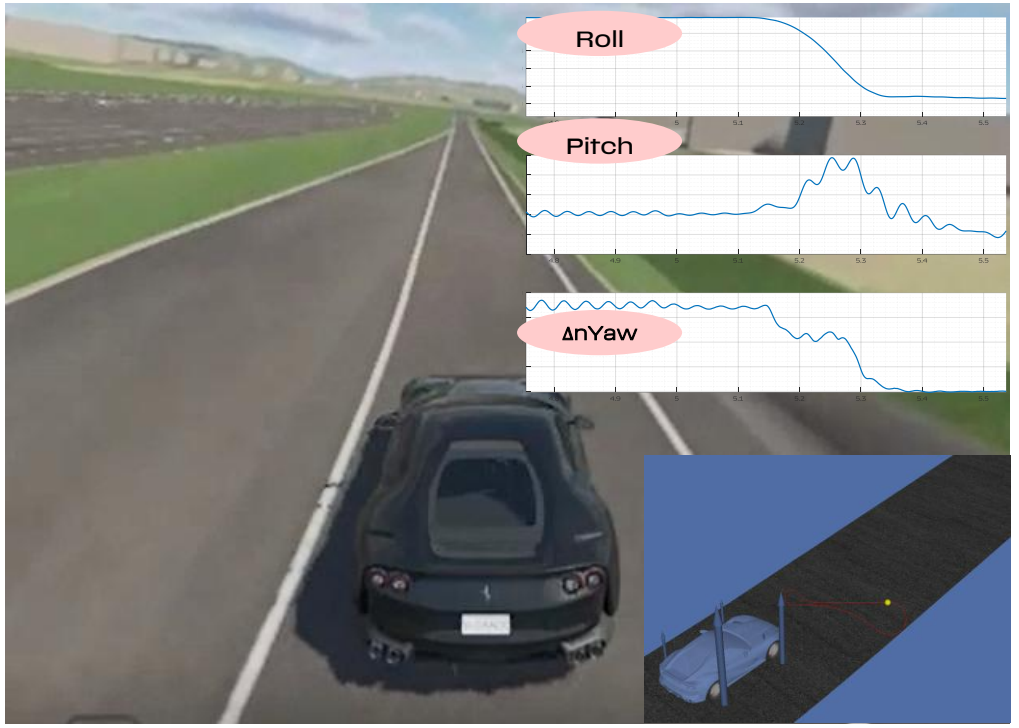


COMPROMISE ON:

- CURVATURE
- BANKING
- DRIVER FEEDABACK

- Reduce the accelerometric load to avoid physical strain during testing

Transition from banking to the straight line



COMPROMISE ON:

- FEEDABCK DRIVER
- CHECKING THE VEHICLE'S BEHAVIOUR

- Identify the transition radius that makes the transition as smooth as possible

E - VORTEX

VIRTUAL TOUR

Some driver's feedback during test sessions

- *"I would suggest creating an inside lane on the banking curve – which is actually flat – to be used in bad weather or on a wet track, or if you need to cool down and slow off"*
- *"We need a centre line to make it look more like a road and discourage drivers from treating it like a racetrack"*
- *"We need to limit the speed to prevent anyone from reaching the semi-bend on the straight coming out of the banking at very high speed*