



PRODUCT DEVELOPMENT UPDATE

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COMPACT FSS SIMULATOR

THE SOFTWARE BACKBONE



BRIDGES AMONG DISCIPLINES

NVH
Simulator



VI-WorldSim visual

- High-quality, high-performance rendering
- Asset sharing

VI-WorldSim



Bridge to VI-DriveSim

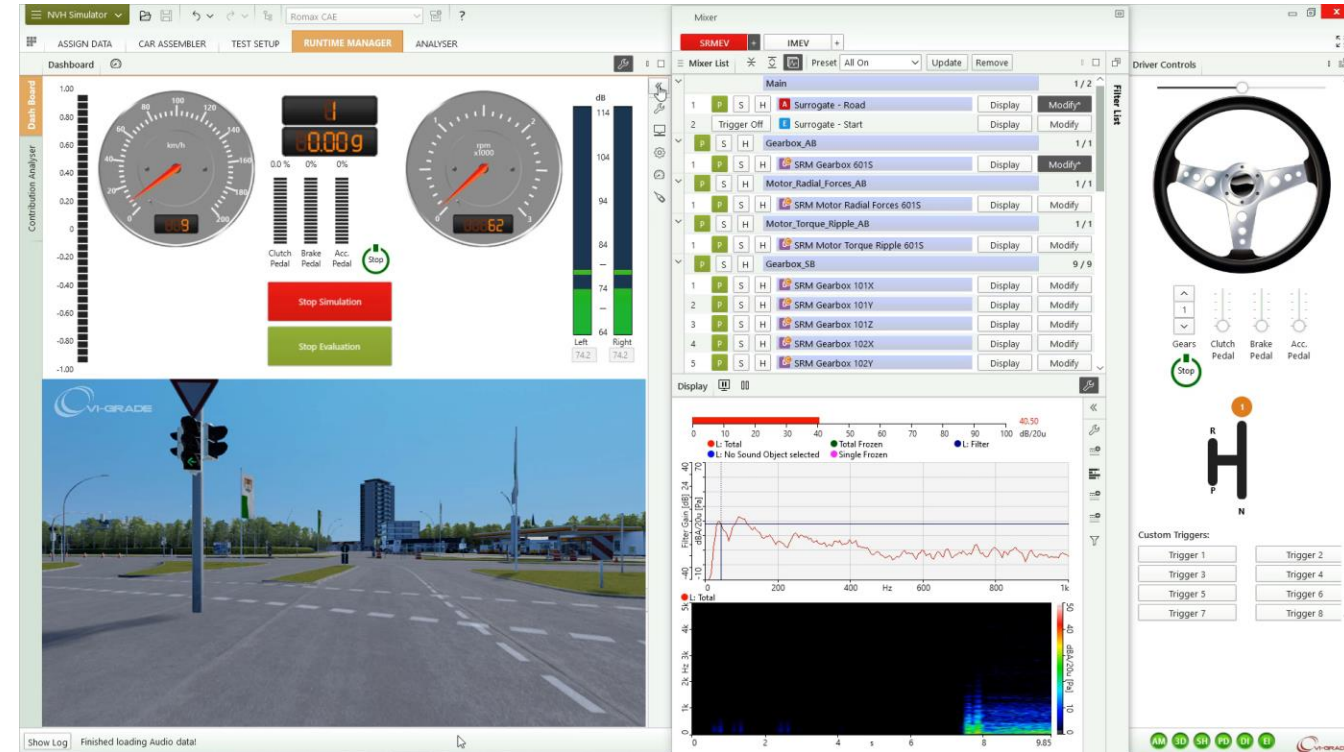
- Combined NVH to Ride & Handling

VI-Road

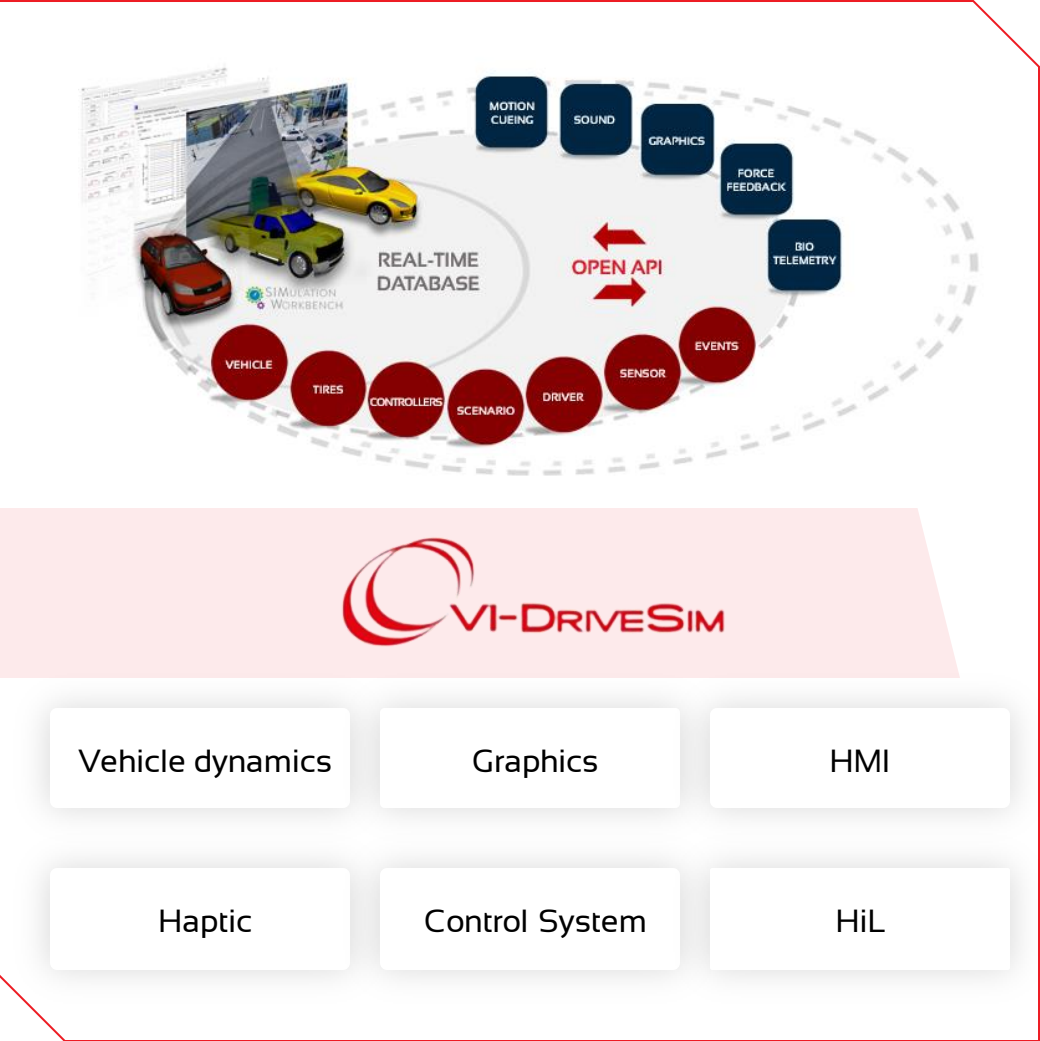


Direct VI-Road access

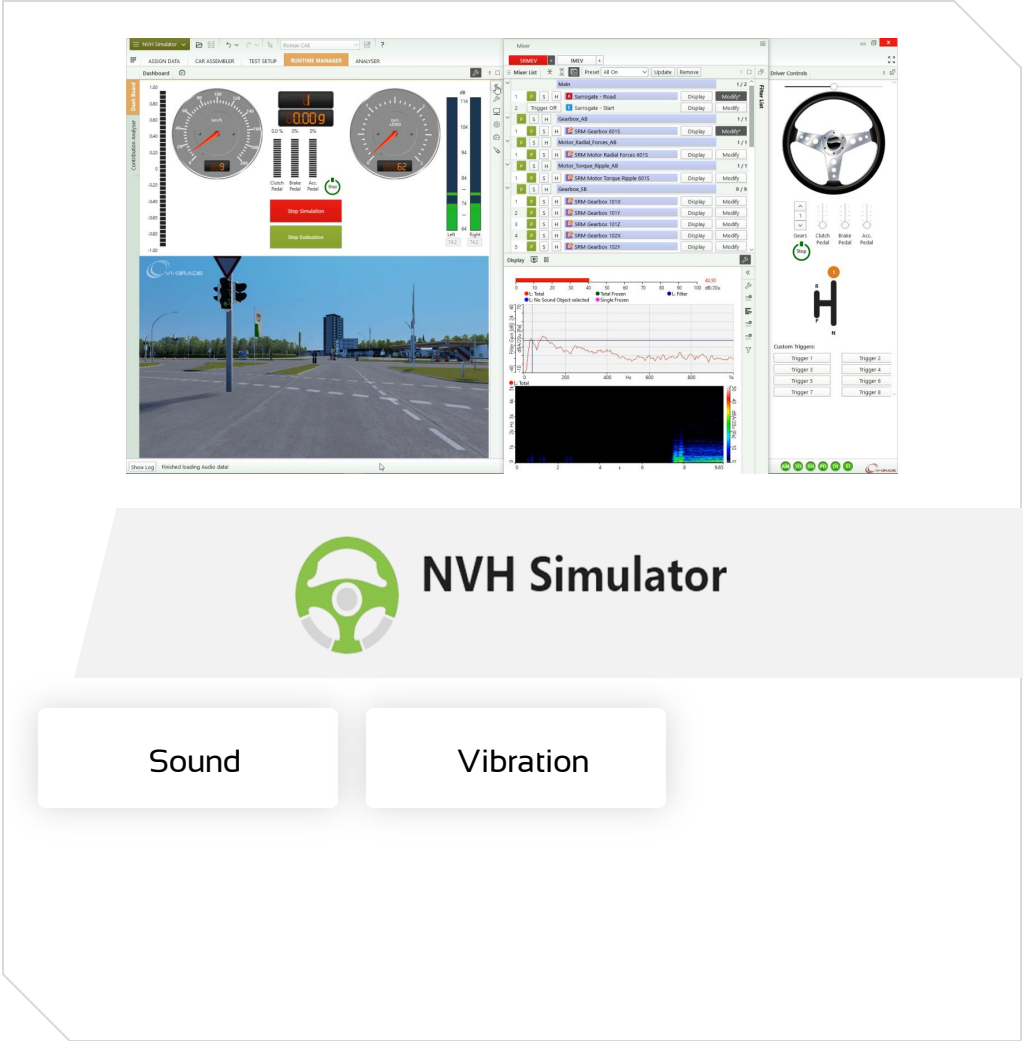
- Retrieve surface information from any digital twin in VI-Road format



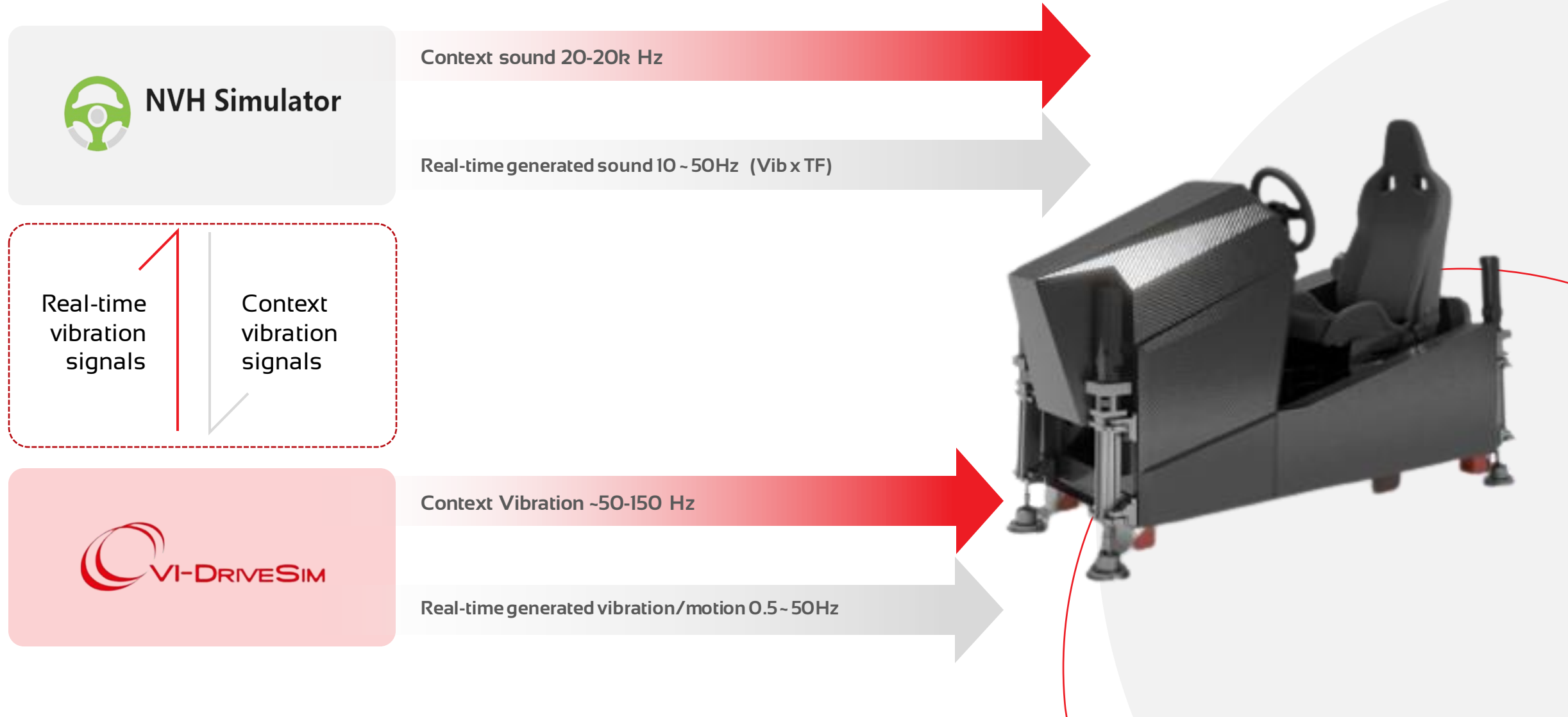
MULTI-ATTRIBUTE ECOSYSTEM



Bridge
process



COMPACT FSS - REALTIME



THE HARDWARE CONTROL



Steering Wheel Target

Vibrations from Simulation
or Measurements



SeatTarget

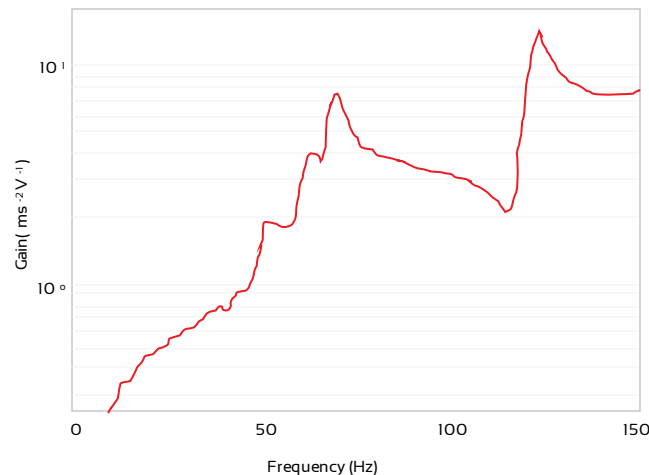
Vibrations from Simulation
or Measurements



Realtime processing

- Multipoint Vibrations Calculation steering (Y, Z), seat (X, Y, Z)
- Filtering to split low frequency to legs and high frequency to shakers
- Crosstalk filtering to make each vibration system independent

Response function



Steering Wheel Shakers



Seat Shakers

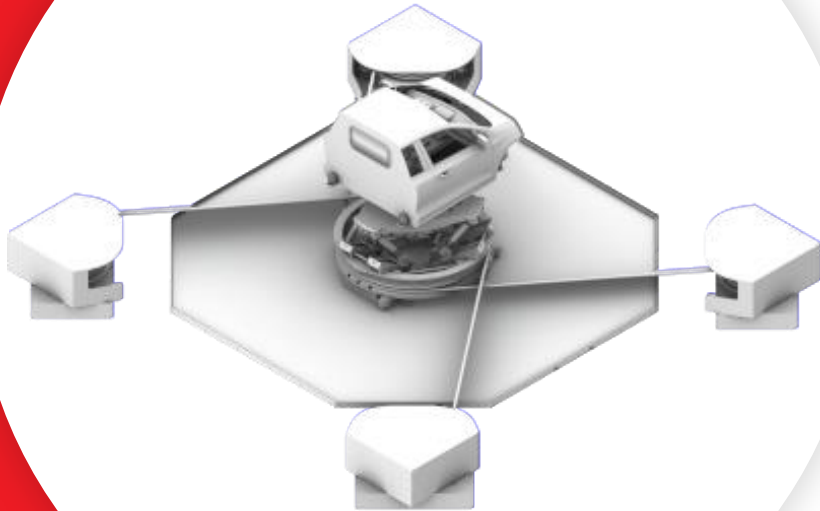


Legs



3 INSTEAD OF 2

Generalize the 3 stages approach for **Motion Cueing**:



01

Low frequency stage

Tripod (DiM 150/250), Cables (DiM400)

02

Intermediate frequency stage

Legs (FSS), Hexapod (DiM 150/250), HexaLift (DiM400)

03

Vibrational stage

FSS Shakers



XR ON DYNAMIC DRIVING SIMULATORS



THE FIRST PROTOTYPE



Old style Compact Sim



Unique environment (VI-WorldSim Highway)



Mixed reality for hands, steering wheel, cluster display



Limited to forward view



AFTER SOME MORE WORK...



Surrounding graphics (approx. 230 deg)



DiM 150 coupling



Urban loop environment

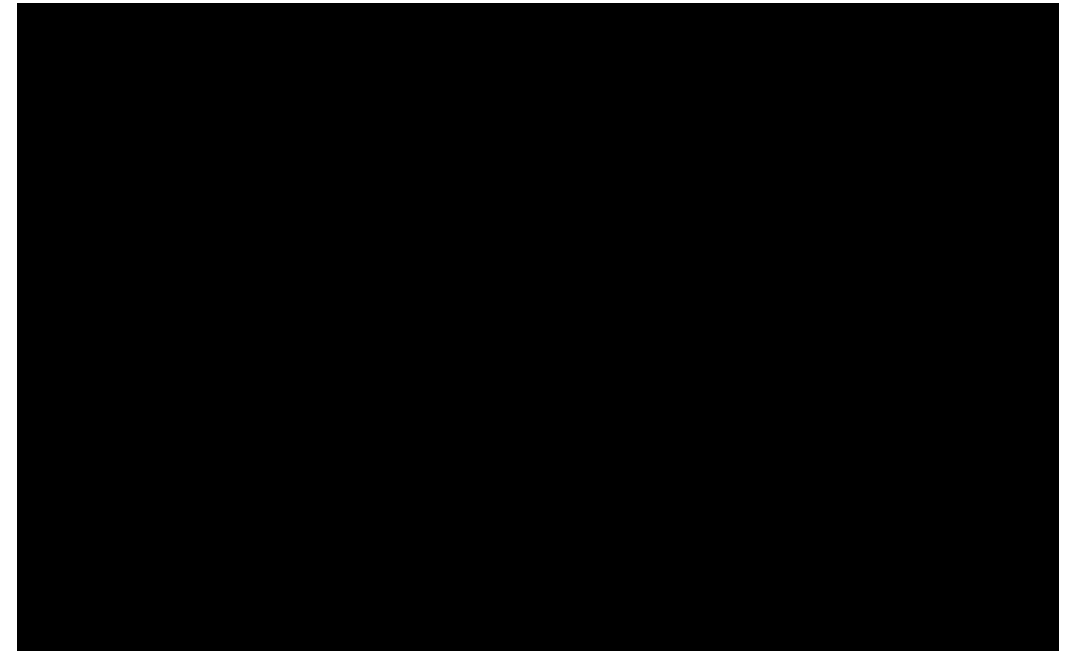
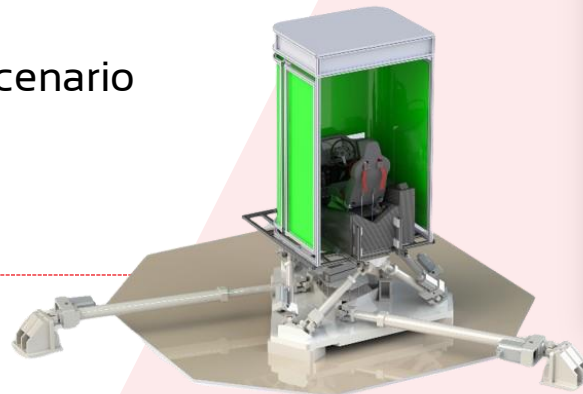


Cluster + Infotainment



HMI events triggered by scenario

- Phone call
- Radio



THE EVOLUTION

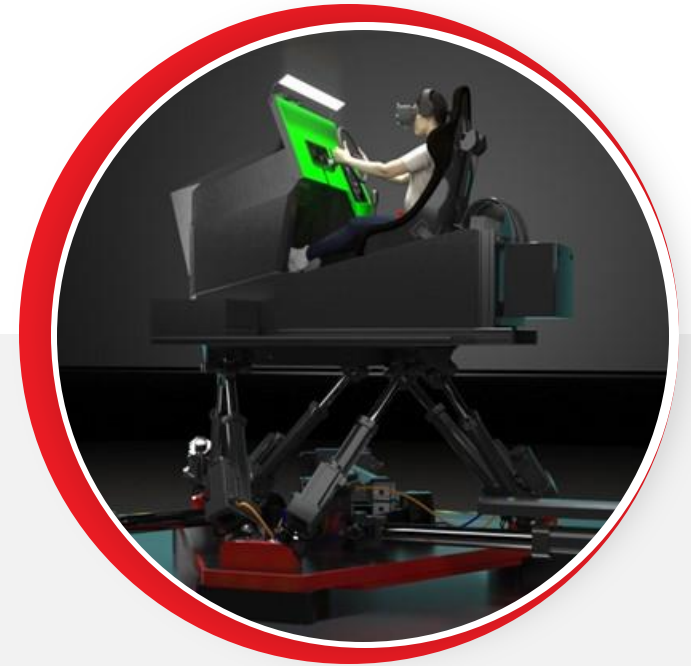
ONE SETUP FOR MULTIPLE DISCIPLINES



GENERIC



XR



DiM

THE XR EXPERIENCE

URBAN LOOP

- Unreal 5
- Open XR
 - Varjo XR3
 - Newer HMDs
- Compatible with VI-WorldSim environments library



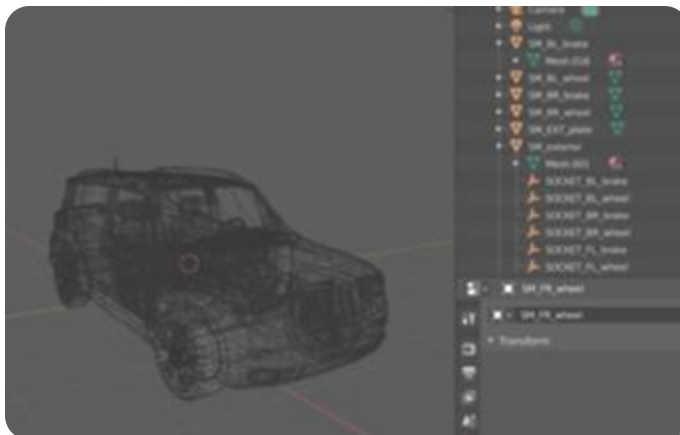
VI-WORLDSIM VEHICLE MODKIT

CUSTOM VEHICLE CREATION PROCESS



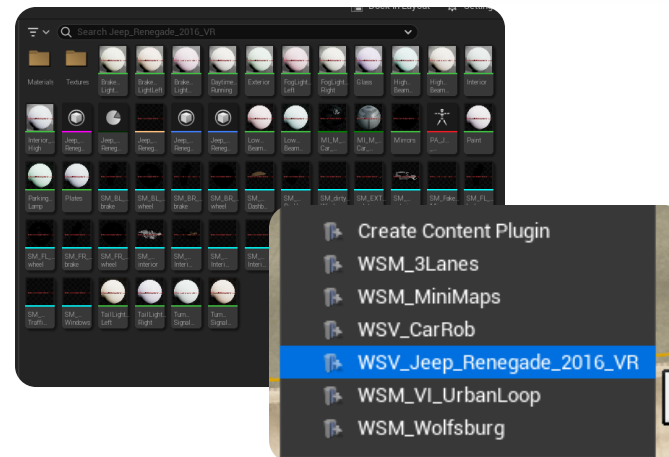
3D Asset Creation

- Use the preferred 3D modeler to create the reference asset



Processing with WorldSim ModKit

- Generate the full Unreal content
- Refine model properties
- Export vehicle mod



Add on for WorldSim

- Deploy custom vehicles in regular WorldSim installations



VI-DASHBOARD VR



Car displays configurable with VI-WorldSim ModKit



VI-Dashboard bindings to VI-WorldSim



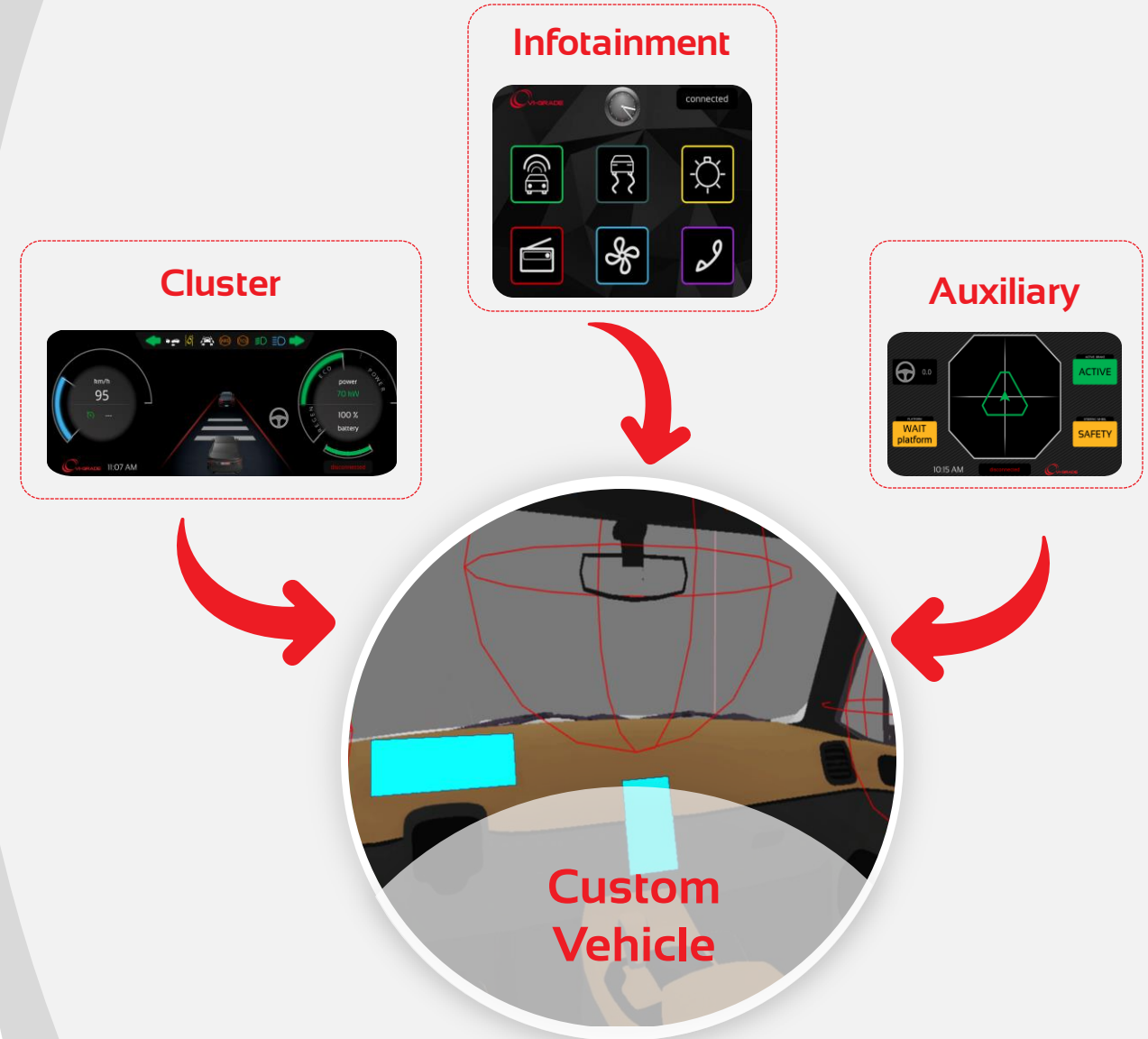
Support for existing layouts



Dashboard control through VI-DriveSim UI



Free mix of virtual vs physical displays



VI-DASHBOARD LAYOUTS

NAVIGATION SCREEN



Navigation component supported for all VI-WorldSim digital twin environments



Geolocalization linked to VI-WorldSim GPS sensor



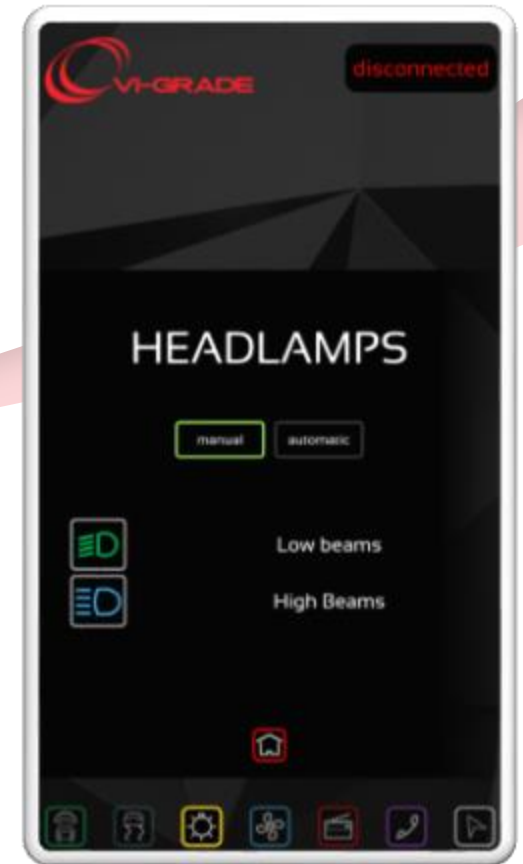
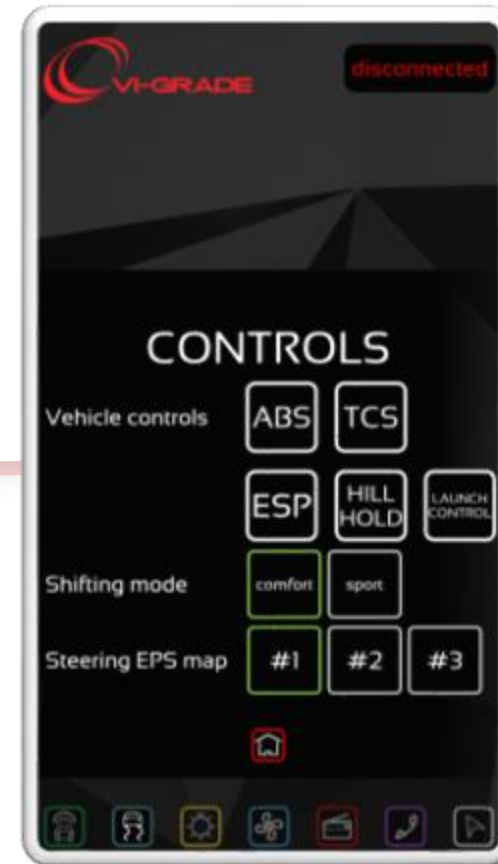
Programmable reference route



VI-DASHBOARD LAYOUTS



VI-DASHBOARD LAYOUTS



VI-DASHBOARD VR

- Tesla Model 3 created with VI-WorldSim ModKit
- Multi-purpose HMI fed by VI-Dashboard VR



RELEASE 2023.1



VL-CARREALTIME 2023.1

VL-CarRealTime

- ESP embedded controller
- Hill Holder embedded controller
- Launch Control embedded controller
- Added actuators between rigid bodies (single component force, general force)
- Added Input for Roll Force at element
- Added electric variant for SedanCar model
- Complete refactoring of braking subsystem
- Added possibility to specify user defined units in fingerprint
- Additional model parameters exposed as investigation candidates:
- Element property files (spring, damper...)
- Rigid parts properties
- Template

Model Diagnostic Tool (preview)

VI-SuspensionGen (and template based suspensions)

- Added bushing at Outer Joints
- Added hub compliance
- Added pushrod length variation as suspension setup method
- Allowed tierod to arm connection for rear pushrod suspensions

Tire & Roads

- Added suspension mass and inertia correction for tires having rigid ring or belt mass enabled (depends on tire model and use mode)
- Tire Toolkit: added support for CDTire
- Exposed Tire Toolkit messages in Tire Limits application
- Updated User Tire example
- Added Input for runtime friction scaling (works on most tire/road combination)

Matlab Interface

- Support for String Parameters in Simulink Model Export



VI-DRIVESIM 2023.1

VI-MotionCueing

- Improved ramp down strategy for all motion platforms

VI-ActiveSystems

- Active seat/belts and shakers parameters storage to file

iodb_csv-logging

- Added a disable logging mode
- Logged channels setup storage to single file



VI-SimSound

- Realtime vehicle volumes adjustments

Simulation IC

- Override initial speed and gear
- Inherit initial speed from VI-WorldSim scenario

VI-Dashboard

- New layouts and navigation sample

VI-Logger

- Log messages include SimWB scheduler and Simulink model
- Full log support for VI-Certified products

Fanatec Steering wheels

- CSL DD wheelbase support
- New buttons available to be mapped with iodb_hwmap

Miscellaneous

- Support for Redhawk 8 on Ubuntu 20.04
- New State Machine simulation control ready to sync 3rd party components

NVH SIMULATOR 2023.1

NVH Simulator

- CAN Setup Integration
- ORS Mode
- CAN Sender Mode (HIL)
- ESS Support for WorldSim Scenarios
- QNX LiveAmp and Grid Matrix supported in ESS
- Automatic Vibration Unit Support for Compact NVH
- Improved workflow for RoadRunner Imported Visual Scenarios
- Video Playback for Fixed Driving Evaluations
- Video Export using WorldSim Visuals

Data Preparation

- Magic Brush Editor
- Compact NVH Workflow Enhancements
- Gear Ratio Tachometer Property
- Batch Mode using Reference Parameters
- File Relocate
- Performance Improvements
 - RPM Autotracking
 - High-Res. Order Display

Simsound/Vsound

- QNX LiveAmp support
- GridMatrix Sound Object support



VI-WORLDSIM 2023.1

WorldSim Studio

- New stationary objects in WorldSim Studio

Multiagent

- Round about yielding policy for European maps

Offline

- New interface blocks for data mangling

Miscellaneous

- Various fixes
- Improved default headlight setup