VI-GRADE
DRIVING SIMULATORS
START. ACCELERATE. EVOLVE.

DO YOU WANT
TO GET TO MARKET
FASTER AND
MORE RELIABLY?

"Within just one week we could carry out more than 110 tests in order to define tuning setup and robust design before building the first prototype. Only on a simulator it is possible to do the A-to-B comparison in a robust way, allowing drivers to remember the events and reactions."

Claudio Fernandes
CAD/CAE & VD Simulation Manager BENTELER

START. ACCELERATE. EVOLVE.

The Challenge: How to adopt a new methodology for vehicle development in less time, with less risk and with less cost?

The Solution: VI-grade's new approach to product development is designed to accelerate your vehicle development process. Many OEMs and suppliers have already adopted this new method, which enables them to efficiently evolve from physical testing to simulation. This process allows them to test more vehicle variants in less time, solving problems much earlier in the development process and ultimately reducing the number of physical prototypes.

See how VI-grade can help accelerate your development process!

VI-GRADE

WE ACCELERATE THE AUTOMOTIVE PRODUCT DEVELOPMENT

MISSION

At VI-grade we help automotive OEMs, suppliers, research institutes and racing teams to develop their products faster with our wide range of simulation software and Driving Simulators.

By using an end-to-end simulation process that goes from off-line simulation on a desktop computer to employing simulation models on Driving Simulators, our customers are able to identify problems earlier in the design cycle. Enabling innovative solutions and minimizing late cycle changes lets you develop more innovative products and get them to market faster.

Driving Simulators are the key to gaining this competitive advantage. VI-grade's wide range of state-of the-art Driving Simulators are an invaluable tool for those companies who have successfully accelerated their development process.
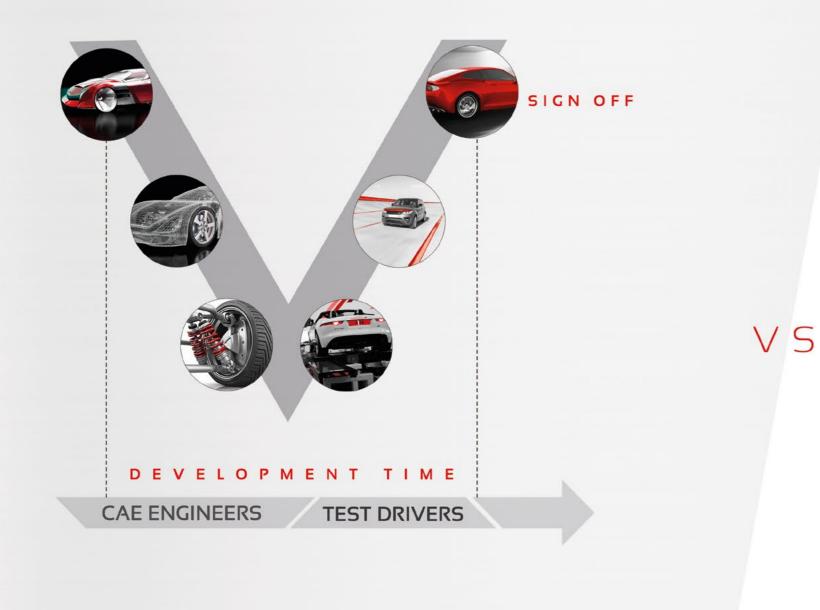
VI-GRADE

"It's about making the car better, not just saving time. I believe we have created the best car so far in Volvo's history."
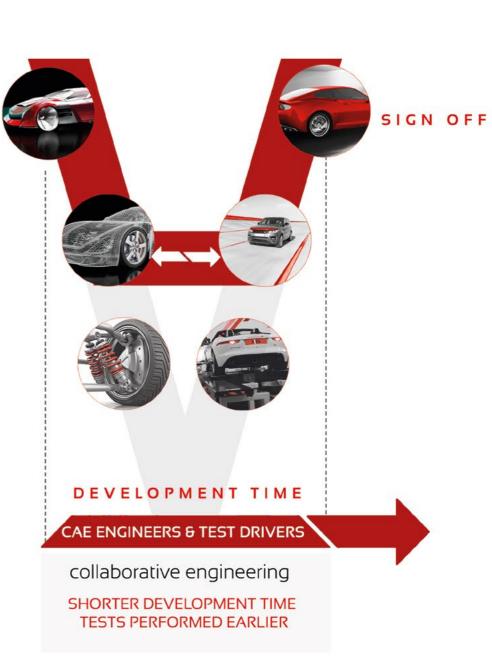
Mattias Davidsson
Lead vehicle dynamics engineer
Volvo

Volvo reduced the development time of the new XC60 by 50% and developed the new S90 chassis with VI-grade's Driving Simulator.

VI-GRADE

SIGN OFF

SIGN OFF

VS

DEVELOPMENT TIME

DEVELOPMENT TIME

CAE ENGINEERS   TEST DRIVERS

CAE ENGINEERS & TEST DRIVERS

collaborative engineering

SHORTER DEVELOPMENT TIME
TESTS PERFORMED EARLIER

ENGINEERING CENTER

RIDE & HANDLING

NVH

ADAS & AV

HMI

MOTORSPORT

BRIDGING THE GAP
BETWEEN TESTING AND SIMULATION

VISION

Until now, vehicles and automotive components have been developed following a so-called sequential design process (target setting, simulation activities, physical prototypes, testing on test track), leading to the definition of all modifications required to reach product sign-off.

This process is now obsolete, thanks to the powerful combination of simulation and Driving Simulator solutions. Developers can now gain valuable information on developed products much earlier in the design cycle. Test drivers no longer need to wait until the first physical prototype is available; they can literally virtually "drive" simulation models, providing real-time subjective feedback to CAE engineers.

This is how VI-grade is "Bridging the Gap between Testing and Simulation".

VI-GRADE

ACCELERATED
PRODUCT
DEVELOPMENT

EASIER
SYSTEM-LEVEL
VALIDATION

AFFORDABLE
DEVELOPMENT
PROCESS

DECREASE PROTOTYPES
AND DEVELOPMENT TIME

OVERCOME COMPLEXITY
OF SYSTEM INTEGRATION

DISCOVER POTENTIAL ISSUES
AND INVOLVE TESTING
DEPARTMENT EARLIER

VI-GRADE

COMPLETE
WORKFLOW

from offline simulation
through Driving Simulator
up to in-vehicle testing

UNIQUE
ARCHITECTURE

unparalleled separation
of chassis
and body behaviour

OPEN
ENVIRONMENT

turn-key solution
that can be adjusted
to customer's needs

A SOLUTION FOR EVERY NEED

COMPLETE, UNIQUE, OPEN

No matter what kind of vehicle you have to develop,
no matter what kind of discipline you have to investigate,
no matter what kind of frequency range you have to work on,
no matter how much space you have available in your engineering facilities...
VI-grade has the Driving Simulator that fits your development needs!

VI-grade Driving Simulators are COMPLETE, UNIQUE and OPEN.
COMPLETE because they are turn-key solutions and cover the complete
design cycle from concept to sign-off, UNIQUE because they are based on a
patented architecture, and OPEN because they easily interface with
commonly used 3rd party software that's required during
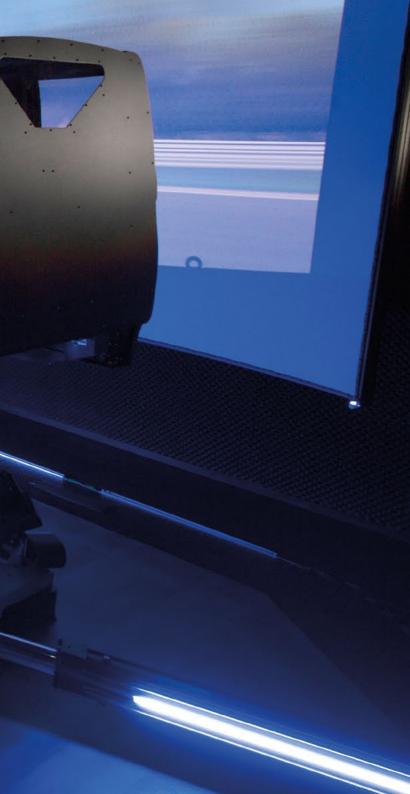development activities.

VI-GRADE

"We're expecting to significantly reduce the number of physical prototypes during the development phase thanks to the Driving Simulator."

Jack Cheng
Co-founder and Executive VP
NIO

NIO developed a brand new electric car
with no reference vehicle to start from,
completely relying on Driving Simulators.

VI-GRADE

1 0 0 +

AUTOMOTIVE CUSTOMERS
IN 20+ COUNTRIES

1 0 0 +

SIMULATORS INSTALLED
SINCE 2013

START

DEFINING
THE FUTURE
OF THE
AUTOMOTIVE
INDUSTRY

VI-grade DRIVING SIMULATORS

DESKTOP **COMPACT** **STATIC** **DYNAMIC**

DESKTOP SIMULATOR

VI-grade's ENTRY-LEVEL SOLUTION FOR
DRIVING SIMULATION

D E S K T O P   S I M U L A T O R

The DESKTOP Simulator is the entry level solution in the driving simulators product line provided by VI-grade. It offers the possibility to test drive your vehicle directly from your desk, validating its basic behaviour.

Highlight of this solution is the new 16 core AutoHawk Desktop tower computer that provides the full power of a true realtime system in combination with a powerful windows PC all in one machine. This is made possible with utilizing the RedHawk hypervisor technology KVM-RT.

The DESKTOP Simulator features a steering wheel and pedals and it can be placed directly on your desk. It is the perfect solution for those engineers who want to start using a Driving Simulator to boost simulation activities and to test models in real-time whilst getting a subjective feeling.

The DESKTOP Simulator from VI-grade is the ideal tool for automotive OEMs that wish to use a desktop technology to prepare models to be used later on a more advanced simulator (COMPACT, STATIC and DiM) and that need to quickly test specific components.This kind of simulator can also be used by universities and research centers, to develop and test dedicated control algorithms, as well as to expose their students to driving simulator technologies.

The DESKTOP Simulator is equipped with the exact same software installed on COMPACT, STATIC and DiM Driving Simulators from VI-grade.
This makes it very easy to upgrade from a DESKTOP Simulator to a more advanced Driving Simulator, leveraging previous investments and experiences.

A P P L I C A T I O N S

- Vehicle dynamics
- Control systems development
- Real-time vehicle model preparation for other simulators

B E N E F I T S

- Minimum size
- Minimum investment
- Same software used on VI-grade COMPACT, STATIC and DiM Simulators
- Fully upgradeable

DESKTOP NVH SIMULATOR

INTERACTIVE DRIVING SIMULATION
OF VEHICLE NVH

DESKTOP NVH SIMULATOR

VI-grade's DESKTOP NVH Simulator creates an interactive driving experience of vehicle NVH, bringing your sound data into the real world, so it can be physically experienced.

Leveraging NVH Simulator and Software technology from Brüel & Kjær, the DESKTOP NVH Simulator is equipped with a steering wheel and pedals so that drivers can interact with the vehicle and experience the sound of the vehicle in real-time. Highly accurate vehicle sound is played through headphones or speakers, allowing the driver to experience the sound of a vehicle throughout all of the dynamic aspects of driving, like changing gears and accelerating, or changing from smooth to coarse to rough road surfaces. This immersive context for sound evaluations helps users select appropriate sounds and compare alternative designs – whether they are engineers or non-experts.

Software-in-the-loop and hardware-in-the-loop capabilities enable integration with other vehicle systems, such as vehicle performance models and active sound design solutions.

Courtesy of Hyundai Motor Group

EXPERIENCE THE SOUND
OF A VEHICLE

- Build and experience the sound and vibration of NVH virtual prototypes, including traditional IC-engine vehicle, EVs, hybrids or vehicles with any type of propulsion system
- Increase confidence in the NVH decision-making process
- Drive and assess new vehicles well in advance of first physical prototypes
- Rapidly assess multiple driving conditions and part load conditions for powertrain sound quality
- Listen to your CAE data and incorporate CAE data in the NVH Simulator virtual prototype
- Combine and experience data from multiple sources, including in-vehicle and test bench recordings, and multiple CAE analysis result types
- Drive any vehicle in the database at any time - no need to coordinate vehicle availability, track time and weather for drive assessments
- Understand and design the NVH of the vehicle through full control of the sound – turn individual components on and off or apply filters to components in real-time

APPLICATIONS

- Virtual prototyping of NVH at any stage of the vehicle design process
- Setting NVH targets before physical prototyping, cascading targets down to individual components
- Competitor vehicle benchmarking
- Powertrain sound quality assessment throughout development
- Non-expert NVH assessment by customers, management and marketing
- Helping computer-aided engineering (CAE) analysts understand the impact of design changes on the NVH characteristics of the vehicle
- Tuning active sound design systems (electronic sound enhancement) on the desktop

COMPACT SIMULATOR

ALL THE MAIN FEATURES
OF OUR SIMULATORS
IN A REDUCED SPACE

COMPACT SIMULATOR

The COMPACT Simulator features a driver's seat, a fully-adjustable steering wheel, dashboard, pedals, gear stick and screen and is small enough to be placed directly in your office. It is the perfect solution for those companies wanting to start using a Driving Simulator to boost simulation activities and to test models in real-time while getting a subjective feeling.

VI-grade's COMPACT Simulator is the ideal tool for automotive OEMs wanting to prepare models to be used for a more advanced simulator (both STATIC and DiM) and needing to quickly test specific components. The COMPACT Simulator is also an ideal solution for Tier 1 suppliers needing to ensure that their components will work well when inserted into a more complex vehicle model. This kind of simulator can also be used by universities and research centers to develop and test dedicated control algorithms, as well as to introduce their students to driving simulator technologies.
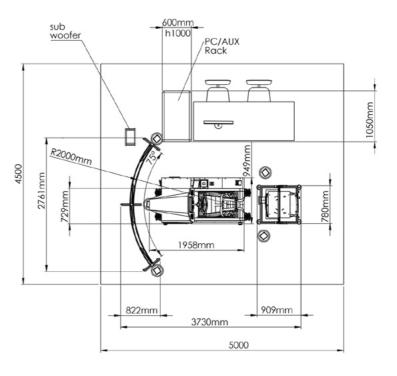
A POCKET SIMULATOR
IN YOUR HANDS

APPLICATIONS

- Vehicle dynamics
- Control systems development
- ADAS development
- Automotive components development
- Real-time vehicle model preparation for DYNAMIC Simulator
- HMI studies

BENEFITS

- Reduced size
- Reduced investment
- Same software used on
- VI-grade STATIC and DYNAMIC Simulators
- Fully upgradeable

TECHNICAL FEATURES

- Cylindrical screen - (R=2m, FOV=75°, H=1.5m)
- BARCO 120Hz projector
- Concurrent iHawk hard real-time computer
- Steering wheel torque feedback unit
- Active belts
- Active seat
- Active brake
- Shakers for high frequency
- VI-DriveSim STATIC 3 channels
- Concurrent simulation workbench (SimWB)
- VI-SimSound
- Traffic simulation software

COMPACT NVH SIMULATOR

COMPLETE VIBRATION +
SOUND EXPERIENCE

C O M P A C T   N V H   S I M U L A T O R

For many NVH phenomena, vibration is a key element. Both sound and vibration need to be accurately assessed at the same time, to make a correct evaluation and decision about the acoustic and tactile character of the vehicle. The COMPACT NVH Simulator brings NVH virtual prototypes to life, making it easy to understand and evaluate NVH data and make decisions on NVH designs and content.

Carbon fiber is used extensively in the COMPACT NVH Simulator to achieve an exceptionally stiff structure capable of delivering controlled, accurate vibration. With its extremely low mass and high stiffness, the steering wheel has no rim modes below 200Hz, which makes it possible to provide controlled and accurate vibration. Seven independent inputs deliver vibration to the driver through the seat, steering wheel and floor pan, enabling high accuracy and real-time driver-in-the-loop simulation. Embedded accelerometers enable easy calibration and real-time feedback and monitoring of vibration levels. A steering wheel with paddle shifters, pedals, a console-mounted shifter, dash screen and touchscreen enable driver input, interaction and feedback.

The COMPACT NVH Simulator utilizes the same vibration system as the full-size STATIC NVH Simulator, providing the same vibration and sound capability in a much smaller footprint, and is available with either an immersive visual system comprising a projector and large curved screen, or a space-saving smaller flat-panel screen visual system, enabling an even smaller footprint.

CALIBRATED, MULTI-AXIAL VIBRATION AT ALL DRIVER TOUCHPOINTS

- NVH driver seat
- NVH steering system
- NVH floor system
- Cylindrical screen
- 120 Hz projector
- Optional small-footprint visual system
- Computer rack for PCs
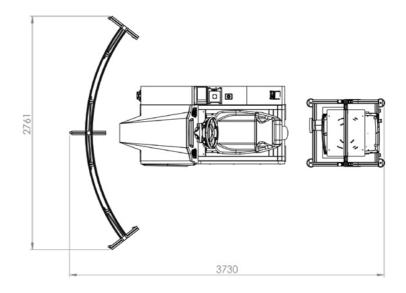- Touch screen for assessment and control

APPLICATIONS

- Experience vibration + sound results of CAE models and hybrid CAE/Test-based models
- Powertrain vibration + sound – Idle, WOT, cylinder deactivation, start-stop, etc.
- Road vibration + sound – smooth road, rough road, impact events
- A/B comparisons between vehicles or designs with instant switching

BENEFITS

- Experience of vibration of virtual NVH prototypes, together with sound
- Enables communication of "Vibration + Sound" characteristics to development engineers, managers and others who need to know
- Minimal space requirements

COMPACT FSS SIMULATOR

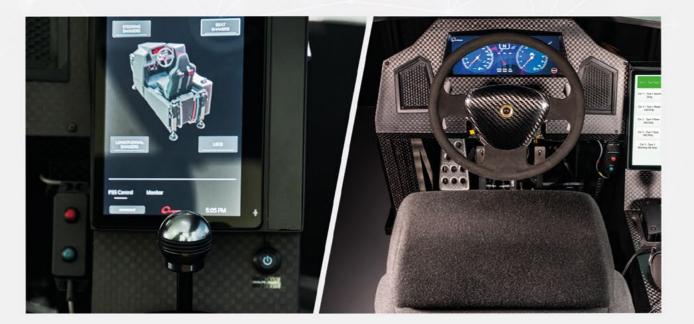# MOTION, VIBRATION + SOUND OF VIRTUAL PROTOTYPES

COMPACT FSS SIMULATOR

Most simulators focus primarily on one attribute, and in the past, NVH and Vehicle Dynamics in particular have been evaluated on separate simulators. But humans perceive all aspects of a vehicle simultaneously, as a complete experience. The COMPACT Full Spectrum Simulator (FSS) is the first real-time, driver-in-the-loop simulator to combine accurate motion, vibration, and sound in a single simulator, to enable a complete and immersive experience including both the NVH and the vehicle dynamics of virtual prototypes.

The COMPACT FSS simulator offers highly accurate motion, vibration, and sound in a compact size. It enables Human-in-the-Loop simulation, connecting objective data with subjective human perception.

Covering a wide range from 0.5Hz to 20kHz, the simulator is ideal for evaluating ride comfort, overall vehicle refinement, and multiple vehicle attributes. It is powered by the VI-grade AutoHawk real-time computer and supported by NVH Simulator software components for additional sound and vibration content.

The COMPACT FSS Simulator is particularly suitable for assessing ride comfort, providing a comprehensive experience for drivers and passengers alike.
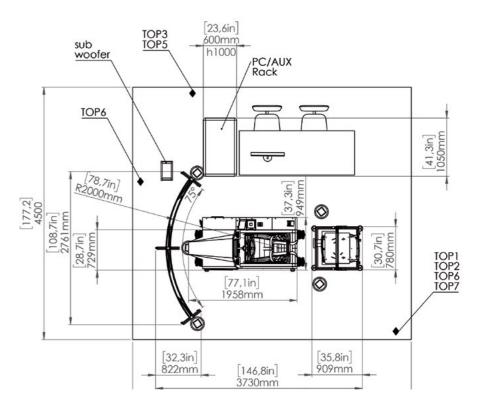
ACCURATE MOTION, VIBRATION AND SOUND IN A SMALL FOOTPRINT

- Ride Comfort evaluations
- Overall vehicle refinement characterization
- Seat evaluations
- Motorsport applications

BENEFITS

- Highly accurate motion, vibration, and sound
- Small footprint and lower cost compared to hexapods
- Full-spectrum simulation from 0.5Hz to 20kHz
- Real-time, Driver-in-the-Loop simulation
- Ideal for experiencing multiple vehicle attributes simultaneously
- Provides confidence for design decisions on subjective attributes like Ride Comfort, sound, and vibration
- Features immersive and realistic evaluations

COMPACT HMI SIMULATOR

DESIGNING AND VALIDATING **VEHICLE HMI AND UX INTERFACES**

C O M P A C T   H M I   S I M U L A T O R

Automotive designers must develop HMI systems that integrate function, ergonomics, and user experience.

Traditional mockups and prototypes are costly, time-consuming, and lack real-world driving replication. Achieving usability and safety in evolving vehicle interiors requires a dynamic solution.
The VI-grade COMPACT HMI Simulator bridges design and testing with a configurable, immersive development environment.

Combining a modular interior with real-time driving simulation, it enables human-in-the-loop HMI testing. Its flexible setup supports various seating, steering, dashboard, and display configurations. By integrating real-time driving dynamics, AI-driven traffic, and ADAS testing, it provides a realistic platform for evaluating usability, driver interaction, and safety.

Eliminating costly prototypes, it accelerates development and optimizes infotainment, ADAS, and controls for intuitive user experiences before production.

The VI-grade COMPACT HMI Simulator revolutionizes HMI development with a simulation-driven approach to designing and validating vehicle interfaces.

TEST AND REFINE HMI SYSTEMS WITH HUMAN-IN-THE-LOOP EVALUATION

- *Rapid reconfiguration*
  Adjust seat, steering, and display positions to match different vehicle layouts.
- *Cost & time efficiency*
  Reduce reliance on expensive physical mockups and prototypes.
- *Realistic driving simulation*
  Test HMI functions under real-world conditions with vehicle dynamics and AI-powered traffic.
- *Seamless ADAS integration*
  Evaluate driver assistance systems within a dynamic virtual test environment.
- *Scalable & flexible*
  Adaptable to various vehicle types, from sports cars to SUVs.

APPLICATIONS

- *Testing & Validation*
- *User Experience (UX) Design*
- *Driver Safety Studies*
- *Prototyping*
- *Training & Demonstrations*

STATIC SIMULATOR
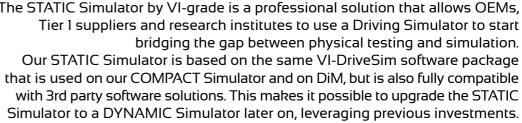
FOR AN **IMMERSIVE AND REALISTIC** DRIVING EXPERIENCE

S T A T I C   S I M U L A T O R

The STATIC Simulator by VI-grade is a professional solution that allows OEMs, Tier 1 suppliers and research institutes to use a Driving Simulator to start bridging the gap between physical testing and simulation.
Our STATIC Simulator is based on the same VI-DriveSim software package that is used on our COMPACT Simulator and on DiM, but is also fully compatible with 3rd party software solutions. This makes it possible to upgrade the STATIC Simulator to a DYNAMIC Simulator later on, leveraging previous investments.

Ride & Handling, NVH, ADAS & AV, HMI and Motorsport are some of the disciplines that could be developed using a STATIC Simulator by VI-grade. Cylindrical screen and professional projectors make it possible to reach very high level of realism and to give the driver an immersive driver experience.

Thanks to the real-time hardware infrastructure, our STATIC Simulator is also suitable for software-in-the-loop and hardware-in-the-loop applications.

EQUIPPED WITH ADAS CONTROLLERS AND HMI DEVICES
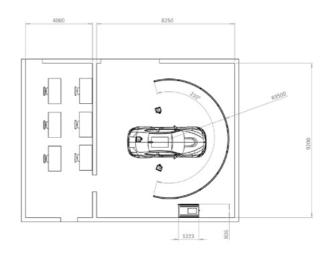
APPLICATIONS

- Ride & Handling
- NVH
- ADAS & AV
- HMI
- Motorsport
- Control system development
- Components development

BENEFITS

- Immersive driving experience
- Full cockpit
- Fully upgradeable to DYNAMIC Simulator
- Limited investment

TECHNICAL FEATURES

- Cylindrical screen - (R=3m, FOV=230°, H=3m)
- BARCO 120Hz projectors
- Concurrent iHawk hard real-time computer
- Steering wheel torque feedback unit
- Active belts
- Active seat
- Active brake
- Shakers for high frequency
- SmartEye eyetracker
- VI-DriveSim STATIC 3 channels
- Concurrent simulation workbench (SimWB)
- Graphic merge & blending, calibration
- VI-SimSound
- Traffic simulation software
- ADAS controllers (ACC, LKA, LDW, AEB, TJA, AutoPilot)
- VI-BioTelemetry

"We expect our STATIC Driving Simulator to be a very important tool for race strategy preparation and driver training."

Sylvain Filippi
Managing Director
Envision Virgin Racing

Envision Virgin Racing installed the cutting-edge race STATIC Simulator in its expanded Silverstone headquarters.

STATIC NVH SIMULATOR

FULLY IMMERSIVE VEHICLE NVH EVALUATION

STATIC NVH SIMULATOR

Our STATIC NVH Simulator creates an interactive driving experience of a vehicle's interior noise, vibration and harshness (NVH), bringing your sound and vibration data into the real world so it can be experienced by real people.

Leveraging best-in-class NVH Simulator and Software technology from Brüel & Kjær, our STATIC NVH Simulator provides even more authenticity, displaying the track in front of a real, stationary vehicle that is equipped with headphones, speakers and shakers – adding vibration simulation to all of the capabilities of the DESKTOP NVH Simulator.

Simulation models can contain any available NVH data, from simple recordings of the whole vehicle to an engineering model including path and source contribution data, and modified components.
Our NVH Simulators can easily incorporate CAE data predictions, allowing subjective evaluations of virtual component designs when inserted into the real vehicle's NVH data.

Courtesy of Bentley Motors

Courtesy of Bentley Motors

EQUIPPED WITH HEADPHONES, SPEAKERS AND SHAKERS

APPLICATIONS

- Virtual prototyping of NVH at any stage of the vehicle design process
- Setting NVH targets before physical prototyping, and cascading targets down to individual components
- Competitor vehicle benchmarking
- Powertrain sound quality assessment throughout development
- Non-expert NVH assessment by customers, management and marketing
- Helping computer-aided engineering (CAE) analysts understand the impact of design changes on the NVH characteristics of the vehicle

BENEFITS

- Build and experience the sound and vibration of NVH virtual prototypes, including traditional IC-engine vehicle, EVs, hybrids or vehicles with any type of propulsion system
- Increase confidence in the NVH decision-making process
- Drive and assess new vehicles well in advance of first physical prototypes
- Rapidly assess multiple driving conditions and part load conditions for powertrain sound quality
- Listen to your CAE data, incorporate CAE data in the NVH Simulator virtual prototype
- Combine and experience data from multiple sources, including in-vehicle and test bench recordings and multiple CAE analysis result types
- Drive any vehicle in the database at any time - no need to coordinate vehicle availability, track time and weather for drive assessments
- Understand and design the NVH of the vehicle through full control of the sound – turn individual components on and off or apply filters to components in real-time
- Complete immersion with a full-vehicle body and large visual screen – looks and feels like a real car
- Calibrated, accurate, multi-axial, independent vibration at all driver touchpoints – seat, steering wheel

DYNAMIC SIMULATOR

"The DiM250 Driving Simulator is the perfect tool for us. We establish a target for where we want to be with the final product and, thanks to the Driving Simulator, we can have a whole set of teams working together."

Michael Bidlingmaier
Key Expert –
Digital Vehicle Dynamics Integration
Mercedes-AMG

Mercedes-AMG adopts DiM250
DYNAMIC Driving Simulator from VI-grade.

TURN-KEY
YET OPEN DRIVING
SIMULATORS

DYNAMIC SIMULATOR

DiM, the family of turn-key, yet open driving simulation solutions from VI-grade, provides automotive engineers with a complete set of innovative, integrated Driving Simulators for a new generation approach to system-level simulation, allowing companies to bridge the gap between testing and simulation.

The dynamic configuration provides motion feedback to the driver thanks to an innovative nine-degrees-of-freedom moving platform with reduced dimensions and larger displacements, called Driver-in-Motion (DiM).

Our engineers went beyond the basic six actuators design to provide a larger workspace while maintaining high stiffness. This allows the system to be more relevant for low as well as for high frequencies which characterize automotive chassis design. By dividing and conquering the problem, it is now possible to study both vehicle dynamics and ride on the same motion platform with DiM Driving Simulators.

The DiM product family is now larger than ever, thanks to the addition of VI-grade's unique cable-driven simulators. This cable-driven technology allows the DiM product family to go beyond the mechanical barriers of other simulator architectures, guaranteeing high adaptability and top-class performances.

A UNIQUE ARCHITECTURE:
LOW & HIGH FREQUENCY
FOR COMBINED DYNAMICS

DiM PRODUCT LINE

DiM50 - DiM150 - DiM250 - DiM400 and higher

APPLICATIONS

Motorsport
- *Race set up*
- *Hybrid and race strategy*
- *Driver's training*
- *Car development*

Vehicle Dynamics
- *Chassis tuning (Vehicle Dynamic Targets)*
- *Tire development*
- *Driver's training*
- *Control system design (SIL & HIL)*

Ride & Comfort
- *Chassis tuning (Ride & Comfort Targets)*
- *A to B comparison*
- *Off-line results (from experimental test and/or multibody simulations) playback*

ADAS & AV
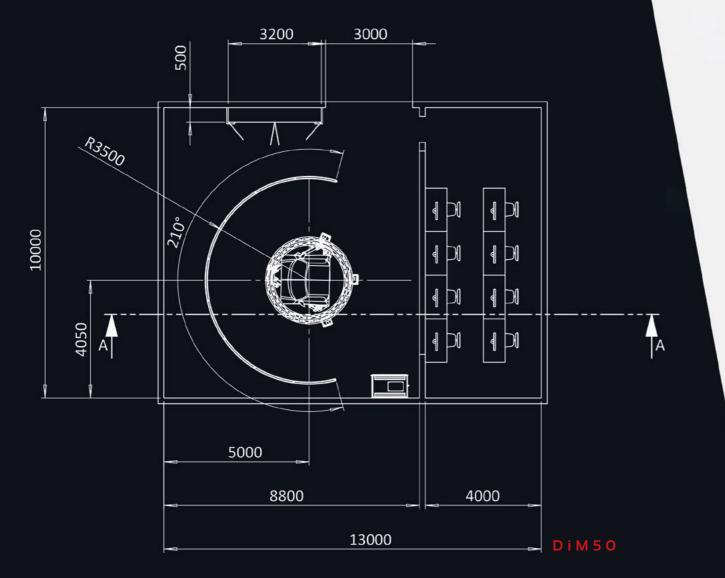- *ADAS development & verification (AEB, LKA, ACC, ...)*
- *Dangerous maneuvers simulation*
- *AV algorithms development & verification*
- *HMI studies*
- *Driver's distraction and monitoring*
- *Human – systems interactions*

DiM50

The **DiM50** DYNAMIC Simulator is an entry-level dynamic driver-in-the-loop simulator for those needing to perform ride and ADAS simulation, as well as basic handling maneuvers and provides a higher degree of realism with respect to a STATIC Simulator.
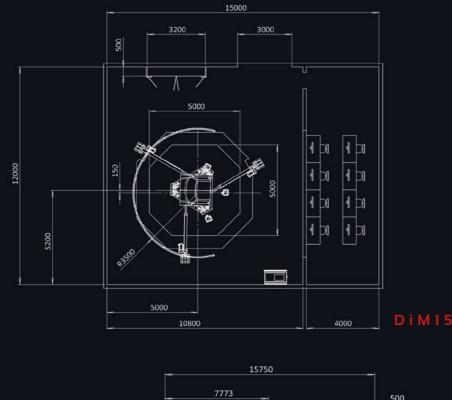
DiM50 represents a natural evolution of VI-grade's STATIC Simulator technology and, since it leverages the same, proven hexapod technology featured in our DiM150 or DiM250 models, it can be further upgraded to a 9 degrees of freedom DiM150 or DiM250 model through the addition of a baseframe and three planar motion actuators.
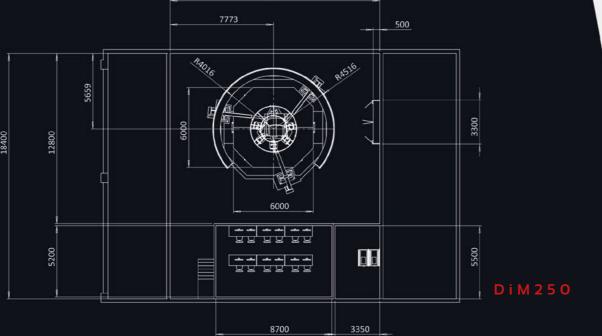
DiM50 features a wide array of automotive applications ranging from ride & comfort, basic vehicle dynamics and control system design, up to HMI/ADAS applications and driver training in motorsports.

DiM50 lends itself well to universities, research centers, suppliers and motorsport teams as well as automotive OEMs that already invested in bigger simulators.

- Fully scalable, configurable and upgradeable
- Proven motion platform
- Active components (seats, belts, brakes, ...)
- Hard-real-time computing platform
- Customizable cockpits
- HiL-ready architecture
- Unparalleled flexibility through VI-grade's open environment in line with VI-Certified
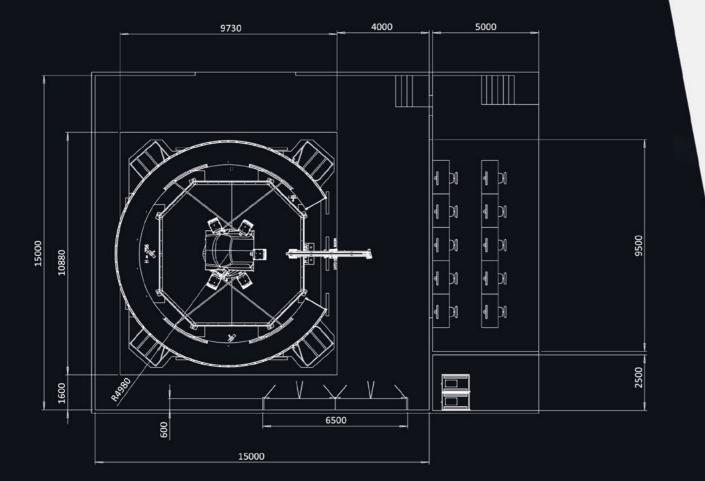
DiM150

DiM250

BENEFITS

The **DiM150** is already successfully installed at leading automotive OEMs, motorsport teams and engineering service providers. It is an award-winning Driving Simulator for integrated active & passive vehicle dynamics and ride development, as well as for ADAS and NVH applications. Thanks to its architecture, the DiM captures low and high frequency performance for combined dynamics.

- Standard workspace
- Typical steady-state accelerations (tested on several situations by many expert users)
- Good immersion (standard 7m cylindrical screen)
- Class leading velocity and acceleration performances

The **DiM250** features the same architecture and performance as the DiM150, however, with extended linear actuators for increased travel of the tripod. This motion platform is suitable for applications which require longer time exposure to steady state accelerations.
The longer time exposure corresponds to larger platform movement to cover the driver reaction time. Like the DiM150, the DiM250 comes with a fixed screen, thus ensuring the best possible visual immersion quality.

- More workspace (longer tripod actuators)
- Longer steady-state accelerations (better acceptance of Driving Simulator by unexperienced users)
- Better immersion (bigger 8/9m conical screen)
- Same class leading velocity and acceleration performances on bigger workspace

DiM400

The **DiM400** (and higher) is the newest addition to the DiM family and adds a host of state-of-the-art, new technologies to advanced Driving Simulators.

Leveraging the concept of the original DiM150 and DiM250, the DiM400 adds a unique cable drive system for the lower stage to enable a larger motion envelope for even longer time exposure. For the upper stage, a new hexalift component enables an improved motion envelope by increasing available vertical travel, which in turn leads to a better vertical feel under combined loading events.

Cable-driven simulators are uniquely able to easily adapt to client-specific budgetary and space requirements. They can be configured in any size, ranging from 4 meters of surge and sway up to 15 meters and beyond.

Cable-driven simulators up to 5 meters in size come with a fixed screen. For simulators larger than 5 meters, the screen is replaced by a dome or other visualization equipment, such as VR headsets.

VI-grade cable-driven simulators are the first and only simulators that adapt to your needs... and not vice-versa!

- Even more workspace (freely adjustable to customer needs thanks to cable-based design)
- Longer exposure to steady state acceleration (capable of lane change at 1:1 motion cueing)
- Better immersion through improved motion envelope shape under combined loading
- Much larger yaw range while maintaining velocity and acceleration performances on an even larger workspace
- Bigger heave for a better vertical feel
- Active vibration control through a patented inertia compensation system

"The installation of the simulator contributes to making us competitive on an international scale and turns its area into an ecosystem of innovation allowing us to face the great challenges of the future, first of all that of mobility."

Ferruccio Resta
Rector
Politecnico di Milano, Italy

Politecnico di Milano adopts DiM400
DYNAMIC Driving Simulator from VI-grade.

VI-GRADE

DiM FSS SIMULATOR

A QUANTUM LEAP
IN REALISM

D i M   F S S   S I M U L A T O R

The Driver-in-Motion Full Spectrum Dynamic Simulator (DiM FSS) is a real-time, Driver-in-the-Loop simulator which enables the complete experience of accurate motion, vibration and sound over the complete spectrum from 0 to 20kHz.

The DiM FSS is the first ever simulator capable of creating full vehicle motion with 9 degrees of freedom over a multi-meter workspace, together with accurate sound and vibration, resulting in a complete immersive experience.

This is the product of bringing together VI-grade's expertise in vehicle dynamics simulation and NVH simulation. The DiM FSS is truly a game-changer in experiential simulation. Previously, when evaluating future vehicles, the vehicle dynamics and NVH were assessed separately. Yet, driving integrates dynamics, ride quality, sound, and vibration. The most effective evaluation method is to combine all these elements in one simulation.

This unified approach is achieved by the DiM FSS's multi-stage system, which captures vehicle dynamics, motion, vibration, and sound for an integrated, realistic experience.

ACCURATE MOTION, VIBRATION, SOUND OVER THE COMPLETE SPECTRUM FROM 0 TO 20KHz.

APPLICATIONS

- Full-vehicle evaluation and virtual sign-off
- Vehicle Refinement
- Add Vehicle Dynamics content to NVH evaluations
- Add NVH content to Vehicle Dynamics evaluations

Vehicle Dynamics
- Chassis tuning (Vehicle Dynamic Targets)
- Tire development
- Driver's training
- Control system design (SIL & HIL)

Motorsport
- Race set up
- Hybrid and race strategy
- Driver's training
- Car development

Ride & Comfort
- Chassis tuning (Ride & Comfort Targets)
- A to B comparison
- Off-line results (from experimental test and/or multibody simulations) playback

ADAS & AV
- ADAS development & verification (AEB, LKA, ACC, …)
- Dangerous maneuvers simulation
- AV algorithms development & verification

HMI studies
- Driver's distraction and monitoring
- Dangerous maneuvers simulation

HYPERDOCK:
A CARBON-FIBER COCKPIT

HYPERDOCK **VS** **TRADITIONAL COCKPIT + TOPDISK**

F E A T U R E S

- -40% MASS
- -70% INERTIA
- 200mm LOWER CENTER OF MASS
- 10x STRUCTURAL STIFFNESS
- 3.5x 1ST NATURAL FREQUENCY

The DiM FSS follows a 3-stage approach. The lower stage delivers primary vehicle motion, the middle stage provides full 6 DOF motion, and the final Hyperdock stage, a highly optimized **carbon-fiber cockpit**, delivers **higher frequency vibration** thanks to transducers at key driver touchpoints, while **sound** is provided through in-cockpit speakers or headphones.

This approach reduces mass, **increases structural stiffness, and enhances simulation performance**.

The DiM FSS provides the **most immersive simulation environment** for multi-attribute evaluation. And note that all actuator-based and cable-driven dynamic simulators from VI-grade can be upgraded with the Hyperdock.

ACCELERATE
THE AUTOMOTIVE DEVELOPMENT PROCESS BY BRIDGING THE GAP WITH VI-grade

VI-grade APPLICATIONS

RIDE & HANDLING

It's all about fine-tuning your chassis,
developing the right balance,
selecting the right tires,
tuning the transmission,
setting up seamless control systems
to achieve the best driver experience.

VI-grade Driving Simulators, vehicle dynamics software, and services help you wade through the sea of options. Our Driving Simulators lead the market in capability for OEM development in vehicle dynamics and our software is uniquely designed to take advantage of our simulator's capabilities. For steering feel, limit handling, or chassis controls, VI-grade's solution ecosystem is here to help you bridge the gap in vehicle product development.

Accelerated, Easier and Affordable: VI-grade Driving Simulators will bridge the gap between CAE models and sign-off.
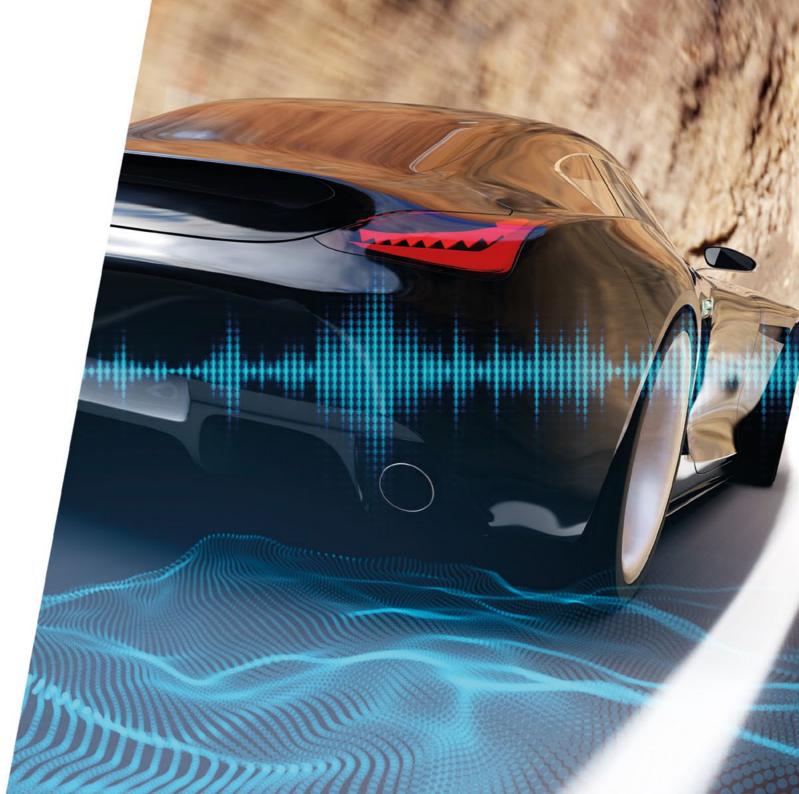
NVH

Design and engineer the sound of your vehicle to meet brand and customer expectations before building the first prototype.

Our NVH Simulators create an interactive driving experience of a vehicle's interior noise, vibration and harshness (NVH), bringing your sound and vibration data into the real world, so it can be experienced by real people.

Highly accurate vehicle sound is played through headphones or speakers, and calibrated, accurate, independent multi-degree-of-freedom vibration is applied at all driver touchpoints. This immersive context for sound evaluations helps users select appropriate sounds and compare alternative designs – whether they are engineers or non-experts.

ADAS & AV

Test your algorithms and automatic systems in a safe and collaborative environment to validate ADAS functions integrating software and hardware sensors.

VI-grade offers a collaborative environment for ADAS and AV applications in which vehicle simulation technology, state-of-the-art software solutions for control system design, traffic simulation, sensor fusion and Driving Simulator are seamlessly – and safely - connected together.

Thanks to this joint offering, multiple ADAS simulation environments are available:

- Software-in-the-loop, environment in which new control strategies are developed and tested with virtual real-time vehicle models.
- Hardware-in-the-loop, environment in which active control strategies are verified against all possible working conditions.
- Driver-in-the-loop, environment aimed to frontload activities in the development cycle when prototypes are not yet available.

HMI

Evaluate your HMI criteria with a real car cockpit and dashboard and develop new interfaces in a controlled and easy-to-modify environment.

VI-grade provides state-of-the-art Driving Simulators with complete cockpits to enable HMI studies to be done in fully immersive events. Highway, urban, or parking lot scenarios can be quickly tested, completely and repeatably.

And by using a Driving Simulator, 24/7 testing is possible with engineers, or public test subjects. Barriers like weather and vehicle maintenance are removed, enabling the most rapid and accurate test environment. Additionally, a controlled environment allows customer feedback and design changes to be more clearly quantified and helps drive faster and more cost-effective development.
Finally, virtual dashboards enable rapid design changes to be built and tested in as little as a few keystrokes.

MOTORSPORT

Push your car to the boundaries, test it in the toughest conditions, train your drivers on highly realistic tracks and win the race.

The high quality, immersive experience in a VI-grade Driving Simulator allows the driver to familiarize themself with and "learn" the track, thus achieving accurate lap times. Together with the race engineer, driver feedback and simulator-based telemetry can help the engineer optimally navigate vehicle setup options.

Gain time off-track to gain time on-track with faster optimization of the chassis setup and experimenting with a wider range of setups. Save time and money by simultaneously performing driver training of the track and of the vehicle.

"We use the COMPACT Driving Simulator to perform all vehicle dynamics activities which fall under the Simulator Aided Engineering (SAE) definition."

Noritaka Hayashi
Manager of CAE Department
Subaru Corporation

Subaru Corporation adopts
COMPACT Driving Simulator
from VI-grade.

VI-GRADE

"The Driving Simulator is a key facility in our chassis and vehicle dynamics development projects as it links up our virtual and real activities."

Roger Mateu
Head of Vehicle Dynamics and NVH
Applus+ IDIADA

Applus+ IDIADA integrates
virtual and physical testing
with 2 new VI-grade Driving Simulators.

EXPERT, HIGHLY-SKILLED TECHNICAL TEAM
READY TO ASSIST YOU

VI-grade is a leading provider of real-time simulation and professional driving simulator solutions that accelerate product development across the transportation industry. The company's driving simulators range from static deskside solutions to full-scale driver-in-the-loop dynamic simulators, allowing OEMs, suppliers, research centers, motorsport teams and universities to reduce physical prototypes and accelerate innovation.

With a worldwide network of trusted partners, VI-grade delivers turnkey simulator solutions including proprietary software, hardware, services, and an open framework for customization. With over 30 years' experience in simulation, VI-grade is headquartered in Darmstadt, Germany with technology centers in Italy, UK, Japan, China, and the USA.

Since September 2018, VI-grade has been part of Spectris. The firm conducts business in four major segments - materials analysis, testing & measurement, in-line instrumentation and industrial controls - and serves a broad range of industries ranging from automotive and aerospace to electronics, energy, mining and pharmaceuticals.

VI-GRADE

"This level of simulation sophistication will allow us to drive breakthroughs in future tire creation, leading to an enhanced customer and driver experience. I'm proud to say that we are leading the industry with VI-grade."

Chris Helsel
Senior Vice President and Chief Technology
Officer Goodyear Tire & Rubber Company

Goodyear adopts COMPACT and DiM250
Driving Simulators from VI-grade.

VI-GRADE

SCALABLE AND UPGRADEABLE DRIVING SIMULATOR PRODUCT LINE

COMPACT   STATIC   DiM50   DiM150   DiM250   DiM400

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BRIDGING THE GAP
BETWEEN TESTING AND SIMULATION

DESKTOP. COMPACT. STATIC. DYNAMIC.