

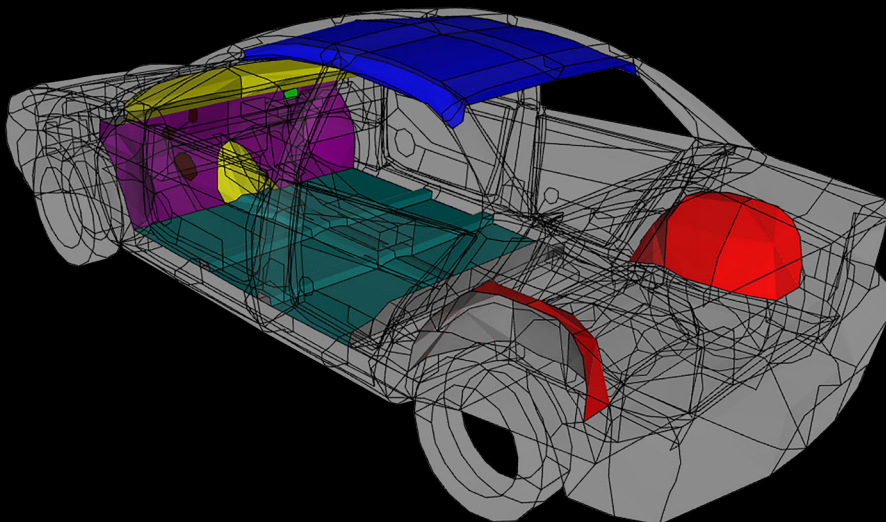


Validate Vibro-Acoustic Performance

Test Virtually Anytime, Anywhere

Assess Designs Instantly Without Waiting for Physical Builds

As new vehicle types emerge with lightweight materials and quiet drivetrains, acoustic performance testing requires a **fresh engineering perspective** on both interior sound insulation and exterior noise emissions. While the fundamentals remain familiar, acoustic engineers must adapt their existing development practices by **leveraging virtual testing methods** over traditional physical ones. By simulating complex acoustic behaviors, engineers can ensure that vehicles **meet regulatory standards** and provide an exceptional cabin experience — all **on the first design attempt**.

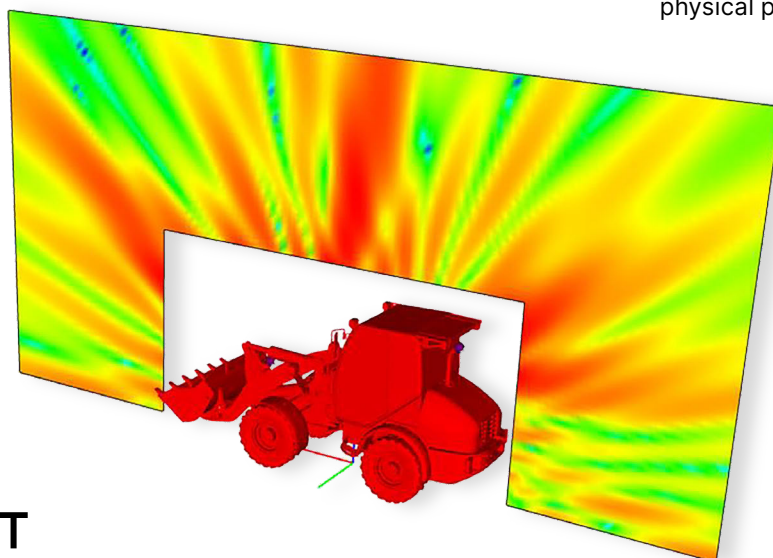


Leverage a Digital Platform for Effective Vibroacoustic Design & Analysis

Keysight's Virtual vibroacoustic testing emerges as a game-changing solution, empowering acoustic test engineers to **assess how new vehicle designs perform regarding interior and exterior noise emissions very early in the design process**. This virtual testing eliminates the uncertainty associated with the acoustic impact of new trim components and the risk of discovering late in wind tunnel tests that a design may not meet performance criteria for certification.

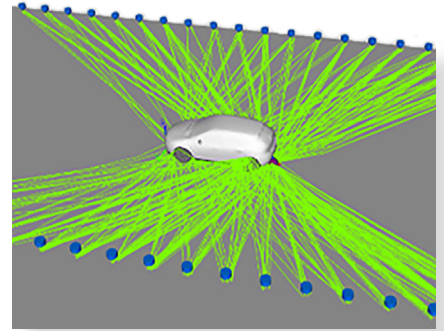
This is especially crucial as industries innovate with fundamentally disruptive mobility devices. Keysight vibro-acoustic performance simulation software, **Keysight VA ONE, is the de facto standard tool for engineers to rapidly and accurately assess high and low-frequency noise emissions**. This advanced tool allows for the optimization of noise control treatments, ensuring that designs comply with regulatory standards from the outset.

By leveraging Keysight VA ONE, acoustic engineers can conduct simulations that provide **immediate insights into how various design elements affect overall noise performance**. This capability not only facilitates **faster certification processes** but also significantly **reduces testing expenses**, ultimately leading to superior design quality. As a result, teams can confidently innovate, knowing their designs will meet stringent acoustic requirements without the delays associated with traditional physical prototypes.



Key Applications

Evaluate how noise control treatments affect **airborne noise** transmission to optimize the design for maximum acoustic comfort and minimum external noise transmission.

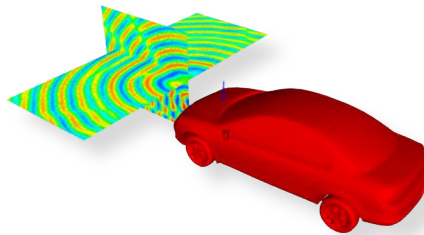


Assess **road noise** and optimize the acoustic design for maximum acoustic performance.

Analyze **pass-by-noise (PBN)** to meet exterior noise regulations, considering the impact of the sound package.

Predict **sound power levels** of new machines according to regulations such as ISO 6393, ensuring compliance while providing essential insights for optimizing acoustic design.

Examine **Acoustic Vehicle Alerting System (AVAS)** performance and choosing the best sound actuator position.

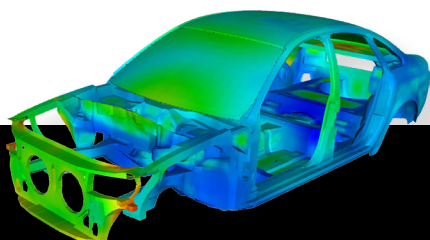


Predict how the different **encapsulation** configurations of the electric motors and powertrain affect the interior and exterior acoustic performance of the vehicle.

Investigate **structure-borne noise** across the entire frequency range.

Validate how noise control treatments affect overall vehicle **Sound Package Design**, considering cost, weight, and packaging space.

Explore speech clarity and how to optimize the acoustic design for **maximum speech intelligibility** and minimal background noise interference.



In the field of **auralization**, predict how transfer paths and acoustic treatments interact to create a perceived sound and allows for subjective evaluations of interior acoustics prior to physical testing.

Measure the effect of **wind noise** on acoustic comfort by integrating CFD data into the vehicle models.

Industries Preferred Choice: **Key Benefits of Keysight's Vibro-Acoustics (VA One)**

Achieve Milestones: Meet operating targets for quality and cost while ensuring timely project milestones with accurate noise prediction models early in the design process.

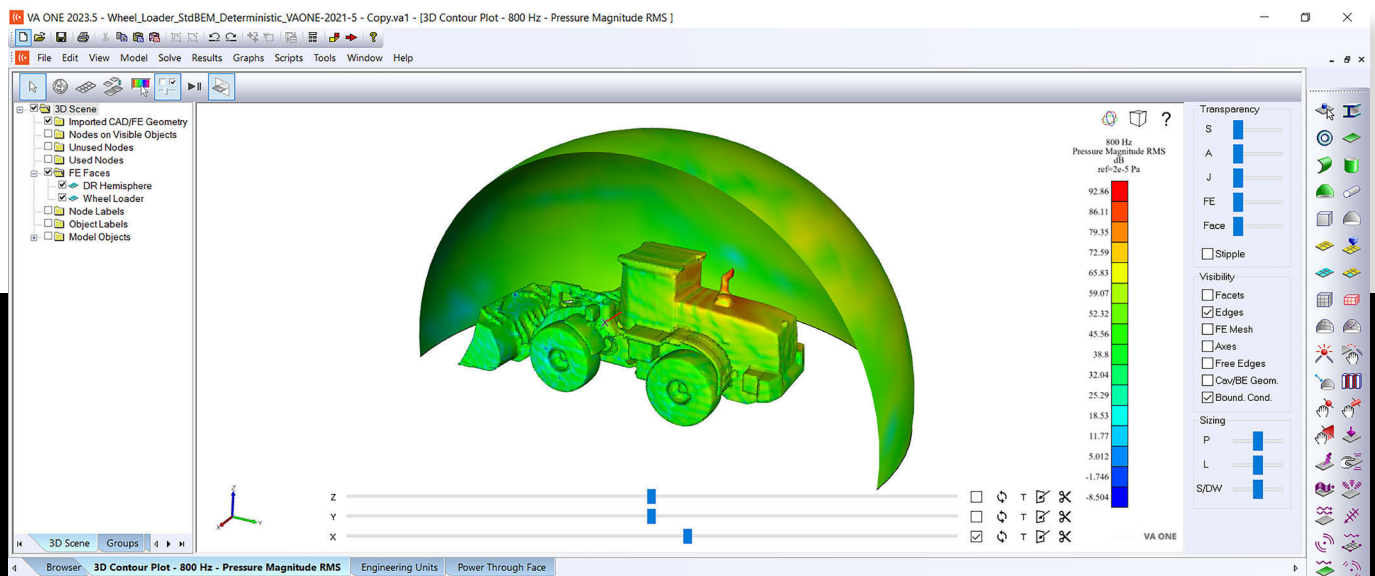
Seamless Integration: Integrate noise prediction tools into existing design environments for rapid assessment of prototype designs, enabling quick model creation.

Minimize Simulation Time: Access an optimal set of seamlessly coupled, fast methods to significantly reduce simulation time without compromising accuracy.

Rapid Countermeasure Testing: Evaluate your design and swiftly test countermeasures, ensuring you meet critical attribute targets effectively.

Holistic Design Evaluation: Achieve design objectives for both interior and exterior noise within a single integrated environment, streamlining your workflow.

Cost-Effective Modifications: Eliminate expensive, late-stage modifications by identifying and addressing noise issues early in the design process.



In the realm of ground vehicles, leading manufacturers showcase the transformative power of virtual acoustic testing with Keysight's software. **Nissan**, for example, uses Keysight VA One to develop a transfer function prediction method for their Acoustic Vehicle Alerting System (AVAS).

Keysight VA One enables teams to assess acoustic performance early in the design process, ensuring regulatory compliance and optimizing vehicle quality. Ready to reduce late-stage modifications and boost design efficiency? Transform your testing process now!

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.



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