

LMS Virtual.Lab Introduction



LMS Virtual.Lab

The integrated solution for 3D functional performance simulation

LMS Virtual.Lab offers an integrated software suite to simulate and optimize the performance of mechanical systems for structural integrity, noise and vibration, system dynamics and durability. LMS Virtual.Lab covers all the process steps and required technologies to perform an end-to-end design assessment in each key discipline. Using LMS Virtual.Lab, engineering teams can build accurate simulation models, simulate their real-life performance, quickly assess multiple design alternatives and optimize designs before prototype construction.

Accurately simulate real-life behavior

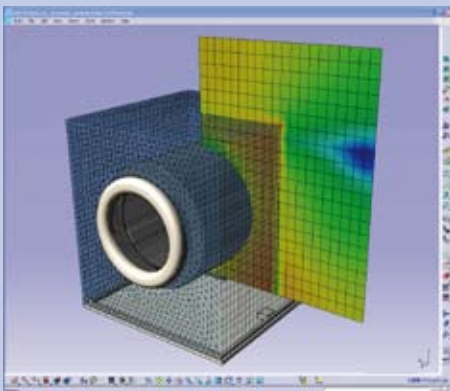
Ever-increasing competition forces manufacturers to deliver a steady stream of attractive products that meet or exceed customer expectations. This requires solid processes and user-friendly tools that deliver reliable insight into new product design performance. LMS Virtual.Lab delivers exactly that. This suite accurately models and simulates mechanical design behavior in real-life circumstances. Its robust and accurate solvers and innovative tools take actual user circumstances into account. LMS Virtual.Lab accurately detects weak spots and allows users to efficiently explore multiple design alternatives in time to impact major design decisions.

Streamline product development

To achieve shorter time-to-market, development teams have to accelerate every single step of the development process. LMS Virtual.Lab lets them evaluate designs from the early concept stage onwards, long before detailed CAD models become available. Teams can make the right decisions from the start, implementing the right balance of various performance traits across multiple disciplines and, most importantly, avoid expensive quick fixes later on. LMS Virtual.Lab efficiently captures and automates simulation processes to facilitate a quick assessment of multiple design options. Its highly efficient solvers tackle large simulation models with unprecedented speed and accuracy. All together, LMS Virtual.Lab is the ideal tool to design and deliver better products in ever-shortening timeframes.

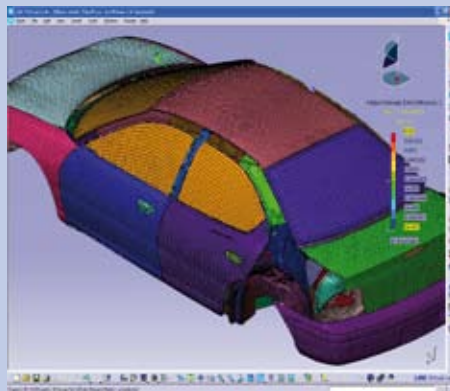


Engineering the right product



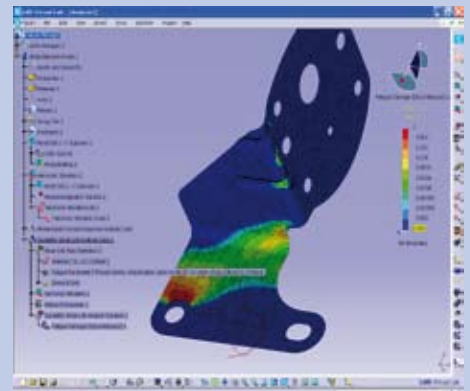
Simulate real-life behavior

Simulate the behavior of mechanical designs under actual real-life circumstances long before committing to expensive and time-consuming prototype testing.



Deliver a balanced performance

Quickly and accurately investigate a design option for multiple performance attributes in a single integrated modeling and simulation environment.

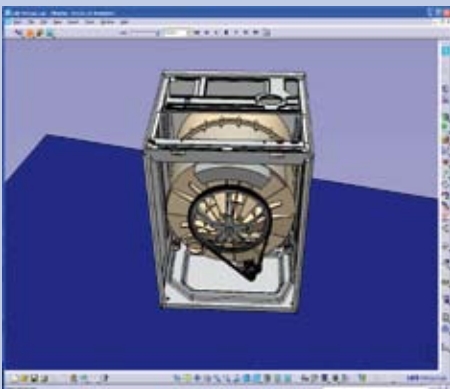


Dive into the root causes

Analyze simulation results and tackle the root causes of the engineering problem with attribute-specific post-processing tools.

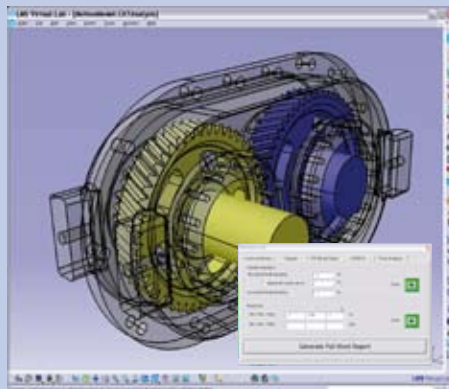


Accelerating the development process



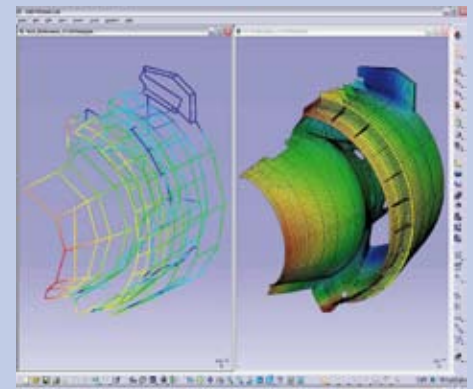
Accelerate model creation

Integrate model creation, meshing and multi-disciplinary simulation in a unified modeling environment, eliminating the need for individual models for each separate discipline.



Automate simulation processes

Easily create simulation models through parameterized templates and automatically assess multiple design alternatives.



Combine the best of testing and simulation

Improve simulation speed and accuracy by using real-world loads, test-based models and validated virtual models.

Accelerating model creation

Extensive modeling time and inaccuracy are typical job stoppers for system-level simulation. LMS Virtual.Lab delivers a unified modeling environment, which integrates all the required model creation, meshing and multi-disciplinary simulation capabilities to accurately assess the real-life performance of any complex mechanical assembly.

- Eliminate the need to create individual models for separate disciplines
- Save tremendous amounts of time and avoid accumulating modeling errors and inaccuracies
- Perform easy and reliable cross-attribute analyses between structural integrity, noise and vibration, system dynamics and durability

Integrating mission-critical applications

A streamlined and fast-paced development process requires strong cooperation between design teams and different engineering disciplines. LMS Virtual.Lab features a tightly integrated working environment to smoothly transfer and exchange data, files and models.

- Openly communicate with CATIA, I-DEAS, UniGraphics and ProENGINEER
- Seamlessly exchange models, data and results between different simulation and testing disciplines
- Eliminate unnecessary data transfers and file translations

Combining the best of testing and simulation

LMS Virtual.Lab implements a unique hybrid simulation approach – one where test-based models and loads are combined with virtual models and synthesized loads. Combining testing and virtual simulation, LMS Virtual.Lab accelerates the engineering process, making it much more accurate and thoroughly robust.

- Combine test-based models of existing components with virtual models of new components
- Generate accurate load data from tests on existing designs and virtual simulations
- Improve the speed and accuracy of system-level simulation by using real-world loads and validated virtual models

Tackling the root cause of engineering problems

Quick fixes seem like an easy way out when tackling engineering challenges. But changing the design to remedy a problem in one area may cause difficulties elsewhere. In contrast, LMS Virtual.Lab tracks the problems to the source – an effective way to gain valuable insight and optimize the overall design.

- Generate accurate loads that reflect actual real-life user circumstances
- Analyze simulation results to identify the root causes with attribute specific post-processing tools
- Efficiently analyze multiple design variants to optimize designs



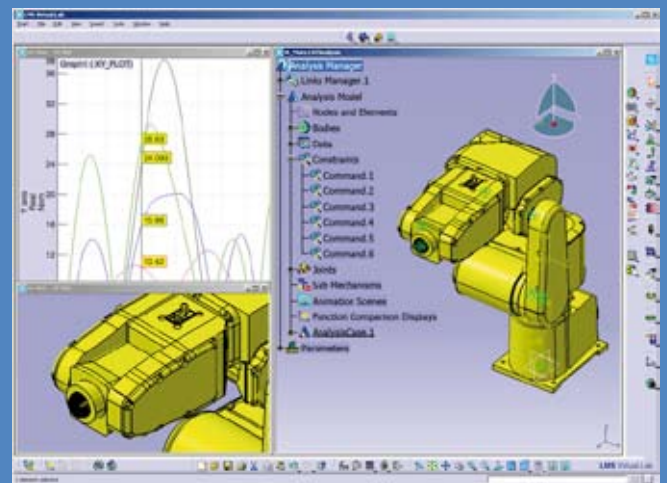


LMS Virtual.Lab Desktop configurations

A desktop serves as the common environment and starting point for all LMS Virtual.Lab analysis packages. There are three types of desktops:

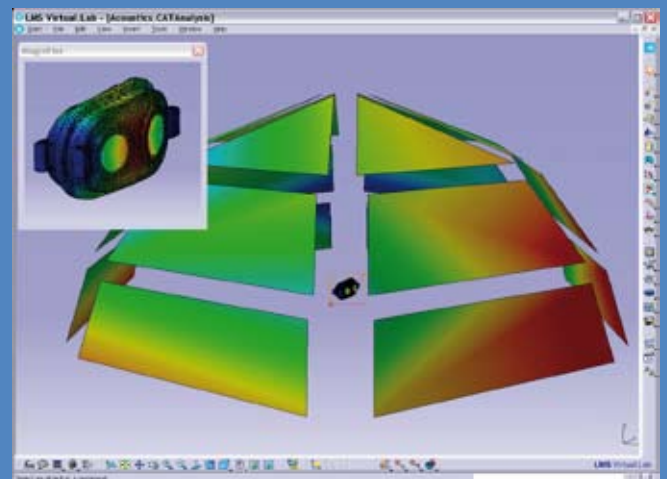
The LMS Virtual.Lab Desktop

This multi-disciplinary desktop is the starting point for all structures, noise and vibration, acoustics, durability and correlation solutions. Users can seamlessly access models and interface with other CAE codes and test data. LMS Virtual.Lab Desktop contains full pre- and post-processing capabilities for general FEA analysis as well as specific tools for acoustics, durability, and noise and vibration applications.



The LMS Virtual.Lab Motion Desktop

LMS Virtual.Lab Motion Desktop provides the multi-body pre- / post-processing capabilities necessary to simulate any mechanical or mechatronic system. It lets users create a multibody dynamic model and animate, plot and compare the simulation results. Various graphing features let users view detailed results of the moving simulation.



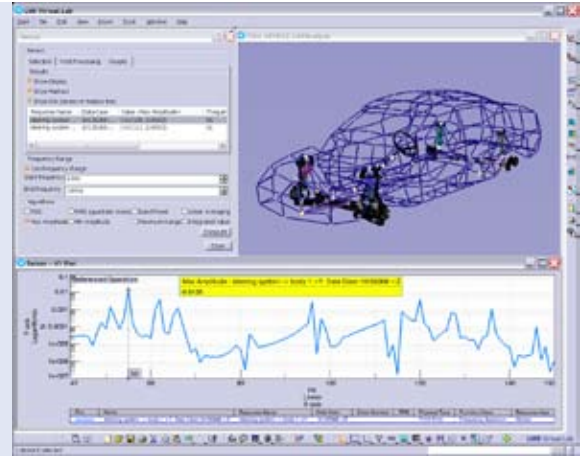
LMS Virtual.Lab Premium Desktop

This product includes both LMS Virtual.Lab Desktop and LMS Virtual.Lab Motion Desktop functionalities. It is an excellent solution for users requiring motion functionality as well as any of the other LMS Virtual.Lab domains (acoustics, durability, structures or noise and vibration).

LMS Virtual.Lab overview

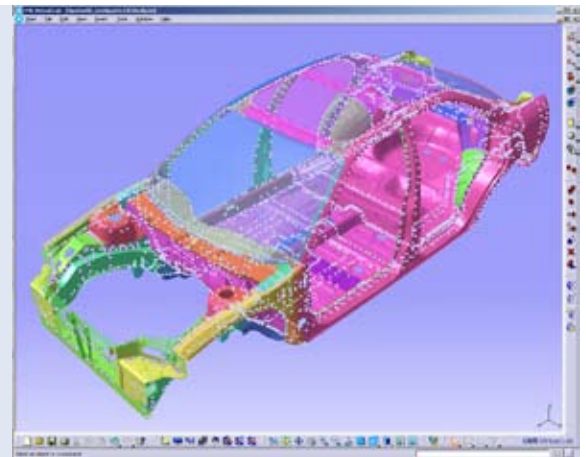
LMS Virtual.Lab Desktop

LMS Virtual.Lab Desktop provides a common environment for multiple functional performance applications. With LMS Virtual.Lab Desktop, users have seamless access to models and load data, geometry and simulation models from industry-standard CAD and CAE tools as well as test data. LMS Virtual.Lab Desktop also offers a complete visualization environment for part and assembly models, functional performance engineering data, time and frequency functions and much more.



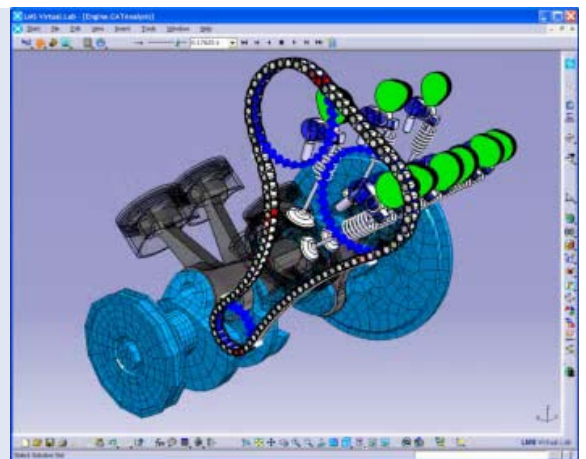
LMS Virtual.Lab Structures

LMS Virtual.Lab Structures offers a scalable solution for structural modeling and analysis, integrating advanced model creation and manipulation tools to efficiently generate component, subsystem and full-system models. LMS Virtual.Lab Structures offers full meshing capabilities and captures the complete modeling and analysis process from CAD drawing to multi-attribute simulation results. It offers multi-solver support for Abaqus, Ansys, CATIA CAE and Nastran (MD, MSC, NX, NEI).



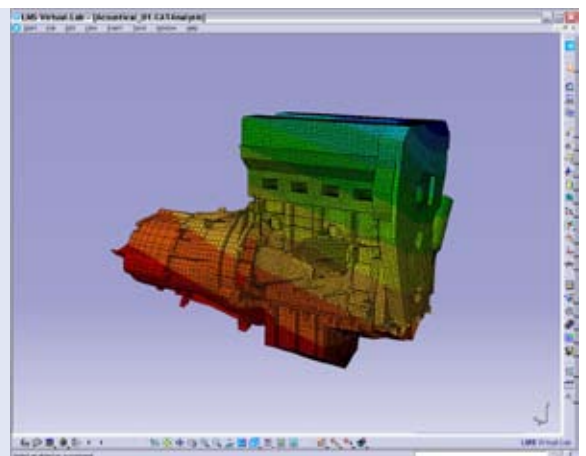
LMS Virtual.Lab Motion

LMS Virtual.Lab Motion offers a highly efficient, completely integrated solution to build multibody models that simulate the full-motion behavior of complex mechanical system designs. Users can easily create a complete and accurate system model from scratch or import geometry models from any industry-standard CAD system. LMS Virtual.Lab Motion applies forces and motion to simulate the actual operational behavior of the new design. The resulting simulation is excellent input to optimize the design's dynamic performance. The resulting loads can also be used for structural analysis, durability, and noise and vibration studies.



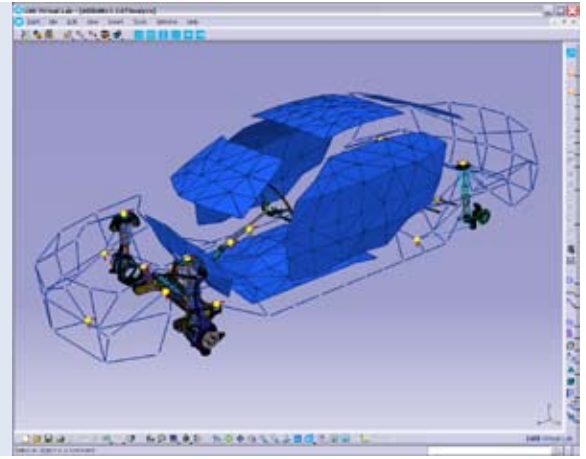
LMS Virtual.Lab Acoustics

LMS Virtual.Lab Acoustics offers an integrated solution to minimize radiated noise or optimize the sound quality in new designs. Convenient modeling capabilities combined with efficient solvers and easy-to-interpret visualization tools enable users to quickly gain insight to the acoustic performance of their product. LMS Virtual.Lab Acoustics simulates both internal and external acoustic radiation and offers dedicated applications for structural noise radiation, engine acoustics, transmission loss through panels, aero-acoustic phenomena and much more.



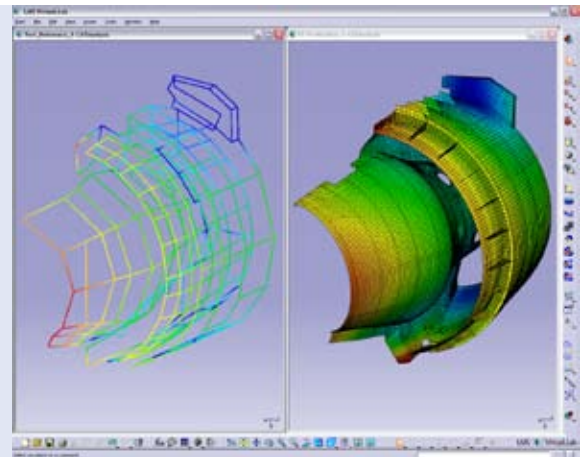
LMS Virtual.Lab Noise and Vibration

LMS Virtual.Lab Noise and Vibration is developed to efficiently analyze, refine and optimize the vibro-acoustic behavior of a design. It offers all the required tools to create system-level models, build realistic load cases and simulate noise and vibration responses. It includes a wide range of visualization and analysis tools to analyze noise and vibration performance and accurately pinpoint the most critical contributors to noise and vibration issues. Convenient tools enable engineers to quickly perform design modifications and assess the noise and vibration performance of a design variant in minutes.



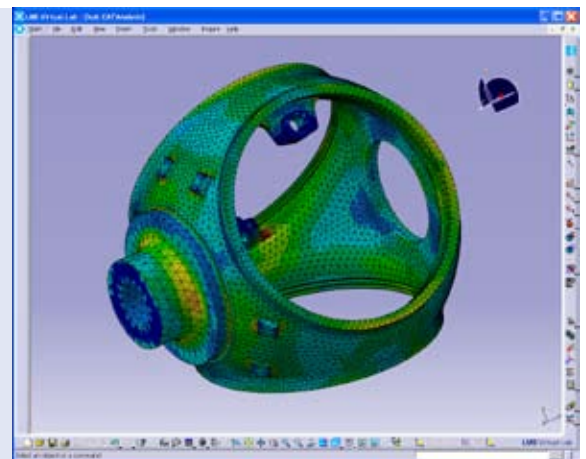
LMS Virtual.Lab Correlation

LMS Virtual.Lab Correlation allows users to combine test-based and virtual component models into system-level models for more productive simulation. It offers direct access to standard FE and test data formats and a unique export to LMS Test.Lab. LMS Virtual.Lab quickly compares and validates FE models to test data and identifies possible modeling errors to systematically improve existing simulation models.



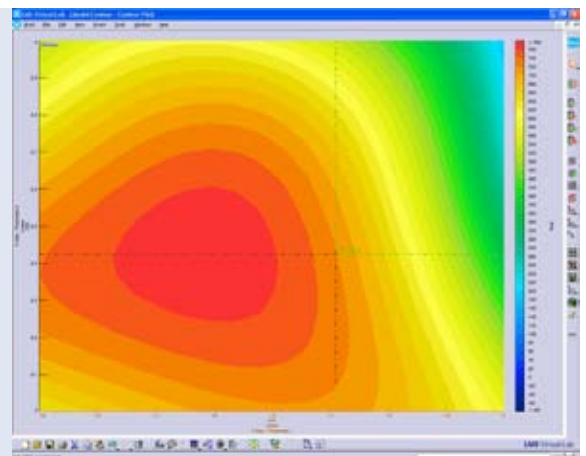
LMS Virtual.Lab Durability

LMS Virtual.Lab Durability allows engineers to design reliable products right from the start. It predicts fatigue hotspots and system-level fatigue life by combining dynamic component loads with stress results and fatigue material parameters. LMS Virtual.Lab Durability provides direct feedback regarding critical fatigue areas and the root cause of fatigue problems. This immediate insight enables engineering teams to validate more design variants for fatigue life within ever-shorter development cycles.



LMS Virtual.Lab Optimization

LMS Virtual.Lab Optimization lets design and engineering teams automatically select the optimal design while accounting for multiple performance targets. Users can easily identify the key variables that have the most influence on the functional performance of a mechanical system. LMS Virtual.Lab Optimization automatically explores a multitude of design alternatives using design of experiment and response surface modeling techniques. It also analyzes design robustness and reliability according to Design for Six Sigma criteria.





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LMS is an engineering innovation partner for companies in the automotive, aerospace and other advanced manufacturing industries. With approximately 30 years of experience, LMS helps customers get better products to market faster and turn superior process efficiency into key competitive advantages.

With a unique combination of 1D and 3D simulation software, testing systems and engineering services, LMS tunes into mission critical engineering attributes, ranging from system dynamics, structural integrity and sound quality to durability, safety and power consumption. With multi-domain solutions for thermal, fluid dynamics, electrical and mechanical system behavior, LMS can address the complex engineering challenges associated with intelligent system design.

Thanks to our technology and dedicated people, LMS has become the partner of choice of more than 5,000 leading manufacturing companies worldwide. LMS is certified to ISO9001:2000 quality standards and operates through a network of subsidiaries and representatives in key locations around the world. For more information on LMS, visit www.lmsintl.com.

