

## DIGITAL INDUSTRIES SOFTWARE

# What's New in Simcenter Testlab 2206

### Benefits

- Frontload full vehicle NVH analysis using measured and simulated component models
- Increase productivity by automating NVH performance evaluation
- Achieve effective collaboration across simulation and test domains
- Boost multi-physics testing efficiency in harsh environments

### Summary

In the fast-paced world of product design, sub-optimal performance validation and decision-making done too late in the development cycle can cost time and money. They may even result in a product's failure. Disconnected processes for data intake, processing, and analysis, as well as difficult-to-maintain in-house solutions, are challenges that must be tackled to ensure efficient operations. Physical testing teams performing multi-physics measurements need efficient data acquisition, processing, validation, and certification tools. Conversely, simulation engineers often need performance attributes that can only be obtained from physical measurements to evaluate design performance accurately.

Simcenter Testlab 2206 offers test and simulation teams new capabilities to develop innovative products faster with tighter collaboration between testing and simulation. It introduces new technologies and user experiences that advance the latest methods and set new standards in test-based engineering, seamlessly integrating the use of simulation models and data.

The 2206 release continues its predecessor's long-term success by sufficiently building its functional depth. It enables engineers to model their products' complexity accurately, make their measurement campaigns go faster, explore their design alternatives, and integrate their testing and simulation processes through a unified data management system.

- System NVH prediction with Simcenter Testlab Virtual Prototype Assembly has matured and extended with several additional challenging use cases, supporting the Simcenter Digital Twin objective by frontloading full vehicle NVH analysis.
- Simcenter Testlab Neo further focuses on creating a productive solution for NVH performance evaluation. Intuitive psycho-acoustic evaluation, productive, interactive data handling, automated test run validation and processing, and advanced reporting are all bundled into a single productive user experience.
- Simcenter Testlab Data Management has been enriched to assure effective and efficient data organization, annotation, and sharing capabilities, scaling up from a local environment to a centrally managed database.
- Simcenter SCADAS RS hardware extends its use cases to enhance the productivity of multi-physics data collection in harsh environments.

**System NVH Prediction**

The combination of simulation and test can help engineers easily explore the NVH performance of interconnected interior and exterior components. Simcenter Testlab Virtual Prototype Assembly (VPA) allows engineers to assemble virtual vehicles based on separate, modular component models from test and/or

simulation. Engineers can easily swap new component designs in the assembly to explore variants and understand the overall impact on NVH performance.

**Support of VPA-Assembler in Simcenter Testlab Neo**

The evaluation of the NVH performance should be consistent throughout the complete development cycle so that the uncertainty on the evaluation methods that are used doesn't add to the prediction.

With the integration of the VPA-Assembler workbook in the Simcenter Testlab Neo family, engineers can now leverage advanced process designer functionalities to post-process the prediction results in the same way and at every stage of the development process.

**Support of Multi-level Substructuring**

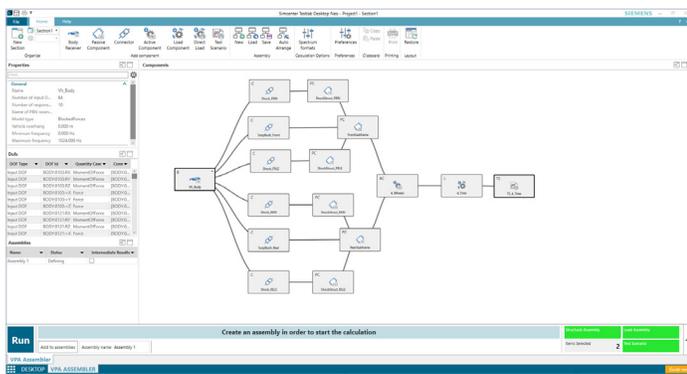
Intermediate passive structural components (e.g., sub-frames, axle carriers, suspensions) are often used to improve the isolation from the vibration source, which enormously complicates the vibration prediction of the whole system.

With the support of Multi-level Substructuring, it is possible to add intermediate structures to the entire system NVH model in the Virtual Prototype Assembly solution and predict vibrations at all structural elements up to the receiver by leveraging the integrated sub-structuring technology. This enables engineers to evaluate the NVH performance of many design alternatives and quickly converge to an optimal architecture.

**Support of Multi-sources**

Modern complex systems can have multiple sources of noise and vibration. It is, therefore, paramount to include all of them in a single system architecture to have a full view of their combined air-borne and/or structure-born contributions.

With the support of multiple vibration and acoustic sources in the same NVH model in the Virtual Prototype Assembly solution, engineers can now accurately predict the receiver response by transparently benefitting from the integrated path-recombination calculation.



VPA-Assembler in Simcenter Testlab Neo.

### Support of loads with multiple dependencies

There is typically a large variety of operational conditions to be analyzed, with multiple boundary conditions to consider simultaneously, such as torque or temperature.

With the introduction of source components with Multi-dependency loads, engineers can evaluate a wide range of complex driving scenarios, including run-ups at different torque levels and complex xEV drive cycles.

### NVH Performance Evaluation

No one likes to have to repeat a process over and over again. Yet many data processing tools force engineers to do just that. Simcenter Testlab Neo Process Designer helps test engineers process data faster by creating reusable automated NVH performance evaluation routines. The following enhancements add even more depth to the process designer's productivity capabilities.

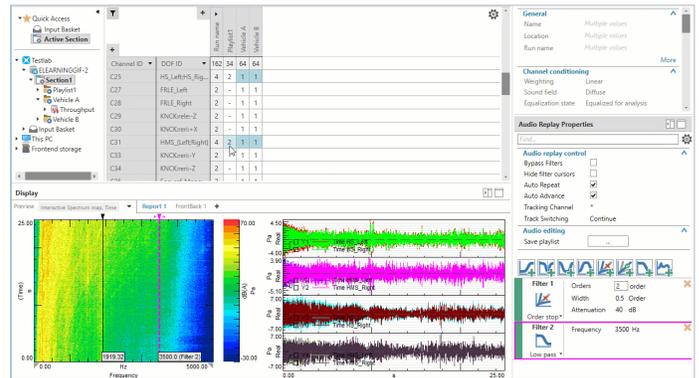
### Offline NVH processing

Streamlining the complete NVH post-processing scheme, from time-domain input traces to reporting, is a common challenge.

With the enhanced offline NVH processing capability of Simcenter Testlab Neo, engineers can automate the whole process, from segment extraction to dedicated metrics calculations, from quick troubleshooting to advanced processing. To increase usability, standard fixed sampling and order tracking processing has been complemented with additional features such as angle map calculation and tacho moment correction. The process is completed with a Block calculator and report to excel functionalities for enhanced efficiency.

### Sound Quality and audio replay

To allow acoustic experts to master their products' sound signature, we completed the psychoacoustic metrics offering of Simcenter Testlab Neo with the introduction of Roughness. To improve efficiency, we enhanced Tonality calculation performance and added the possibility to create user-defined FRF filters for audio replay. The enhancements ensure a flexible and user-definable sound quality evaluation. You can now save the effect of your audio replay filters as a new time trace, immediately available for further processing, what-if calculations, or as input to machine learning algorithms and jury tests. You can also define your in-house preference metrics with the Block calculator.



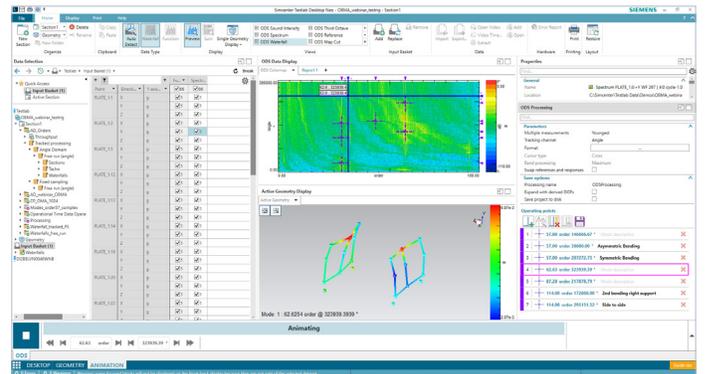
Audio Replay in Simcenter Testlab Neo.

### Operational Data Animation

NVH performance cannot exist without structural analysis. This is why Simcenter Testlab Neo has been extended with several tools that will help you create test geometries more efficiently, interactively animate the measured data and visualize the operational response.

Validation teams need to quickly identify the root cause of operational NVH issues using existing data without needing additional dedicated processing.

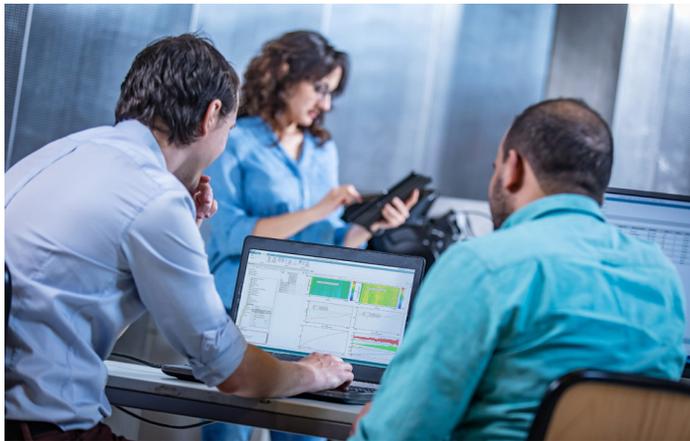
The new Operational Data Animation application is designed to gain insight into the behavior of your structure quickly. You can interactively extract your product's structural and acoustic responses from functions (FRF, spectra, orders) and waterfall data to easily animate your geometry and save individual operating points.



Operational Data Animation of Waterfall Data.

### Scalable Collaboration

Physical Testing engineers aren't the only people who care about test data. Simulation engineers, suppliers, and other key partners and stakeholders also extract value from data captured by testing teams. As a result, test data needs to be integrated within the broader development digital thread. Achieve effective collaboration with Simcenter Testlab Data Management through scalable, productive, and unified data and context management.



Simcenter Testlab 2206 supports scalable collaboration.

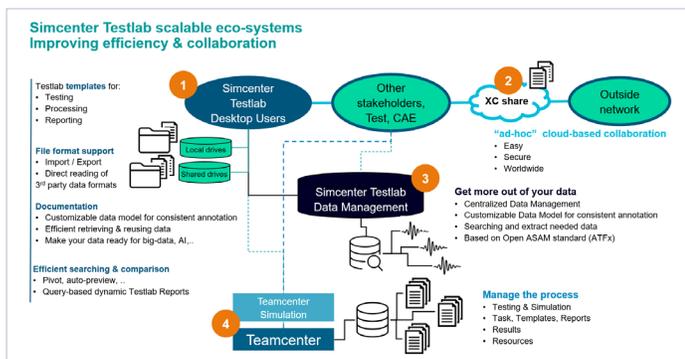
### Simcenter Testlab Desktop

Engineers need to be able to share data and results throughout the organization conveniently.

Simcenter Testlab Neo Desktop enables users to evaluate easily, analyze, report, and share test and simulation results within their team, maximizing efficiency and providing engineering insights, even when handling large volumes of data.

### Simcenter Testlab Data Management

Data tends to be poorly annotated and scattered throughout the company. Often, no standard procedures for naming convention, test description, workflows, and data sharing between teams and sites are kept. This results in high data management costs or data never being used.

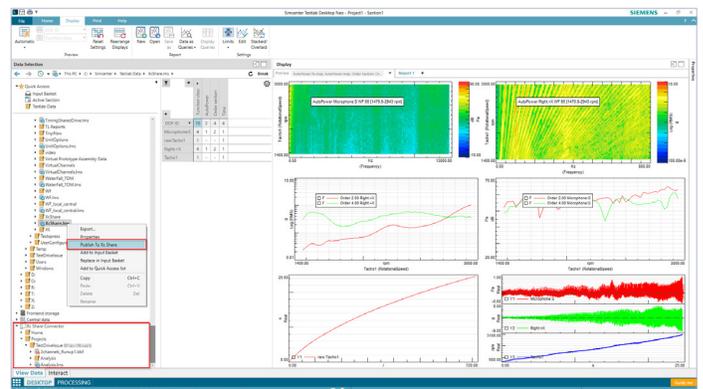


Simcenter Testlab scalable eco-systems.

Simcenter Testlab Data Management allows scaling your data management from a local solution to a centralized ASAM-ODS database. The data can be published and retrieved based on engineering properties and context information in a standardized yet customizable way.

### Xcelerator Share

The collaboration between simulation and test teams or even between different companies is growing in importance. More and more often, engineers have to share data with colleagues and external parties.



Publishing test data to Xcelerator Share from Simcenter Testlab.

The Xcelerator Share offers an engineering-centric cloud collaboration solution compatible with all products in the Simcenter portfolio. It allows different teams to collaborate securely with key stakeholders, including designers, managers, test engineers, simulation engineers, suppliers, and even customers, with appropriate access control.

### Teamcenter Simulation

Simulation and test engineers use various commercial and in-house tools in their workflows, requiring an open SPDM ecosystem to manage their data and processes efficiently.

Teamcenter Simulation enhances collaboration by harmonizing the process and data management approach across all simulation and test domains. It serves as a bridge to the various Simcenter authoring solutions, including Simcenter Testlab. Its tight integration in the PLM environment creates a true digital thread from product definition to evaluation and back.

### Load Data Acquisition with Simcenter SCADAS RS

Your products are complex machines, and you need to understand what's happening in an operating environment. But it can be a challenge to acquire performance data for machines that operate in a rugged environment. The new Simcenter SCADAS RS can withstand harsh conditions to help you measure the complex performance of your machine.



Simcenter SCADAS RS.

### Digital Inputs Unit

The importance of digital buses increases continuously in all markets, including the off-highway industry. Next to vehicle buses, also more and more sensors deliver their data via a CAN-bus output, e.g. Wheel Force Transducers and Inertial Measurement Units. But the measurement of CAN-bus data is not limited to pure recording of digital buses or sensors: the SAE J1939 standard for on-board diagnostics of heavy equipment vehicles also broadcasts many additional signals and manages the communication with trails and equipment.

The new Simcenter SCADAS RS Digital Pulse & CAN (DI) Unit allows measurement of up to 9 additional pulse inputs and 4 CAN/CAN-FD channels and extends the Simcenter SCADAS RS system to an integrated and fit-for-purpose solution for the growing usage of digital buses.

### EtherCAT Unit

Today's market trend is to use real-time field buses to share measured data, for instance, with testbench controllers. EtherCAT has mainly become an industry standard for this.

The new Simcenter SCADAS RS EtherCAT unit allows engineers to share digitalized data with testbench controllers, further improving the productivity and quality of their road-to-rig objective.

### Autonomous acquisition

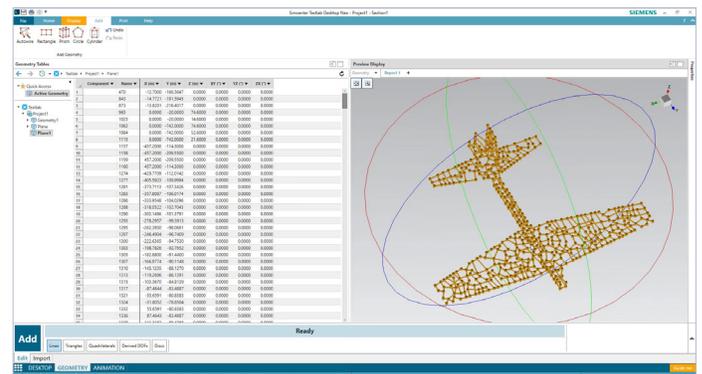
Validation of Off-high-way machines is often done by acquiring data during real usage, in the field. The system should acquire data autonomously and safely store them throughout multiple days of machine operation.

Thanks to the Simcenter SCADAS RS UPS units, the system will boot automatically as soon as power is available or when the vehicle is switched on. The system will be up and running, waiting for trigger conditions to start or stop the measurements. To top it off, the engineer can monitor the status remotely on his mobile device. This tremendously increases resource availability as both the machine operator and the engineer can focus on additional tasks during the data acquisition.

### Enhancements in Simcenter Testlab 2206

#### Geometry creation

Creating accurate geometries can be cumbersome for test engineers. Large FE and STL models are challenging to manage and are often complicated for simulation colleagues to reduce. It is time-consuming to connect nodes manually and create measurement grids.



Wireframe geometry creation.

The enhancements of Simcenter Testlab Geometry allow test engineers to redefine the geometry creation process. The auto-reduction function added in the import task automatically reduces big geometries and shapes and automatically creates wireframes

to connect nodes and point clouds. In addition, the mesh generator function automatically adds components representing basic geometry shapes.

### Model-Based System Testing

There is a need for a streamlined way to include simulation models in the test process to facilitate dedicated data processing tasks and expand test workflows.

Next to the support of the FMI standard for the exchange of simulation models, Simcenter Testlab Neo Process Designer also supports the ONNX standard for Neural Networks. Imported models and neural networks are leveraged to enhance data processing efficiency, such as model parameter identification based on test data.

Innovate smart products faster by strengthening the collaboration between testing and simulation teams with Simcenter Testlab 2206.

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