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Ingenuity for life

What's new in Simcenter Testlab 2019.1

Using test-based data for certification, validation, simulation and design

Benefits

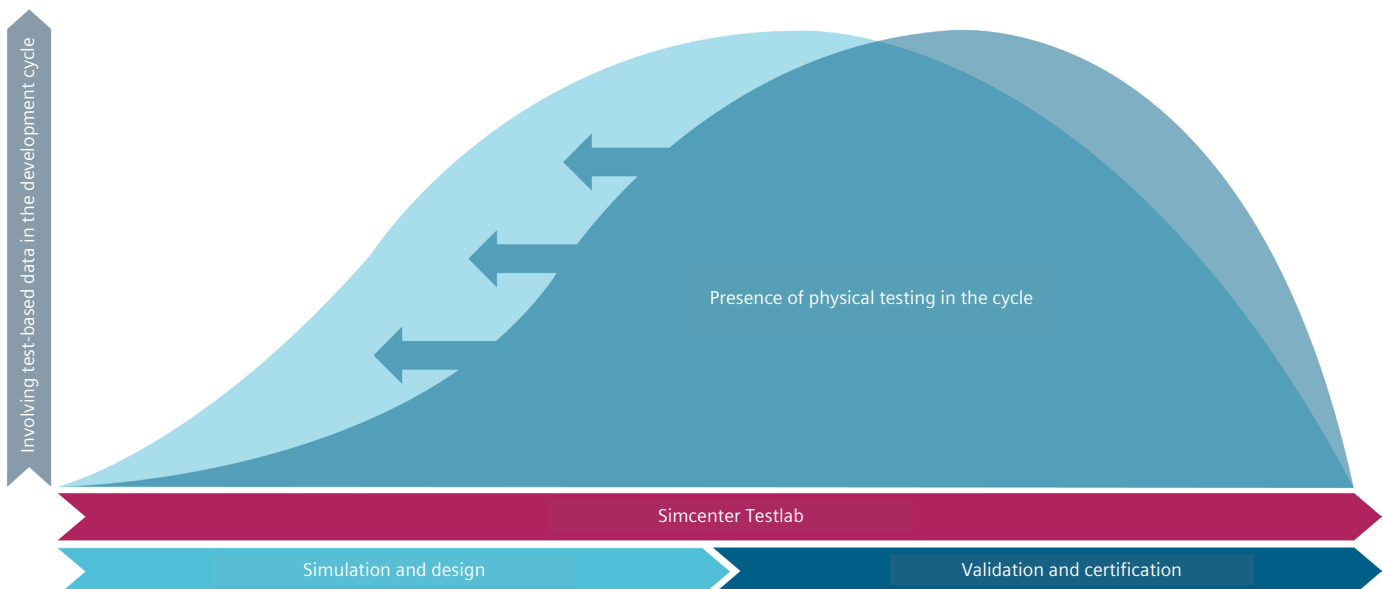
- Use test-based data not only for validation and certification, but also earlier in the product development cycle during simulation and design
- Merge test and simulation to unlock the potential of digital development, gaining faster results and working with deeper insights
- Predict full-system NVH performance earlier by combining component models and measurements

Summary

The development processes based on a verification-centric engineering approach are in transition. Teams across industries are exploring and adopting new predictive methods with the aim of establishing a better process for early performance prediction, supporting systems-driven product development. This emerging industry paradigm, which involves developing a digital twin of a product, enables development teams to deliver innovations faster and with greater confidence.

Consequently, test-based engineering not only plays an essential role in the fully assembled system prototype validation and certification stages, but it is also growing in importance in much earlier development stages. Accurate test data and dedicated tools are the key to validating component models to accelerate digital development.

The Simcenter Testlab 2019.1 release introduces new technologies as well as a series of functional enhancements, adding a dimension to the digitalization trend and effectively implementing the new role of physical testing. Using Simcenter Testlab 2019.1 enlarges the scope of the contribution test engineers can make in all product development phases: design, engineering, validation and certification.



What's new in Simcenter Testlab 2019.1

Benefits continued

- Use active sound design to create brand-specific sounds in electric, hybrid and combustion vehicles
- Enhance sound quality engineering with high quality interactive audio and video replay
- Comply with the new mandatory minimum pass-by noise regulation for electrified vehicles



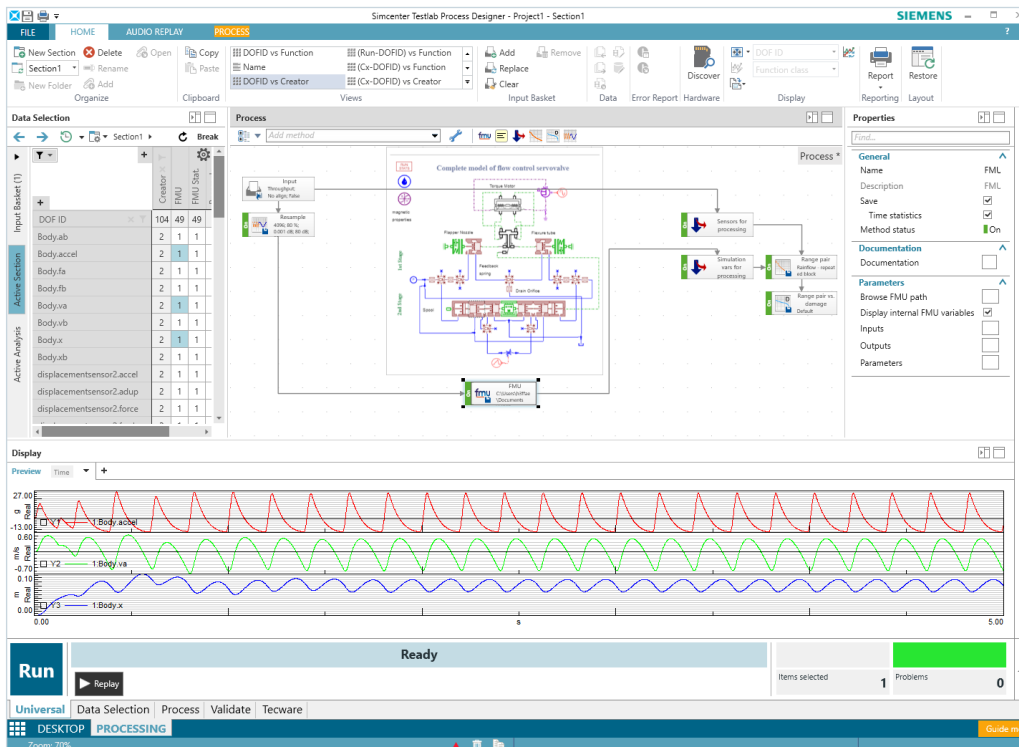
Model-based system testing

Simcenter Testlab 2019.1 model-based system testing solutions offer a unique working environment, merging physical testing and simulation processes. By embedding simulation models in physical testing workflows, Simcenter Testlab 2019.1 unlocks the potential for engineering teams to accelerate product development.

Test for simulation serves to build, validate, improve and use simulation models throughout the development process, enhancing model accuracy and guaranteeing consistency in the correlation process by applying test data processing methods to simulation model outputs. The sketch viewer for Simcenter Amesim™ software models in Simcenter Testlab Neo software

provides direct access to variables and simulation data in the testing environment. In addition, Simcenter Testlab 2019.1 is a highly convenient environment for visualizing, processing, comparing, correlating and reporting data from simulation and test sources in a productive way.

With increasing product complexity and the interaction of the subsystems, conducting simultaneous test and simulation early in the development cycle reduces multisystem integration risks. The Simcenter Testlab Process Designer module features the latest version of the Functional Mock-up Interface (FMI) standard for co-simulation. A Functional Mockup Unit (FMU) – a simulation model exported according to the FMI standard



Merge test and simulation. Direct access to Simcenter Amesim models and simulation data from Simcenter Testlab

and supported by over 100 1D and 3D simulation tools – can be imported as an external method in the Simcenter Testlab Process Designer calculation chain. The equations contained in the FMU get their input from the physical sensor measurements in Simcenter Testlab and are solved by the embedded solver at the pace dictated by the measured data. Hence, the measured data set is extended with simulated internal behavior, or a component test bench can be virtually extended to assess the full system performance.

Simulation for test lets engineers define, validate, optimize and complement testing procedures prior to executing them. Once simulation models are validated and calibrated, they can serve to augment the outcome of the physical instrumentation as virtual sensors. The net result is faster and

deeper insight into overall system performance.

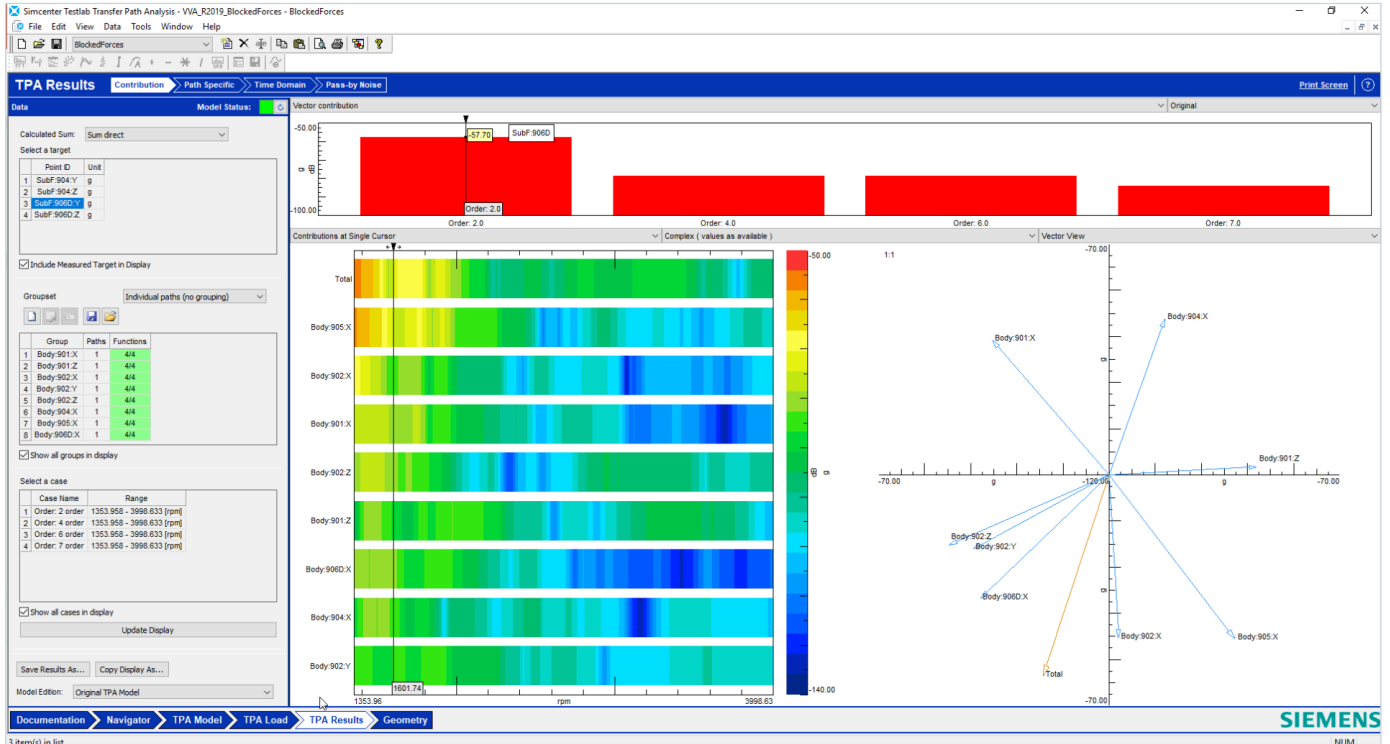
NVH synthesis with component-based TPA

The Simcenter Testlab 2019.1 release extends its test-based engineering capabilities with a new noise, vibration and harshness (NVH) synthesis solution, using component-based and blocked-forces transfer path analysis (TPA) technologies. The 2019.1 TPA solution suite predicts full system NVH performance from individual component models and loads. Engineers can hence characterize the NVH performance of multiple vehicle variants without having to wait for full-vehicle prototypes to be available and without having to test each one of the variants separately. The Simcenter Testlab component-based TPA add-in enables NVH engineers to

investigate advanced what-if scenarios to predict the effect of different variants of selected components, thus enabling faster vibration and noise performance assessments at earlier stages of the design process. The NVH engineer can complete the measurement and contribution analysis steps in an efficient manner, as the solution suite offers all the capabilities needed to support the entire TPA process.

Active sound design

The quiet operation of electrified vehicles opens opportunities for creating distinctive driving experiences by adding new sounds reflecting the brand identity. Simcenter Testlab Sound Designer software, enables you to create a unique signature to add to the original sound of the vehicle. The final synthesized sound is based on driving parameters in real



Predict full-system NVH performance earlier by combining component models and measurements.

time. Moreover, Simcenter Testlab Sound Designer is an excellent tool both for exterior and interior acoustic engineering. In addition to providing new sounds for an electrified car, it can also be used for enhancing combustion engine car noise.

Making the best use of video data

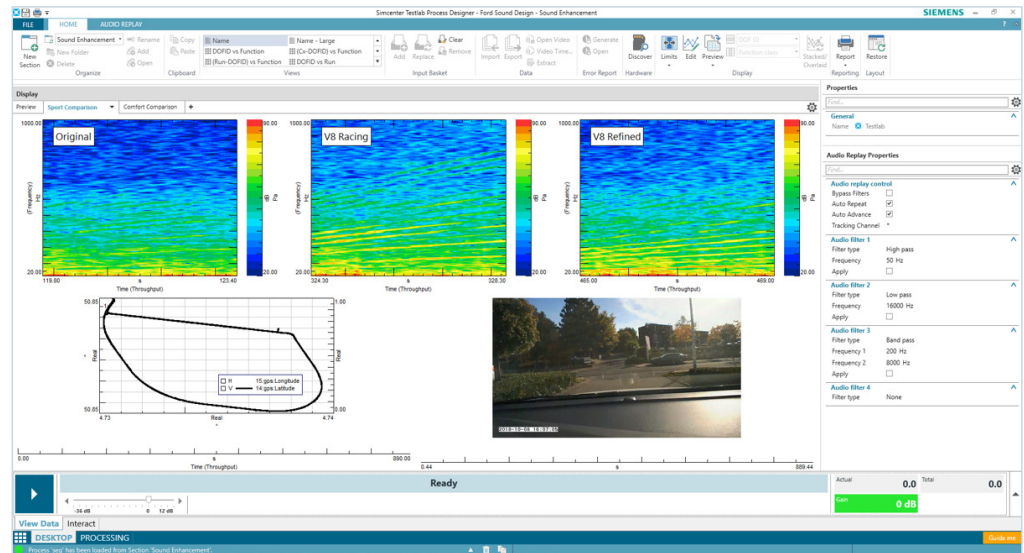
The importance of video recordings to document measurement campaigns is continuing to increase. In addition to direct video recording by the Simcenter SCADAS Camera Interface module for video capture, Simcenter Testlab 2019.1 supports the import and synchronization of video data recorded with external devices. Even if no absolute time information is available in the video data, a graphical synchronization function in the Simcenter Testlab Video

Replay module helps the engineer synchronize video files from multiple sources with the measured sensor data. Hence, every phenomenon observed in the analog sensor signals or digital bus data can be easily correlated with events or operator actions that were recorded by multiple cameras during a test campaign.

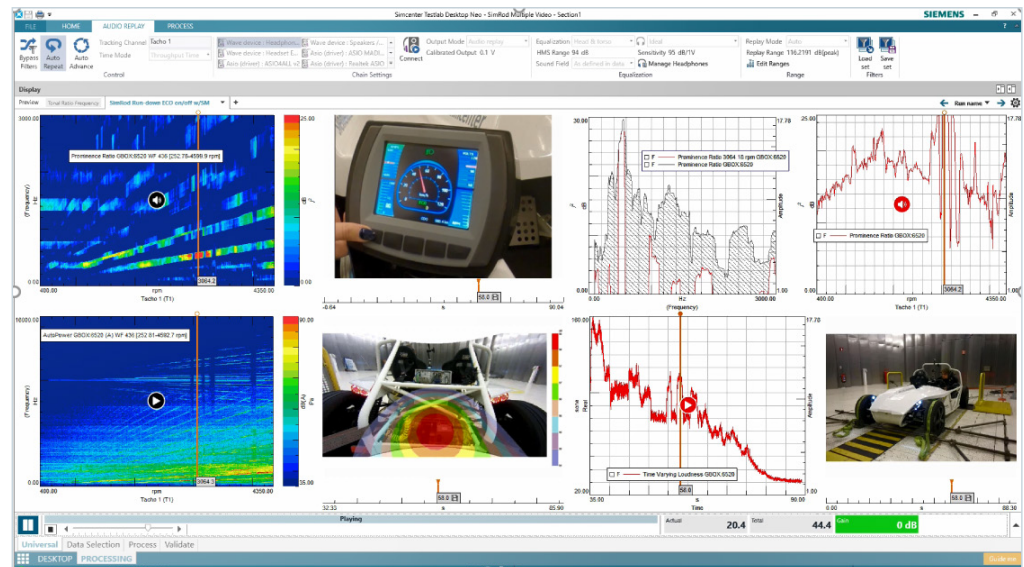
Sound quality engineering

As sound quality engineering is gaining in importance as an element of branding across industries, Simcenter Testlab 2019.1 introduces major enhancements in this domain. Our sound quality engineering solution has been extended with key functionalities for advanced audio replay and analysis and with additional metrics. The audio replay

functions are available in Simcenter Testlab Sound Quality software, a module of Simcenter Testlab Desktop Neo, offering high-quality interactive replay. For equalized replay, both head and torso and headphone corrections are supported. The complete audio replay chain can be fully calibrated and equalized with any available replay device and is protected against overloads and clipping. Users can conveniently and directly control the replay and calibration settings in a new dedicated ribbon with extended options (filtering, saving, color and cursor). More advanced functions, including multiple filter sets, are supported with the Simcenter Testlab Advanced Audio Replay module add-in.



Synchronize video files from multiple sources with measured sensor data.



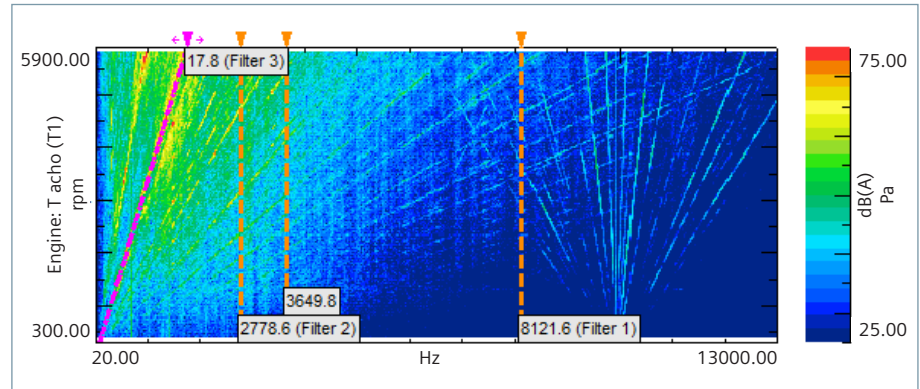
Enhance sound quality engineering with high quality interactive audio and video replay.

The sound signature of a hybrid electric vehicle (HEV) is distinctly different from internal combustion engine (ICE) powered vehicles. To better assess HEV-specific characteristics, metrics such as International Organization of Standardization (ISO) 7779 and the European association for standardizing information and communication systems (ECMA) 74 based tone-to-noise ratio maps and a fluctuation strength

for nonstationary signals are part of the Simcenter Testlab 2019.1 release.

AVAS minimal noise standard

With vehicle electrification gaining importance worldwide, new international acoustic regulations are being imposed. As of September 2019, all electrified vehicles are required to have an acoustic vehicle alert system (AVAS) to comply with the United Nations



Use active sound design to create brand-specific sounds in electric, hybrid and combustion vehicles.

Economic Commission for Europe (ECE) Regulation No. 138, describing in detail the target noise levels and corresponding pass-by-noise (PBN) certification procedures.

To help our customers adapt to this regulation quickly, ECE Regulation No. 138 is covered in the Simcenter Testlab PBN Minimum Noise Analysis add-in and is available in the Exterior Pass-by Noise Testing module workbook.

Enhancements in Simcenter Testlab 2019.1

There are numerous extensions to existing solutions in Simcenter Testlab 2019.1. Key new features include the automated handling of transient operational scenarios in the engine map display, the extension of the functional envelope of durability data collection and processing and the ability to embed external time-2-time (T2T) processing functions in Simcenter Testlab Process Designer. In addition, the reverberant and direct field acoustic control applications are extended, and the Simcenter Testlab Desktop provides direct access to structural dynamics simulation results for correlation.

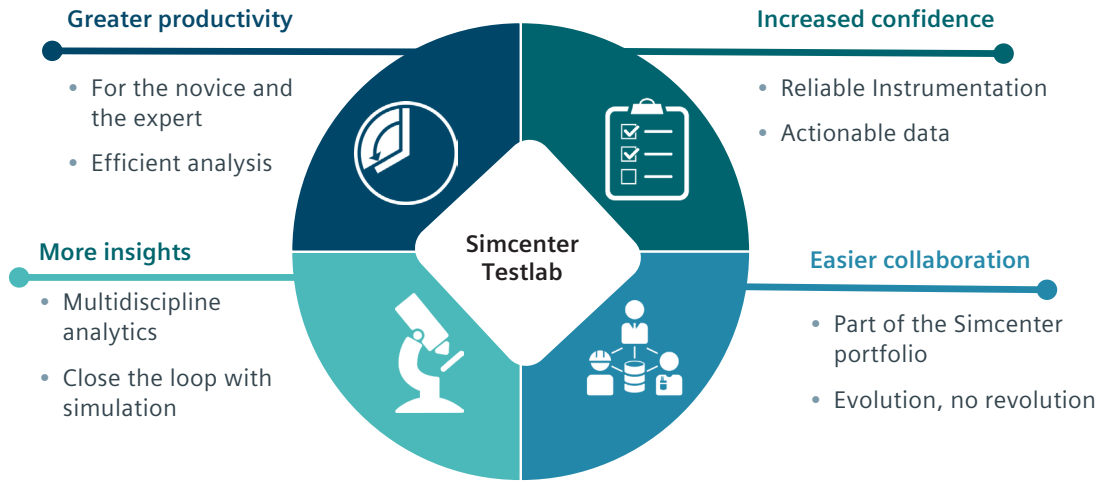
Finally, Simcenter Testlab Desktop Neo provides direct access to the Siemens PLM Community's Testing Knowledge Base, which has grown to be a widely appreciated source of information, providing content that complements the online help.

The premium solution for test-based engineering

Simcenter Testlab is a leading suite of data collection, analytics and modeling software for test-based performance engineering in the core fields of noise and vibration, acoustics and durability.

As part of the Simcenter Testlab portfolio, Simcenter Testlab Neo 2019.1 is designed to offer extra capabilities to innovate smart products faster, with an impressive range of new functionalities – an evolution that helps the value of past investments continue to grow in the future.

It enables engineers to make much quicker decisions by increasing productivity in testing scenarios. It delivers more and better insights by allowing users to investigate issues from



different angles using the same toolset, and by benefiting from the additional understanding simulation models can bring. It further increases the user confidence in their data, minimizing instrumentation errors and making sure they can build on the data measured with the objective to better support the role of simulation in the development process and maximize the benefits of using the digital twin concepts. It also facilitates collaboration between teams and thus smooths the entire

engineering process. The Simcenter Testlab portfolio enables unique ways to access data of other Simcenter product family members. Its ease-of-use makes the novice user operational immediately, while new powerful features will make the expert ever more efficient.

For more information on Simcenter Testlab, please visit: www.plm.automation.siemens.com/global/en/products/simcenter/testlab.html

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