



**SIEMENS**

*Ingenuity for life*

# Road load data acquisition solution

Solution brief

Siemens Digital Industries Software

## Understanding loads

How do engineers figure out just how many potholes, mud puddles, bumpy gravel roads and kilometers of highway driving your car or truck can withstand over a lifetime? This is where road load data acquisition (RLDA) comes in. A critical starting point for successful vehicle durability engineering, RLDA is an excellent method for measuring the precise vehicle response either on public roads in the anticipated market or on proving grounds by replicating specific driving profiles. Road load measurements take into account all types of essential vehicle and driving parameters, such as mass, inertia, air and rolling resistance, road characteristics, engine loads and vehicle speed. This vital load information is key input for downstream computer-aided engineering (CAE) and laboratory testing activities.

Sounds easy, right? Not necessarily. Most RLDA testing teams are under tremendous pressure to deliver high-quality data as fast as possible for as many vehicles as possible. Using complicated and time-consuming traditional systems can make life a bit stressful at times. This is why more and more teams are switching to state-of-the-art methods, such as the advanced Simcenter RLDA solution from Siemens Digital Industries Software. It not only enables you to acquire reliable data under extreme testing conditions, but it also includes embedded universal signal conditioning for easy setup of various test types. Compact and easy-to-install, it interfaces with a wide range of analog and digital sensors, and is designed for flexible channel count measurements. The solution is technician friendly, offers an unparalleled connectivity and provides accurate measurements right-first-time, seamlessly guiding both novice and experienced users through the entire durability acquisition process.

## Enhancing test productivity

- Guides you seamlessly through entire durability acquisition process
- Automatically synchronizes analog data streams from road load sensors and digital data streams from wheel force transducers, GPS receiver, vehicle bus and video sources

## Speeding up the testing process

- Allows multiple users to access the acquisition system at the same time and work in parallel on different parts of the instrumentation
- Accelerates configuration and setup with one button click by copying sensor parameters from in-house sensor databases or reading them from TEDS
- Measures and validates in real time, avoiding costly test reruns and making RLDA a one-man operation

# Solution focus

## Delivering high-quality data

- Offers 1 μs precise sample alignment, high accuracy and low noise and drift over entire operating temperature range
- Automatically annotates measurements with all setup parameters and organizes your tests in an orderly fashion
- Documents key findings during or after the measurement, and detects and corrects anomalies in your data on a channel-by-channel basis or with fully automated standardized processes

## Raising the bar on productivity

A typical RLDA campaign consists of three distinct steps. During the first test setup step, the test vehicle is instrumented with various sensors that typically measure wheel forces, displacements, accelerations, strain and temperature. The data acquisition system is configured, mounted in the vehicle and all sensors are checked for consistency. In the second measurement step, multi-channel road load data is recorded according to the test specifications on a proving ground or public road. The final validation step focuses on validating and sharing the results with downstream test and simulation teams. During this step, the solution is used to inspect the collected road load data, detect and correct anomalies and document key information.

This efficient and convenient RLDA solution is not only about rugged and robust data acquisition equipment with flexible, built-in universal signal conditioning or synchronized road load time, video and vehicle bus data; it is about making sure that every single step of the RLDA campaign is tuned and optimized for testing productivity. Future-focused durability testing departments around the world rely on Siemens' durability engineering expertise to execute RLDA campaigns more confidently, in less time and with fewer errors.

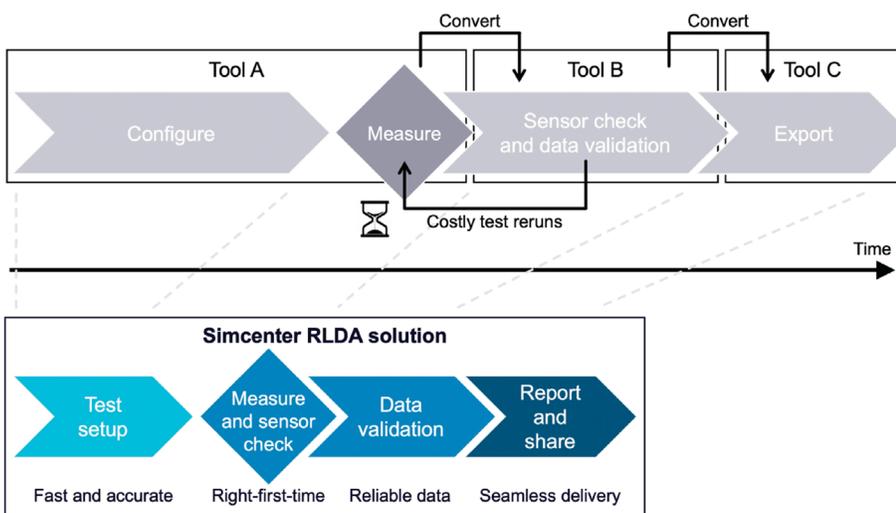


The Simcenter RLDA solution lets users acquire reliable data under extreme conditions and avoid needless test reruns.

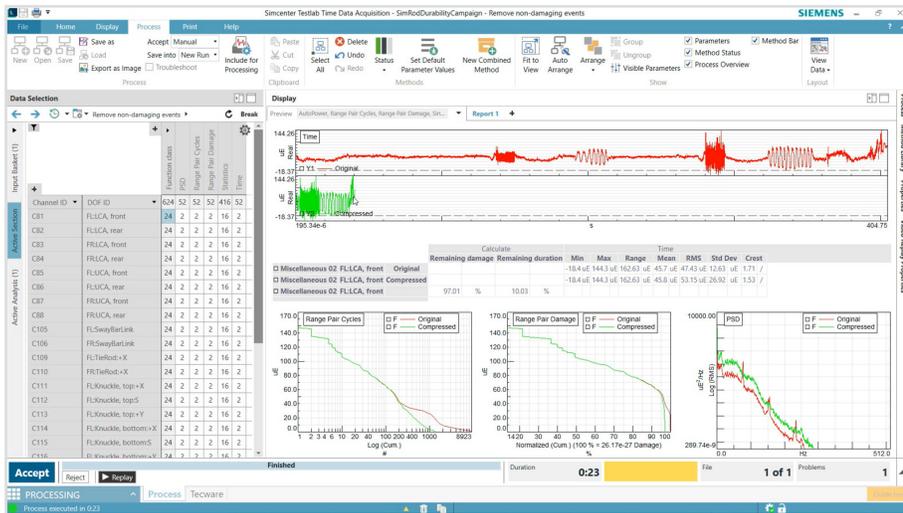
## Fast and accurate setup

Any way you look at it, setting up and configuring a RLDA campaign takes time, especially for high-channel-count measurements. Thanks to its flexible system architecture, the Simcenter SCADAS RS hardware can be used in a distributed setup, not only highly reducing cable length, cost and instrumentation time, but also enabling parallel instrumentation by two or more teams. Very often analog data streams from road load sensors like strain gauges and accelerometers and digital data streams from wheel force transducers, Global Positioning Systems (GPS), vehicle bus and video sources need to be configured and synchronized after recording using a multitude of tools. All this can be quite tedious.

What is impressive about the Simcenter RLDA solution is that a single spreadsheet-based environment, Simcenter Testlab™ software, accelerates the configuration and setup of Simcenter SCADAS™ RS hardware. Pro-ductivity enablers, such as automatic transducer calibration from in-house sensor databases, enable you to copy and paste parameters directly from Microsoft® Office Excel or a transducer electronic data sheet (TEDS) to the Simcenter SCADAS RS hardware. This results in setups that are five to 10 times faster than legacy systems. Digital interface with the Kistler RoaDyn 2000 or KiRoad Wheel Force Transducer system, high-definition quality video cameras or other digital IO saves configuration time and automatically produces synchronized data streams. Finally, the



The Simcenter RLDA solution maximizes testing productivity on all levels. You will acquire data faster, benefit from more measurement flexibility and perform test campaigns with complete confidence.



Each Simcenter RLDA solution can be tailored to budget and easily expanded for future testing requirements.

Simcenter Testlab is an integrated, end-to-end solution for RLDA. Using only a single software platform, you have complete control of the full load data acquisition process.

Simcenter SCADAS RS comes with an integrated GNSS receiver for instant time, speed and position measurement, and supports controller area networks (CAN) vehicle bus interfaces.

To double check sensor consistency during setup, Simcenter SCADAS RS has a number of embedded verification features to ensure measurement integrity. This includes signal checks like overload detection, bridge and ICP cable checks and offset and sensitivity checks. This reduces setup errors and lets you start measuring with confidence.

### Smart, secure and synced recording even in extreme conditions

You normally only have one shot at measuring multi-channel road load data during durability testing scenarios on public roads and proving grounds. This is why secure recording with on-the-spot validation is a must.

Thanks to the high water and dust protection, extraordinary shock and vibration resistance, wide operating

temperature range and smart uninterruptible power supply, the Simcenter SCADAS RS will not shutdown unwantedly during the measurement due to failure or power loss, making sure you can deliver high-quality data under all conditions at all times.

RLDA also becomes an easy operation thanks to the unparalleled connectivity of the Simcenter SCADAS RS. Thanks to the web-based Simcenter RS App that runs on all SCADAS RS units, the measurement system can be accessed by one or multiple users, with any advice, via any interface, wired or wireless. It's ideal for mobile and remote usage under challenging conditions. Test drivers can cycle through test setups, start and stop measurements, monitor in real time, and instantly validate recorded data quality during and after each measurement right on site or from a distance. This way test drivers and technicians can return to the office with all the right data and without fear of having to rerun expensive test campaigns.

Simcenter SCADAS RS stores the high precision (24-bit) and noise-free acquisition data on his on-board solid-state storage. All analog and digital data, is

automatically synchronized and collected into a single measurement file per run. This speeds up downstream analysis since it is not necessary to waste time merging multiple files or aligning different channels. The data is immediately ready to go.

### Seamless delivery of high-quality data

During the validation step, the solution is used to inspect and consolidate road load data, detect and correct anomalies and document key findings so they can be seamlessly shared with downstream test and simulation teams.

Simcenter Testlab helps test engineers efficiently manage and validate gigabytes of raw data. A multitude of measurements are consolidated, either interactively on a channel-by-channel basis or fully automated through standardized processes. During data consolidation, signals are scanned for anomalies (spikes and drifts), channels

are renamed, base statistics are processed, new channels are derived using mathematical operations, data is low-pass filtered, specific sections are extracted, consolidated data is stored and final test results are ready to be delivered.

When sharing test results between departments, Simcenter Testlab helps document your data to prevent losing vital information in the process. By consistently organizing and annotating your tests, you can streamline the delivery of the results. Simcenter Testlab lets you manually add key information to raw data, such as operator details, test object descriptions or testing conditions, relating measurement results to product structure. The software automatically annotates all measurements with a complete description of all setup parameters. Better documentation means your data will retain its value long after the testing phase has been completed.

Simcenter Testlab also enables to create and share 'Active' reports with a single click of the button. Instead of producing static bitmaps, all measurement data is fully embedded into the charts. This allows test engineers to focus on the actual data acquisition while others can

format or edit graphs in Microsoft Office Word or Microsoft Office PowerPoint in whatever way they see fit. In addition, all data can be exported in a wide range of binary data formats making it possible to share or use the consolidated data in other tools.

### **Delivering maximized testing productivity**

The Simcenter RLDA solution maximizes testing productivity on all levels and increases your data quality. You will acquire data faster, benefit from more measurement flexibility and perform test campaigns with complete confidence. Your RLDA test expertise will certainly contribute to the creation of a durable, quality product.

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