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Ingenuity for life

Siemens Digital Industries Software

Simcenter SCADAS RS

Fast and cost-effective testing in harsh environments

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A groundbreaking solution for durability engineering

Whether they are buying mining equipment, building machinery, farming tools, ground vehicles or others, your customers all want the same: fit-for-purpose functionality and absolute reliability. For your customers, failure during operation is among the worst that can happen, as any downtime because of maintenance or repair immediately translates into big costs. Through durability testing and engineering, customers expect you to guarantee that their productivity will be preserved, no matter how harsh external conditions may be. That is a lot of pressure.

How great would it be to have a tool at your disposal that never leaves you alone, no matter how hot, cold, rainy or muddy it is? An end-to-end solution that helps you effectively set up your test campaign and deliver quality data without interruption and on time. A tool that is flexible and scalable to fit all your machines, no matter how small, large or complex they are. A compact data acquisition system that is smart and remotely accessible, even by multiple people simultaneously.

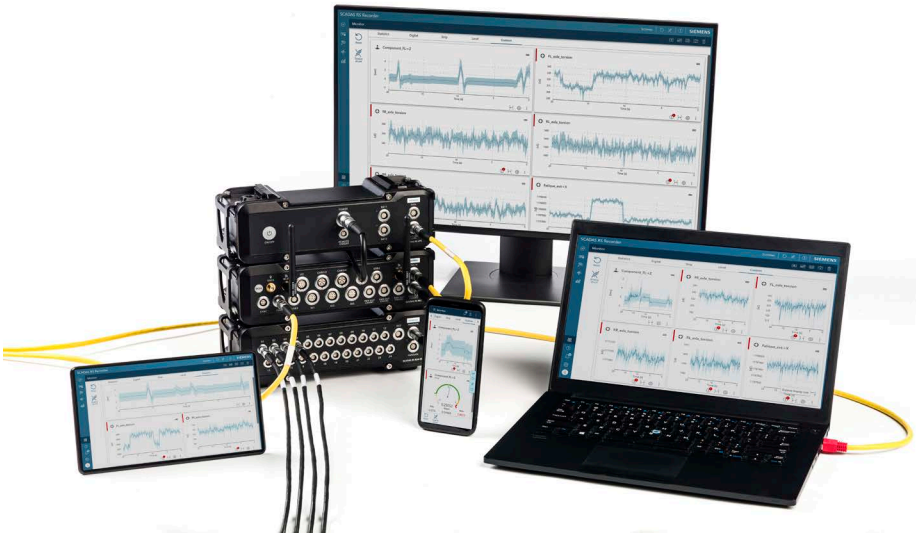
Meet Simcenter™ SCADAS™ RS hardware, your new testing solution for fast and cost-effective testing in harsh environments. This is not just the next data acquisition system. Simcenter SCADAS RS is specifically designed for your confidence, efficiency and productivity.

With its ultra-rugged design, you can be sure Simcenter SCADAS RS does more than just surviving the extreme conditions you subject your machines or vehicles to. Even when pushed to the limit, the system keeps its superior performance by delivering the high-quality multiphysics data you need for successful durability engineering.

Simcenter SCADAS RS is extremely flexible and scalable. You can create any configuration you like by using the small but powerful units as building blocks. Those have very practical stacking and mounting features to significantly facilitate your instrumentation.

In addition, Simcenter SCADAS RS is a truly smart team player. The system has local on-board storage and an on-board software application with functionalities for sensor instrumentation, data processing and measurement monitoring, as well as intelligent capabilities to automate measurements and data offloading. The Simcenter SCADAS RS Recorder app makes the system accessible from remote, via wireless network, even through cellular communication, so that multiple stakeholders can participate in the test preparation and execution, wherever they are.

Simcenter SCADAS RS delivers a groundbreaking solution for durability engineering that lets you effectively conduct precise multiphysics measurements anytime and anywhere.



Rugged design

Simcenter SCADAS RS is 100 percent fit for this heavy duty.

The purpose of testing your machines and vehicles for durability is to confirm that they can continue working properly under all exceptional conditions your customers expect them to withstand. These include extreme temperatures, moisture, mud and dust, as well as high shock and vibration levels.

It's exactly in circumstances like these, where you push your prototypes to the limits, that your test equipment must operate reliably on a daily basis, at steady performance and data quality output. Your Simcenter SCADAS RS is 100 percent fit for this heavy duty.

Certified to operate daily in extreme conditions

All Simcenter SCADAS RS units and connectors are ultra-rugged and extra protected in order to limit downtime during your testing. The system's operational range, certified by standardized test protocols, is as follows:

- Works within a temperature range from -40 °C (-40 °F) to +65 °C (150 °F)
- Has an IP66/IP67 rating within the IEC-60529 standard for protection of electrotechnology against dust and liquid ingress, thanks to its certified enclosure. For these tests, Simcenter SCADAS RS was exposed to powerful waterjets from all possible directions, as well as submerged 1 meter under water for 30 minutes.
- Withstands vibrations of 10g (RMS) and 100g (peak) shocks, as confirmed by tests using the military standard (MIL-STD) 810F protocol
- Provides stable power from unregulated DC power over the entire temperature range. The system includes a safe power buffer even in case of prolonged cranking and ensures safe shutdown and data safeguarding when power cannot be recovered.

The Simcenter SCADAS RS development team did not consider meeting these certification standards as just another item to check off their requirements list. Instead, achieving this degree of ruggedness has been one of the major design drivers. As a result, Simcenter SCADAS RS is by far the most robust data acquisition system within the entire Simcenter SCADAS family and aims at being the best-in-class on the market in this area. Siemens delivers a system that achieves utmost power and precision in the harshest environments to help you execute and complete your test campaigns on schedule and with confidence.

Extreme flexibility

Machines and vehicles come in different sizes and architectures, often in multiple design variations. As critical locations for failure can be very dispersed, proper durability testing typically involves a high number of sensors.

Simcenter SCADAS RS comes with numerous capabilities to make the instrumentation process more effective, lighter and less error prone.

Small units in a modular configuration

As every measurement layout is unique, Simcenter SCADAS RS doesn't come in a standard configuration. You always build your own, tailored to your application, by using small lightweight units – approximately 2 kilogram (kg) – as building blocks, distributed over the test object, or stacked. The latter is very easily done through a simple but extremely solid slide-and-latch mechanism. In this case, no tools are required: Just click and go. For your convenience, all units can have side clamps to securely fix them to the test object using a strap belt. Besides those features, the pragmatic Simcenter SCADAS RS design offers many more mounting possibilities.

Simcenter SCADAS RS is an utterly modular and scalable solution that can easily measure more than 1,000 channels in a single recording file.

There are three types of Simcenter SCADAS RS units: for power, recording and data conditioning. The latter category includes various versions in terms of sensor types and channel count. The uninterruptable, smart and secure power supply units can be chained in parallel via the recorder unit and can feed up to four to five conditioning units each, depending on the sensor power needs. Between all different units, both data and power are transferred by simply plugging a daisy-chain cable up to 50m in length.

In this way, Simcenter SCADAS RS is an utterly modular and scalable solution that can easily measure more than 1,000 channels in a single recording file, synchronized within 1 microsecond (µs), while truly enabling a distributed test configuration. This can present numerous advantages compared to a centralized setup, such as fewer and massively shorter cables and thus lower magnetic interference, noise pickup and lead wire influence. At the same time, you will also reduce the instrumentation weight and lose less time in tedious cable fixation, while keeping a much better overview for in-the-field repair or maintenance of the test installation.

All these flexible mounting options make Simcenter SCADAS RS the perfect fit for prototype machines and vehicles of very different types and sizes.


ON/OFF
SIEMENS

Superior measurement performance

Successful durability analysis requires a comprehensive view of what is happening when your machine or vehicle prototype is subject to extreme loading. Therefore during the test, a wide range of sensors needs to be measured and synchronized, including strain gages, accelerometers, displacement sensors, force cells, thermocouples, wheel force transducers, pressure transducers, Global Navigation Satellite System (GNSS) location and more. Frequently, engineers also want to consider additional information, like data coming from a vehicle digital bus or video images. But space is limited to take several devices on board for all these diverse testing needs.

With Simcenter SCADAS RS, you can have all these capabilities in one box. By building the right configuration, you can achieve any desired sensor combination. Besides, Simcenter SCADAS RS has powerful on-board universal signal conditioning for all these physical aspects. The measurements are conducted with the highest precision, and with low noise and drift over the entire operating temperature range. Thanks to its high signal-to-noise ratio and large dynamic range, Simcenter SCADAS RS can turn any signal into quality data.

Set-up the core of your measurement configuration

Whichever combination you select, a power unit and a recorder unit must always be part of it.

Uninterruptable power supply (UPS) unit

The Uninterruptable Supply Unit (UPS) provides stable output power from unregulated DC inputs and is reverse current protected. It provides 96W of output power for powering of a number of other units (REC or conditioning units) and provides smart powering capabilities. When more units are added, more UPS units can simply be inserted in the daisy-chains for more power. In case of power failure or engine cranking, an internal buffer allows for continued operation for several minutes. Two hot-swappable batteries provide further autonomy of up to 2.5 hours at full load. One main UPS activates the entire system by button push or a remote on/off signal and prevents data loss in case of prolonged power outages.

Recorder (REC) unit

The REC unit adds recording capability to the system by means of the embedded SSD drive of 240 GByte. Connecting to a REC unit is possible over wired (1GB Ethernet) or wireless connections. The REC unit further includes support of GNSS signals (GPS, Glonass and Beidu) as well as digital inputs like quadrature encoders and CAN buses.

Extend your configuration according to your multiphysics testing requirements

Building further on the UPS and the REC unit, you can customize your test configuration the way you want with additional units of different types.

U12: 12-channel universal signal conditioning unit

The U12 packs an impressive set of signal conditioning in a single unit. It provides 12 channels of bridge conditioning (full, half and quarter bridges or piezo-resistive sensors) or sensor signal conditioning (ICP, sensors with supplies, current loop sensors or voltage inputs up to 60V). The 12th channel can also be configured to support analog tacho signals. Other supported sensor types include potentiometers, LVDT's and RTD sensors.

B24: 24-channel bridge-type conditioning extension for high-channel-count measurements

The B24 unit comes in two types: a B24-120 and a B24-350 for respectively 120 and 350 ohm quarter bridge completion. It packs no less than 24 channels of bridge conditioning, potentiometers, LVDT's or RTD sensors in a single housing.

S24: 24-channel sensor-type conditioning extension for high-channel-count measurements

The S24 unit completes the pack with support of 24 channels of ICP sensors, sensors with external supplies, current loops or voltage inputs up to 60V. In addition it provides a 4W power budget that can be freely distributed over the sensors. This way, even power hungry sensors can be measured with this unit.

Unparalleled connectivity

During the measurements you can connect to the app from wherever you like, and closely monitor whether everything goes well.

After completing the practical part of the instrumentation, the actual startup and execution of the measurement campaign can still be a labor-intensive task that you want to do right the first time. Having to redo a test can be laborious and expensive, or even impossible. An important obstacle is often that you need a laptop with acquisition software and an active license for setting up or checking the sensor parameters and for monitoring the test. And that can be serious burden, especially in a harsh environment, with little or no connectivity and limited space.

Designed for unparalleled connectivity, Simcenter SCADAS RS includes a license-free app, directly embedded in the hardware, and easily accessible via any web browser. This Simcenter SCADAS Recorder App lets you define and store sensor settings remotely, and immediately start verifying your data while the test is still running, even on your smartphone.

Making your data acquisition system smart

Through the onboard app, every Simcenter SCADAS RS system is accessible through cable, wireless or even a cellular network for connection to any remote device such as a laptop, a tablet or a mobile phone. The app itself includes functionalities that truly transform your Simcenter SCADAS RS system from standard data acquisition hardware into a complete measurement preparation and execution solution.

The app enables you to create a measurement setup from scratch, perform calibration on a single or multiple sensors, and store these parameter settings locally on each individual Simcenter SCADAS RS unit. When merging these units into one system, the REC unit reads out these local settings and automatically aggregates these in a channel setup for the complete system. The Simcenter SCADAS RS is very clever on connecting these conditioning units. Independent of the topology you choose to line up the conditioning units and connect them to the REC unit, the sensors will be correctly assigned in the right channel order.

During measurements, you can connect to the app from wherever you like, and closely monitor whether everything goes well. Besides, it gives you access to some productivity-increasing functionalities, such as intelligent triggers to start and stop the measurements, to make sure you capture just the data you need, and automated data offloading, for example to PC, cloud or a company server.

Simultaneous access by multiple stakeholders

The app can be accessed by various devices simultaneously. Considering the testing process, the personnel involved and from which locations, this is an absolute game-changer.

Where previously the sensor setup and verification happened sequentially, you can now win a lot of time by dividing that work between different team members. The concept of storing sensor data locally can even facilitate parallel instrumentation by different parties, such as OEMs and suppliers.

And finally, during the test, it's not only you who can follow what's happening from wherever you like, but also an extra pair of eyes back in the office if necessary.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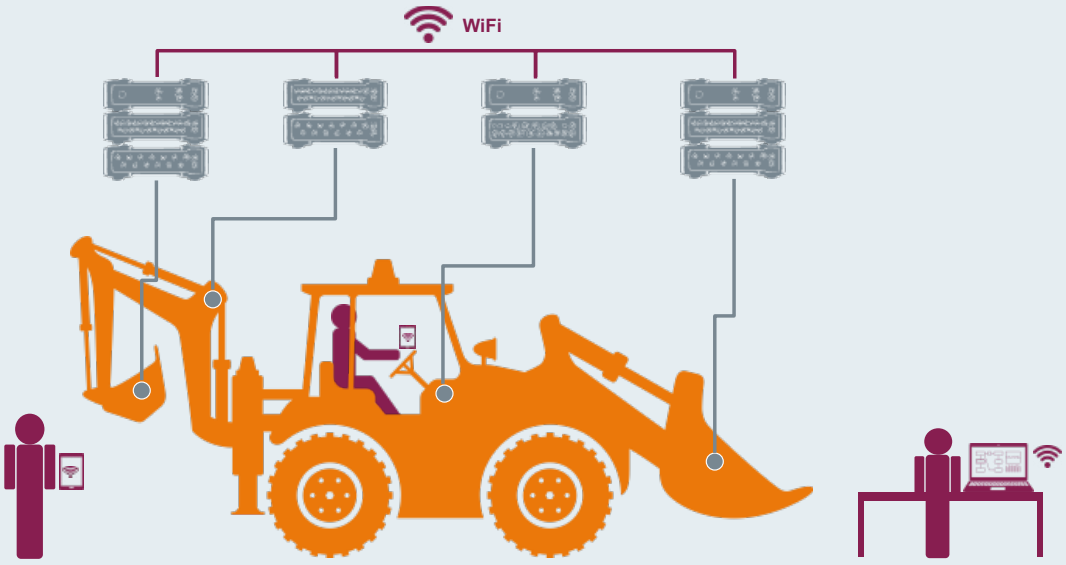
Testing machines of any size

As a distributed, connected and smart data acquisition system, Simcenter SCADAS RS will change the way you test your machinery. Several scenarios that were unthinkable before are now possible.

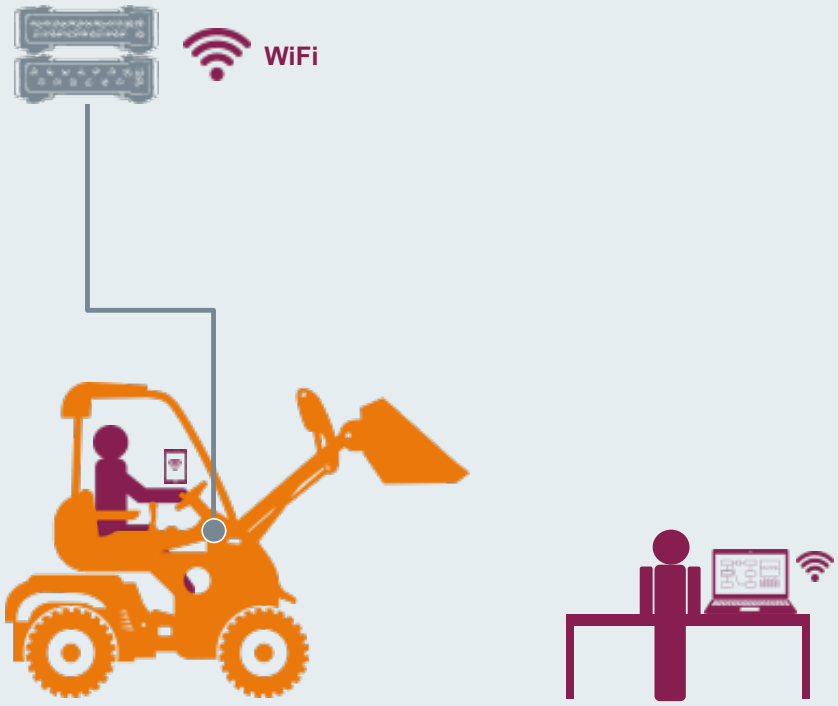
Load data collection in the field for heavy equipment

- Distribute your test equipment over the machine, and measure close to the sensors for reduced noise
- Connect to a network on the proving ground for remote access
- Offload and convert data to other file formats when in reach of the company Wi-Fi network



Load data collection on smaller machines

- Easily mount your test system on smaller vehicles
- Avoid the need for driver intervention through autonomous operation
- Monitor the data while the test is happening, even remotely

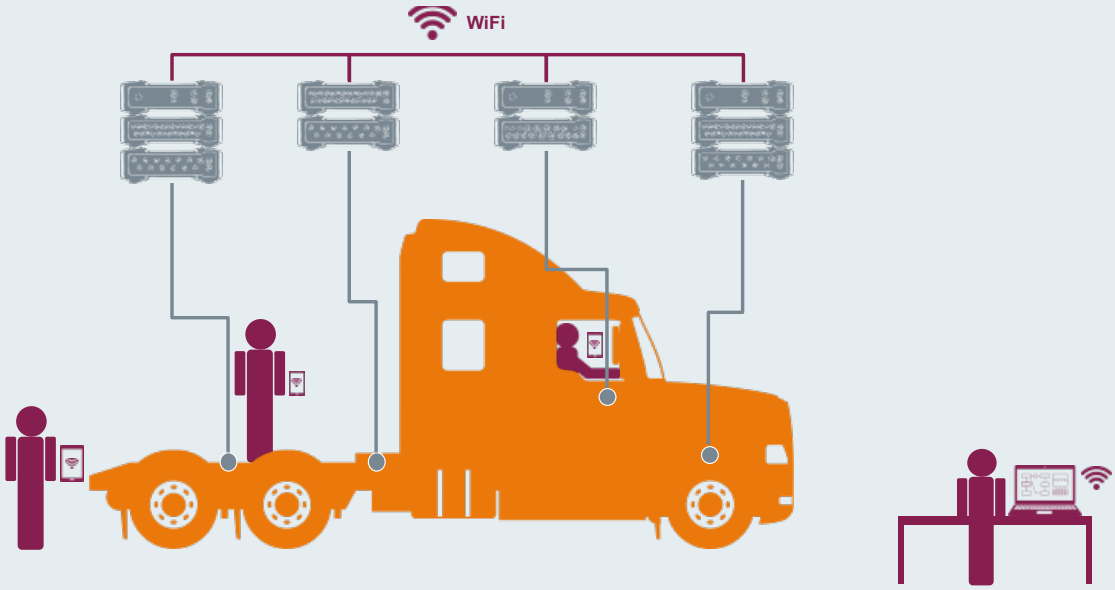


Setting up large-scale measurements in parallel

The Simcenter SCADAS RS system will dramatically increase the test productivity within your organization by allowing any campaign to become a team effort and by enabling automation of certain parts of the process.

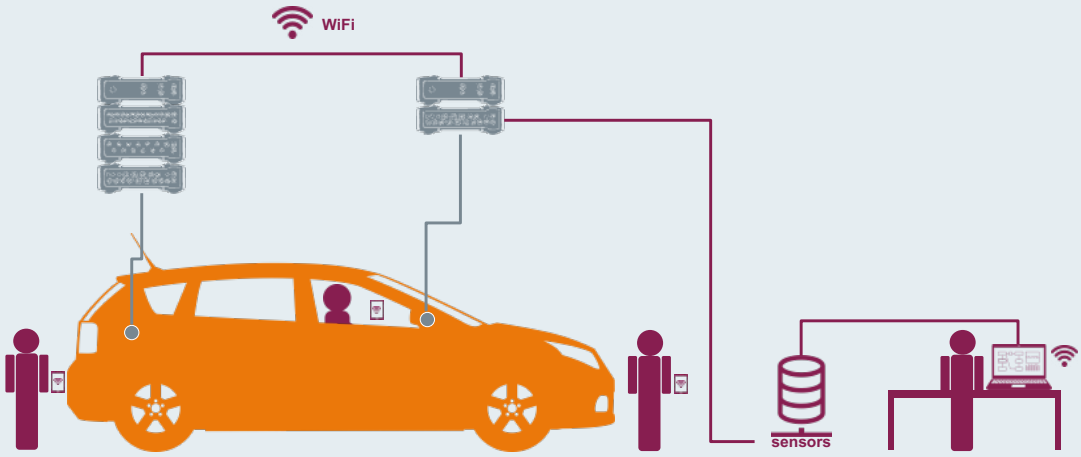
Durability testing for truck and bus

- Deploy parallel instrumentation of supplier components and the in-house test prototype
- Leverage power from the vehicle DC as a secure power buffer for safe recording, and add power as necessary
- Plan scheduled and automated offloading of data, even at remote locations



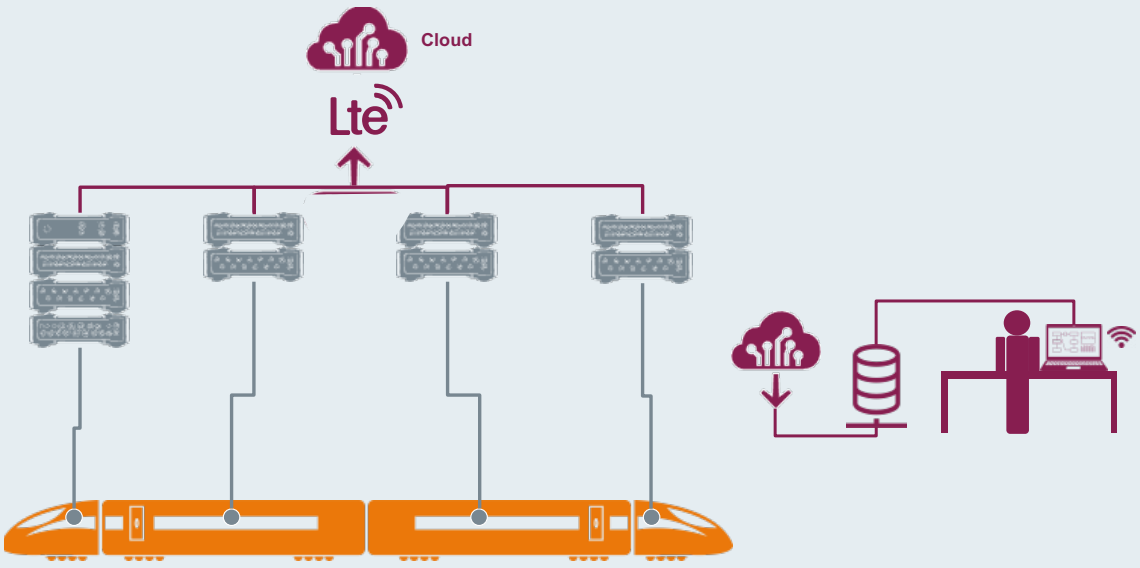
Road load data acquisition for automotive OEM and supplier

- Accelerate instrumentation through multi-user access
- Use a sensor database for fast and error-free setup
- Allow a two-man, one-man or fully autonomous operation



Operational field testing for rolling stock

- Distribute your system units over long distances, up to 50m between individual units
- Allow long-duration tests by combining on-board recording with automated data offload
- Deploy secure long-distance access for remote assistance and troubleshooting

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Getting the most out of your investment

While undertaking your next project and exploring all the new capabilities that come with your Simcenter SCADAS RS system, you will experience its value across the board.

With Simcenter SCADAS RS, you will be able to boost your productivity on the proving ground and on public roads by optimizing operational processes from start to end, including faster setup, increased uptime, faster data access and analysis, and quicker results delivery. You will save time and cost throughout all the steps, from test preparation, to measurement, and ultimately data validation.

Simcenter SCADAS RS will help you achieve a higher return on investment (ROI) from your test facilities by reducing the required number of hardware and software investments and minimizing the need for training.

Effective campaign preparation

Thanks to the availability of the onboard software app in your Simcenter SCADAS RS, you can easily prepare your test campaign, and thereby more easily integrate with existing processes, tools and in-house sensor databases. The capabilities for storing settings on the system remotely and the multi-user access enable team collaboration, reducing the risk for mistakes.

You can also prepare the instrumentation and validate the measurement setup with the Simcenter Testlab Neo software, which is then also used for data validation and durability processing later in the process.

Such teamwork can easily be extended to collaborative instrumentation. Ultimately even different parties, such as OEMs and suppliers, can perform their share of the work in parallel.

Productive field testing

When using a Simcenter SCADAS RS, you will leave the field with all the data you need. During the test, you will always have the possibility to verify that everything goes well and correct if necessary, also remotely. If need be, the test can even be monitored by other people in the office.

The Simcenter SCADAS RS Recorder app securely stores data in a smart way and has built-in processing capabilities. While the test is still running, data can already be offloaded for validation and consolidation, even as part of an automated process.

By combining these capabilities, the Simcenter SCADAS RS system enables you to do more tests in less time, and spend less time in the field, with fewer people.

Successful data consolidation

Simcenter SCADAS RS hardware seamlessly integrates with Simcenter™ Testlab™ software for data acquisition. This solution allows batch processing, automated data consolidation and cleanup, as well as advanced analysis and reporting on huge amounts of data.

By combining Simcenter SCADAS RS and Simcenter Testlab, you can effectively validate and store your data, decide on additional measurements or re-runs, process the results to gain fast engineering insights and optionally convert these results into third-party format for sharing with other colleagues or your customers.

A future proof solution

Your investment in the Simcenter SCADAS RS data acquisition system is safe, secure and future-proof.

In addition, Simcenter SCADAS RS uses universal signal conditioning with standardized cables and connectors. In this way, you can be sure that the investment in your hardware will last multiple years.

Maintenance and calibration

Siemens Digital Industries Software make certain that your device will reliably function, by following rigorous design standards, quality controls and services that are in line with International Organization for Standardization (ISO) guidelines. Careful tracking of every system module allows our global services organization to carry out maintenance and calibration. This process reduces the downtime for repair and ensures reliable operation and stability during mission-critical applications.

Siemens protects your investment for you and provides the service you need to get the most out of the Simcenter SCADAS RS system. Annual hardware calibration offers update and adjustment services with an as-found and as-left report, fully compliant with the ISO 9001-2015 standard.

Additionally, Siemens hardware maintenance services include the same service and reports, complemented with a warranty extension. In the unlikely event that hardware fails, you can then continue your measurement campaign by replacing the defective component with a module that has identical specifications.

Both calibration and maintenance services can be extended with an ISO 17025-accredited calibration.

About Siemens Digital Industries Software
Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. Our solutions help companies of all sizes create and leverage digital twins that provide organizations with new insights, opportunities and levels of automation to drive innovation. For more information on Siemens Digital Industries Software products and services, visit siemens.com/software or follow us on LinkedIn, Twitter, Facebook and Instagram. Siemens Digital Industries Software – Where today meets tomorrow.

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