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Ingenuity for life

Fast and cost-effective testing in harsh environments

Solution brief

Siemens Digital Industries Software

Simcenter SCADAS RS helps optimize data acquisition processes

Real-world load data collected on agricultural, construction and mining equipment is essential for both virtual and physical machine performance validation and verification. The field test conditions this equipment encounters are unforgiving.

These machines are designed to work in environments where there is a lot of water, mud and dust, extreme temperatures and moisture. As a result, the data acquisition system needs to withstand these extreme conditions. The high shocks and vibrations machines undergo during these tests, as well as the wide operating temperature, pose extra challenges on the data acquisition system.

On large machines, test engineers also struggle with the cable instrumentation. Very long cables would be required in order to connect each

sensor that is instrumented on these machines to the data acquisition system. Lengthy cabling is expensive and the fixation of all these cables on the structure in a secure way is very time consuming. On top of that, long cables are more sensitive to noise pickup, voltage drops, etc.

Test engineers also want the acquisition system to automatically start to measure when the machine starts without interaction from the engineer or driver. And instead of having an engineer in the machine with a PC on his lap looking at the data that is coming in, especially in case of long duration measurements, they want to save the data on the acquisition device itself while the operators drive the machine.

Even if the test engineers cannot be present during the measurement, they still prefer to have access to the measurement from a distance in order to set up the sensor and measurement parameters and check if all these sensors are working correctly.

Challenges

- Harsh environments and demanding test conditions
- Speed up test campaigns by optimizing operational processes from start to end
- Test in remote areas offering monitoring from a distance
- Scalability needs in terms of channel count and measurement topology

Solutions

- Requires rugged design for use in harsh environments
- Extreme flexibility to optimally match the device under test
- Superior performance for best possible accuracy
- Unparalleled connectivity simplifying data collection and providing access from anywhere

Solution focus

Results

- Realized faster and more cost-effective execution of the most demanding test campaigns
- Acquired precise multiphysics measurements anytime and anywhere
- Enables access in remote locations

Simcenter™ SCADAS™ RS hardware is designed to tackle all these challenges while enabling test campaigns in a faster and more cost-effective way. Simcenter is a part of the Xcelerator™ portfolio, a comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software.

Rugged design

Simcenter SCADAS RS with its rugged design can be used in any condition, from minus 40 to 65 degrees Celsius. It has the ingress protection of IP66/IP67 against water and dust and is capable to withstand extreme vibration up to 10g RMS and 100g shock.

Ruggedness is not limited to conditions like weather, temperature and mechanical loads. Power sources from machines and vehicles are not optimized for powering systems for data acquisition. So being able to work from different, sometimes unreliable power sources, also requires a rugged design.

Our rugged data acquisition system is also designed for reliable power input to the sensors. It can be configured with an uninterruptible power supply (UPS) unit which provides a stable DC output voltage from unregulated DC power sources. If more power is needed, simply add more UPS units in the daisy chain.



Durability field data acquisition campaigns are typically done under very tough conditions.

The UPS can also be powered with a remote on/off mechanism, working off engine key switch activation. This ensures that when starting the engine, the system boots and is operational from the very start of the test.

Extreme flexibility

To optimally match the device under test our scalable and flexible systems support centralized, distributed, or combined topologies. Simcenter SCADAS RS is designed with a rugged slide-and-latch mechanism to mount units on top of each other without any tools and easily unmount them again. The slide-and-latch mechanism is designed with the same criteria for shock and vibration ruggedness.

Units can be mounted in different ways: vertically or horizontally stacked and strapped to the machine, in a back-to-back configuration by means of mounting holes in the back of the units or even in a sideways configuration.

Connecting Simcenter SCADAS RS units is as simple as plugging in a daisy chain cable. It provides both power and data between each of the units. Adding units can be done by connecting them through the same daisy chain cable. There is a wide range of selections for the cable length from 0.4 meters up to 50 meters. These different cable lengths allow you to configure a system depending on the need: as a centralized

system, all units closely together, to an entirely distributed system, where units are located apart from each other with short cables to signals from analog sensors. With its flexible mounting options, different configurations are possible on prototype machines with very different sizes.

Superior measurement performance

Simcenter SCADAS RS offers multiphysics analog sensor support and digital bus interfaces. Simcenter SCADAS RS supports all common sensor types like strain gauges, accelerometers, force cells, pressure sensors, displacement sensors, thermocouples, wheel force transducers, GPS locations and more.

It offers 1 μs precise sample alignment, high accuracy, low noise and low drift over its entire operating temperature range. Simcenter SCADAS RS is designed as a smart system where intelligent triggers ensure the needed data is captured, and onboard processing assists in further analyzing and reducing data while measuring.

Unparalleled connectivity

Connection to Simcenter SCADAS RS can be obtained through any device, including a tablet, a smartphone or a PC, using wireless or wired connections. It is possible to access the onboard application on the Simcenter SCADAS RS hardware using a simple internet browser.



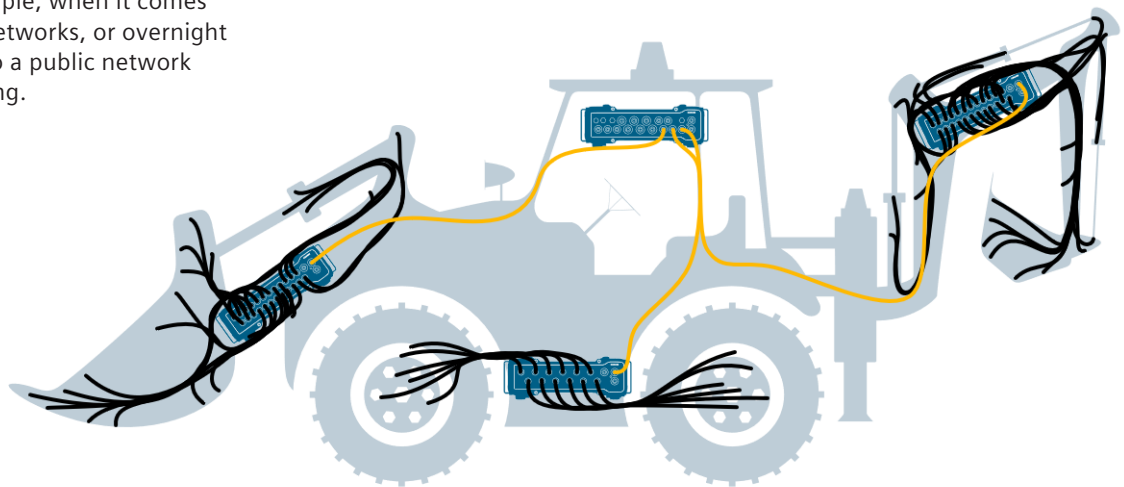
Lengthy cabling is expensive and the fixation of all these cables on the structure in a secure way is very time consuming.

Thanks to its wired and wireless connection options, Simcenter SCADAS RS can easily be connected to company networks. In addition, using modem connections to cellular networks, a Simcenter SCADAS RS system can be accessed when it is at a very remote location over extremely long distance.

The Simcenter SCADAS RS can also be configured to offload data in different ways: manually, at the end of the working day or even after each run. But downloads can also be scheduled automatically, for example, when it comes in range of Wi-Fi networks, or overnight when connected to a public network after a day of testing.

Secondly, connection to the same Simcenter SCADAS RS system can be obtained with more than one device at the same time. Any changes that are applied on one device are immediately visible on all other devices.

And since all settings are stored on the individual Simcenter SCADAS RS units, instrumentation can be completed in parallel with multiple persons or teams. One team can instrument and set up the front axle of the machine, and an external supplier does the rear axle.



Each can use his or her own device to connect with the onboard app to configure the sensor settings and verify correct sensor behavior.

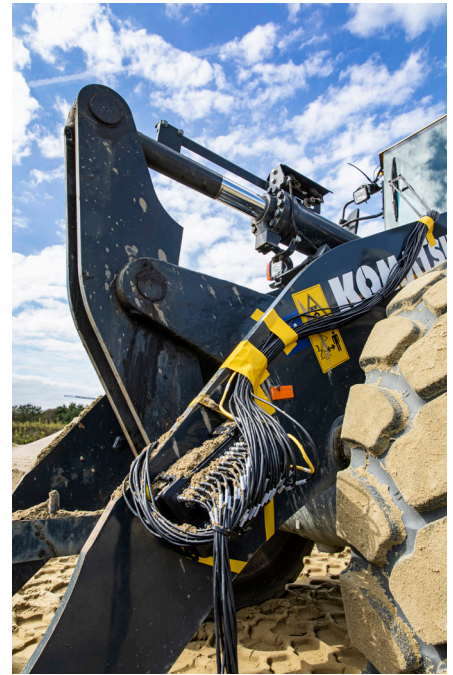
When all Simcenter SCADAS RS units are mounted on different parts of the vehicle or machine, they are connected with a single daisy-chain cable. All settings are automatically read out and the test campaign can start immediately, increasing overall efficiency.

Fast and cost-effective testing in harsh environments

Simcenter SCADAS RS is designed to work in extreme environments due to its rugged design. Its extreme flexibility in mounting increases instrumentation efficiency. Superior signal conditioning performance and onboard intelligence ensure you collect the data you need. The unparalleled connectivity Simcenter SCADAS RS provides ensures system access from anywhere, anytime, by anyone, boosting efficiency before, during and after measurement campaigns.



Every system includes a web-based application for secure access from anywhere, whether on your mobile, tablet or desktop.



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