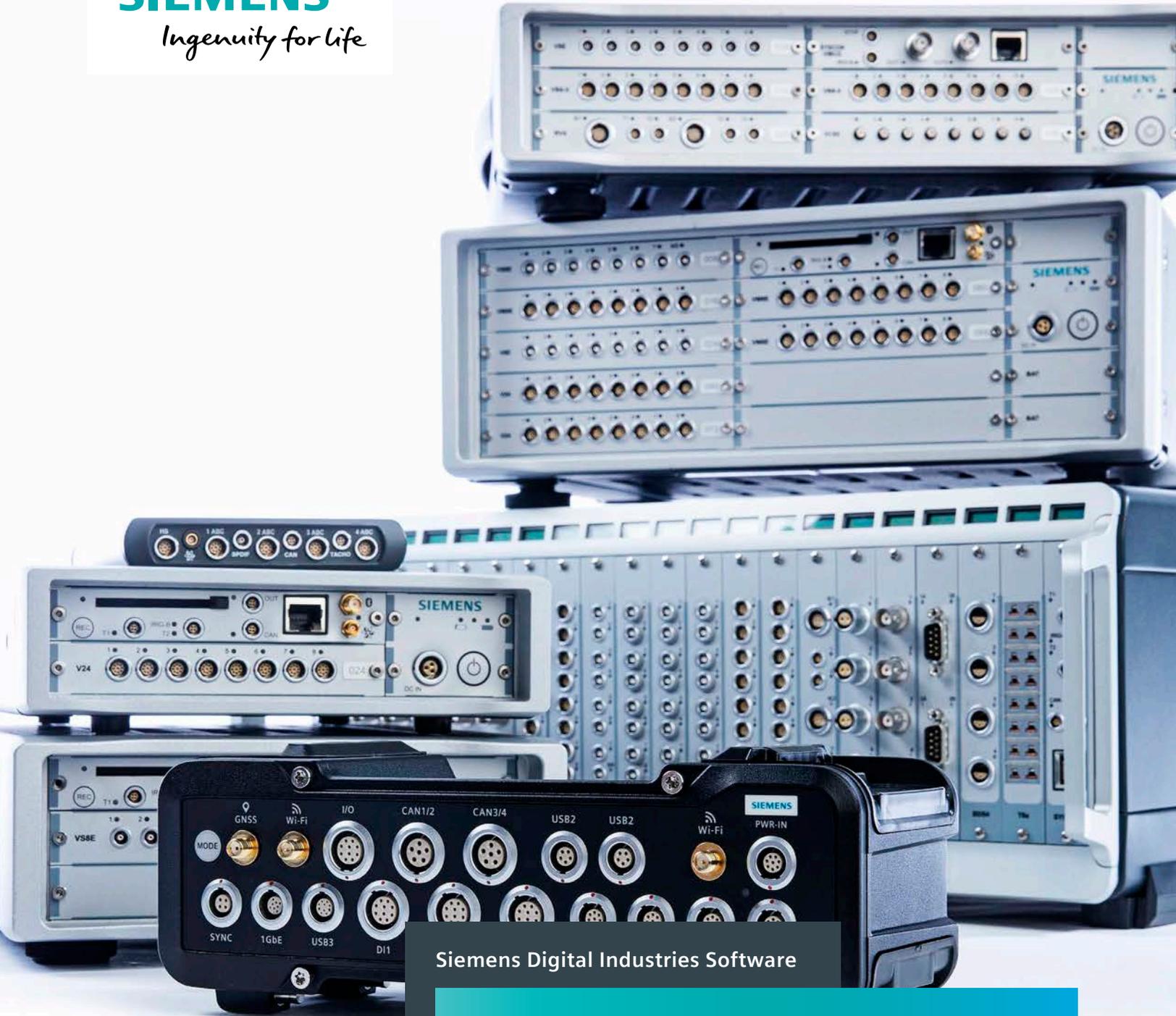


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Siemens Digital Industries Software

# Simcenter SCADAS

Delivering a solution for all your measurement needs

[siemens.com/simcenterscadas](https://www.siemens.com/simcenterscadas)



# Increasing productivity throughout the testing cycle

Simcenter™ SCADAS™ hardware can be used for all your testing requirements. They include portable solutions, compact mobile units and autonomous smart recorders, rugged data acquisition systems, as well as high-channel-count laboratory systems. Every device can be seamlessly integrated with dedicated and tailored software packages for accelerated measurement setup and correctly formatted results and analysis, such as Simcenter Testlab™ Apps tablet software and Simcenter Testxpress and Simcenter Testlab software applications on tablets. This increases productivity throughout the testing cycle, from instrumentation to reporting.

## **Testing complex products**

When developing new products, manufacturers are challenged to find the optimal balance between various, often conflicting requirements, such as energy efficiency, noise and vibration and durability. Current products are complex, include smart systems and come in an increasing number of varieties.

Additionally, today's fast-changing markets and classic cost and time-to-market development concerns put test departments under significant pressure. Increasing product complexity requires test engineers to handle a large variety of physical aspects and plan additional validation activities during the early design stages. Meanwhile, prototype testing needs to be conducted in a compressed timeframe.

## **Gaining insight and delivering quality**

Simcenter SCADAS systems offer test engineers versatile and scalable high-precision measurement tools that can be used to conduct productive measurements during all development stages. The solution allows you to quickly gain insight into the root cause of problems.

Simcenter SCADAS systems help you increase productivity by delivering the data quality and format required to get the job done right the first time for a wide range of analog and digital sensors. The flexibility, performance and precision of Simcenter SCADAS hardware makes it an excellent data acquisition system for a broad range of multi-physics measurement applications; at any scale, in the lab or the field and with a PC or through autonomous recording. At the same time, using Simcenter SCADAS systems in-depth coverage for dedicated acoustic, vibration and durability engineering tasks. With its modular design and multipurpose functionality, Simcenter SCADAS represents a secure investment that can easily be extended to the scale of your measurement requirements.

Providing productivity,  
flexibility and precision



### Take the fast track from measurement to insight

- Measure and synchronize a large variety of analog and digital sensor data for processing and analysis in a single file
- Obtain high data throughput for both low- and high-sample rates
- Use a single system for multi-physics applications
- Avoid multiple individual tests to gain instrumentation time
- Standardize, automate or autonomously run tests
- Streamline data acquisition, processing, analysis, reporting and sharing in a single integrated software application
- Facilitate plug-and-play deployment

### A testing solution that fits your industry needs

- Combine various systems in a distributed setup
- Cover a wide variety of multi-physics critical applications
- Combine portable systems for field measurements with high-channel-count laboratory frontends
- Transfer a large amount of data over long distances and multiple frames

### Optimize your measurement precision and data quality

- Limited harmonic distortion
- Highly precise phase matching
- State-of-the-art signal-to-noise ratio and dynamic range
- Accurately synchronized time data for both low- and high-varying signals, even over long distances or in a distributed test setup



# The Simcenter SCADAS family

The Simcenter SCADAS suite of data acquisition systems covers a broad range of engineering applications for manufacturing industries. Here is a summary of system solutions:



**Simcenter SCADAS Lab** hardware is a rack-based, high-performance laboratory solution that offers channel-count independent data acquisition and highly reliable, high-speed throughput performance. Simcenter SCADAS Lab is well-suited for high-channel-count modal, aircraft ground vibration, acoustic, high-speed throughput or turbine testing applications.



**Simcenter SCADAS Mobile** hardware is designed for testing productivity and covers a wide range of noise, vibration, durability and multi-physics applications. Simcenter SCADAS Mobile frontends incorporate robustness, reliability and acquisition power into a portable, compact and rugged design.



**Simcenter SCADAS Recorder** system is an intelligent mobile system for data recording without PC. You can use Simcenter SCADAS Recorder autonomously, as a smart recorder operated by a tablet or as a frontend system for in-field and laboratory applications.



**Simcenter SCADAS XS** hardware is a handheld solution for noise and vibration testing. It provides the ideal size, flexibility and measurement performance for optimal mobility and comes with a tablet application that allows mobile diagnostics and troubleshooting, even by nonexpert users.



**Simcenter SCADAS RS** is a rugged data acquisition system engineered for use in harsh environments. It deploys precise multi-physics measurements anytime and anywhere. Its rugged design, superior performance, extreme flexibility and unparalleled connectivity facilitate faster and cost-effective execution of the most demanding test campaigns.

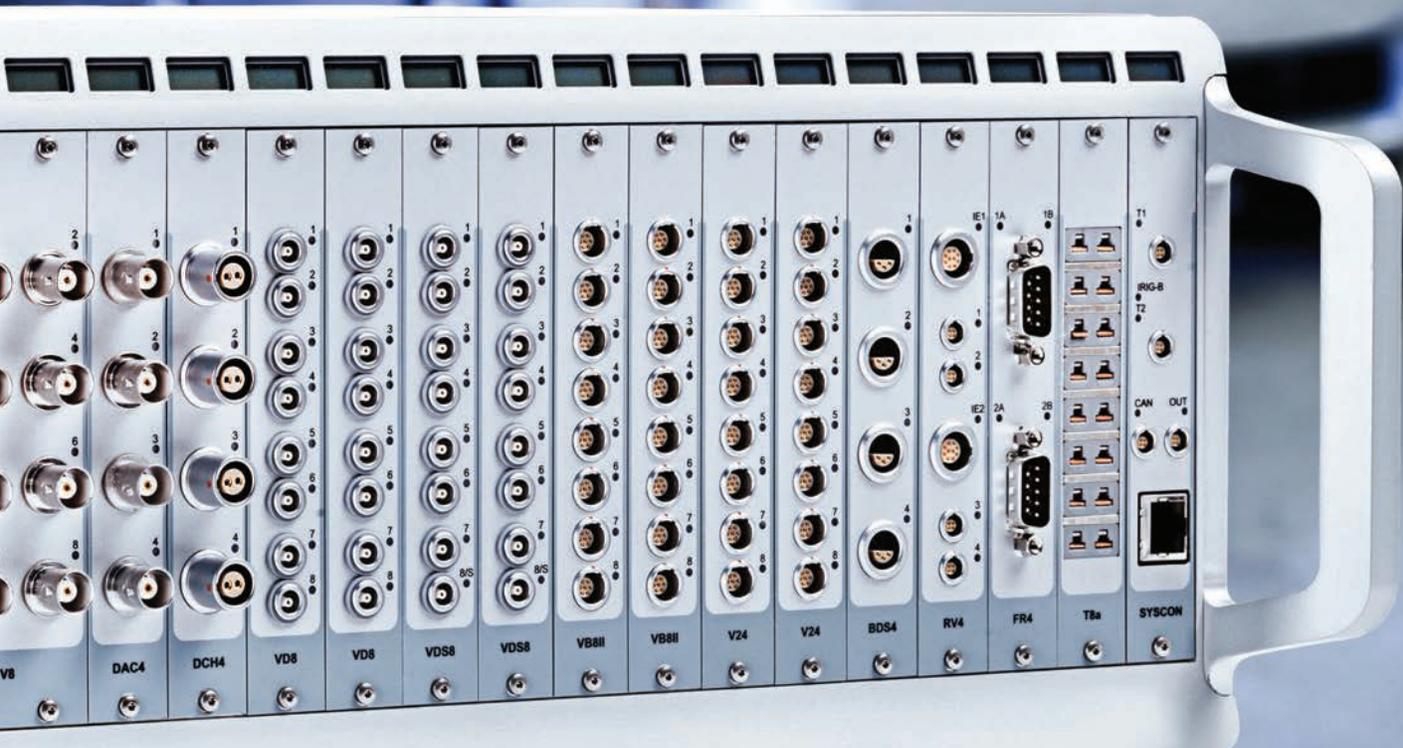
**Lab mobility** offers increased flexibility by the possibility to connect any Simcenter SCADAS Lab to any Simcenter SCADAS Mobile or Simcenter SCADAS Recorder without having to create or re-instrument a test setup. The option to mix and match Simcenter SCADAS frames makes your investment expandable and increases productivity by offering extra channels and signal-conditioning capabilities.

**Dedicated system controller modules** allow you to expeditiously transmit data and offer many variants for optimal flexibility and effective acquisition. These modules include features such as Ethernet connectivity, tachometer and inter-range instrumentation group (IRIG-B) time codes, signal generation outputs, controller area network (CAN bus) inputs and a stop input.

**Variants with a real-time bus** allow you to integrate your Simcenter SCADAS frames into a broader Ethernet control automation technology (EtherCAT) network. This high-performing, bi-directional network type is typically used in real-time control applications, such as industrial digital networks or closed-loop test benches.



# Simcenter SCADAS Lab for high-performance laboratory data acquisition



- A 19-inch rack-mountable frame with an alternating current (AC) power supply
- Scalability from eight to more than 1,000 channels
- Premium data acquisition with constant high throughput and channel density of up to 480 input channels in one frame
- The ability to measure an enormous number of channels
- A powerful system that takes limited space in the lab

### An extensible solution for demanding lab testing

You can easily connect additional slave frames to Simcenter SCADAS Lab by using optical fiber cables. This type of modularity is convenient for noise and vibration laboratories and lets you configure a multi-frame system for more than 1,000 channels. You can assemble individual master frames into master-slave configurations and run it as one unit using a single master station. Simcenter

SCADAS Lab offers you channel-count-independent signal conditioning and exceptional throughput performance, which makes the solution an excellent choice for applications such as high-channel-count modal testing, aircraft ground vibration testing, acoustic high-speed throughput or turbine testing.

Additionally, with lab mobility you can directly connect the system to Simcenter SCADAS Mobile or Simcenter SCADAS Recorder for additional measurements without creating a new test setup.

### Securely test costly items

You can extend any Simcenter SCADAS Lab system to become a frontend for vibration-control applications with a hardware emergency stop. This includes a 24-bit effective digital-to-analog convertor (DAC) output with tapered startup and shutdown. It has a status output for advanced synchronization purposes, and lets you control safety using the hardware emergency stop and a power watchdog feature.

## Specifications

- Up to 204.8 kilohertz (kHz) sampling rate per channel and throughput up to 19 mega samples per second (MSamples/s)
- 24-bit delta-sigma analog-to-digital (ADC) technology
- 150-decibel (dB) dynamic range
- Various signal-conditioning modules and a choice of commercially-available connectors, such as Bayonet Neill-Concelman (BNC), CAMAC LEMO® and Sub-D for patch panel configuration
- Can include onboard CAN bus, dual tachometer and signal generator support
- 1.25-gigabit (Gbit) hotlink fiberoptic, master-slave connection with long optical cables for distributed system configurations
- Quality components with extended temperature range for optimized reliability

# Simcenter SCADAS Mobile for powerful and flexible mobile and lab testing



- A variety of frontends for versatile signal conditioning and data acquisition capabilities in a small-sized and portable frame
- The ability to accommodate from eight to 216 channels in a single frame
- Takes only a small space in, or on, a test object
- An optimal system for field and mobile measurements
- Significant testing productivity with compact systems
- Quiet operation, including fanless cooling, which is ideal for acoustic measurements

#### A complete portfolio for all field and lab testing requirements

Simcenter SCADAS Mobile hardware includes various systems to satisfy all your mobile testing needs, from ultralight yet robust systems of 2.5 kilograms (kg) that have a nominal 2.5-hour battery autonomy, to laptop-sized systems that can host from eight to 216 channels in a single frame.

#### Build a large test setup in the field

By using Simcenter SCADAS Mobile you can build a large field test setup with slave frames to expand mobile measurements to include hundreds of input channels. All systems can work in a true master-slave configuration with fully synchronized data saved in one measurement file. The distributed acquisition happens through optical cabling, and you can easily daisy chain several frames into a single measurement platform.

#### Component certification testing

In addition, you can extend any Simcenter SCADAS Mobile system to become a frontend for vibration-control applications or for certification testing of individual components under operational loads.

## Specifications

- Up to 204.8 kHz sampling rate per channel and throughput up to 14 MSamples/s
- 24-bit delta-sigma ADC technology
- 150-dB dynamic range
- Can include onboard CAN bus, dual tachometer and signal generator support
- Master-slave configurations for distributed systems and channel expansion
- High-speed Ethernet host interface
- Military-standard (MIL-STD)-810F qualified for shock and vibration
- Rugged design and low power consumption

# Simcenter SCADAS Recorder for autonomous and smart data recording



- Features a versatile data acquisition system that can work autonomously as a blind recorder, tablet-operated recorder or a frontend system for a laptop or PC
- Accommodates eight to 216 channels in a single frame
- Allows on-the-spot validation to prevent errors and annoying reruns
- Supports measurements while operating the test object

#### Increase recorded data quality by combining acquisition with instant analysis

With a wireless connected tablet you can instantly validate data while measuring it, which allows you to increase the quality of the recorded data by combining acquisition with immediate analysis. With this state-of-the-art remote control system, you can visualize and monitor data in real time and adjust settings in the field.

You can operate the Simcenter SCADAS Recorder in frontend mode, controlled from a PC or laptop, and parallel-stream the data to the PC and/or to a flash memory mass storage device through an embedded local area network (LAN) interface. This process allows you to visualize the data in real time as it is processed and saved.

#### Invest on a scale that fits your testing requirements

Simcenter SCADAS Recorder systems come in a variety of versions, from smaller-sized systems that host from four to 24 channels, to larger systems that can include 216 channels in a single frame. Additionally, you can combine various systems in a master-slave configuration. The large variety and modularity of the system enables you to make a scalable investment that fits your needs.

## Specifications

- Up to 204.8 kHz sampling rate per channel and throughput up to 14 MSamples/s
- 24-bit delta-sigma ADC technology
- 150-dB dynamic range
- Includes onboard CAN bus, dual tachometer and signal generator support
- Master-slave configurations for distributed systems and channel expansion
- High-speed Ethernet host interface
- MIL-STD-810F qualified for shock and vibration
- Rugged design and low power consumption
- Easy-to-use recorder software for acquisition, measurement setup, instant data validation and data export

# Simcenter SCADAS XS for maximal testing freedom with a handheld solution



- Combine broad noise and vibration testing functionality with the autonomy and freedom that comes with a handheld solution
- Test products in real-life circumstances
- Support expert and nonexpert users
- Instantly set up, monitor and validate
- Use as a standalone with a tablet or PC

### Instantly test and troubleshoot your product

Simcenter SCADAS XS helps you perform fast and reliable measurements and comes with a tablet for instant investigation, diagnostics and troubleshooting. With its compact design, Simcenter SCADAS XS comfortably fits in your hand. It features reliable onboard data storage and a full working day of battery autonomy, offering the flexibility you need to improve testing efficiency.

### Replay the entire recorded soundscape

Simcenter SCADAS XS can be combined with an optional Simcenter SCADAS 3D BHS for cost-effective binaural recording and immediate, high-quality data replay of any analog, Sony/Philips Digital interface format (S/PDIF) or headset channel. This integrated replay capability provides an easy and effective way to validate acoustic quality.

### Extending Simcenter SCADAS XS systems

You can combine various Simcenter SCADAS XS systems in a distributed test setup that considers the different systems as individual frontends. The combined system synchronizes time signals while streaming to a single measurement file following the precision time protocol (PTP) based on the Institute of Electrical and Electronics Engineers (IEEE) 1588 standard. This configuration allows you to set up star topologies with a 50-meter cable length using a standard Ethernet connection.

## Specifications

- Up to six hours of battery autonomy in typical use
- Replay in full standalone mode with a tablet or PC
- 12-plus input channels, including:
  - 12 analog
  - One optional Simcenter SCADAS 3D binaural headset (BHS)
  - One BHS digital input (including equalization)
  - Global Positioning System (GPS)
  - Digital controller area network (CAN)
  - Two analog tachometer inputs
- License-free functionality to export time data and make it accessible in various software formats

# Simcenter SCADAS RS for rugged data acquisition



- Protects from dust, water, vibration and shock and guarantees reliable operation
- Accurate multi-physics measurements with a wide range of precise signal conditioning
- On-the spot decisions and reduction of raw data with smart on-board processing
- Centralized, distributed or combined topologies to optimally match the test
- On-board app for secure access from anywhere and simplifying data collection

#### Rugged design with superior performance

Simcenter SCADAS RS combines ruggedness and performance for harsh environments. It precisely conditions and synchronizes a wide range of multi-physics sensors. Smart on-board processing avoids capturing wrong data and enables on-the-spot data validation.

#### Extreme flexibility

To optimally match the device under test Simcenter SCADAS RS supports centralized, distributed or combined topologies. Cut on cabling costs and complexity by distributing your measurements closer to your sensors. Quickly insert extra conditioning units to scale from 12 up to 1000+ synchronized channels. Reduce installation and configuration time through parallel instrumentation of subparts.

#### Unparalleled connectivity

Every unit includes an embedded application for secure access from anywhere, on your mobile, tablet or desktop. With just a few clicks you quickly and easily configure, measure, visualize, analyze and download measurements – data collection as simple as it can get!

## Specifications

- Ingress protection rating (IP66/67) certified enclosure
- Operating temperature range from -40 Celsius (°C) / -40 Fahrenheit (°F) to +65 °C / 149 °F
- MIL-STD-810F shock (100g) and vibration (10g rms) resistance
- 12 up to 1000+ synchronized channels
- Centralized or distributed system configuration with easy mounting and daisy-chain connection
- License-free embedded app for remote access, system configuration and data collection
- Scalable and high-performance on-board processor architecture for on-line processing and instant data validation
- Accessible from any device (PC, tablet or smartphone)
- Power as needed: easily expand power by adding extra units
- Seamlessly connects to Simcenter Testlab software for further analytics and modeling

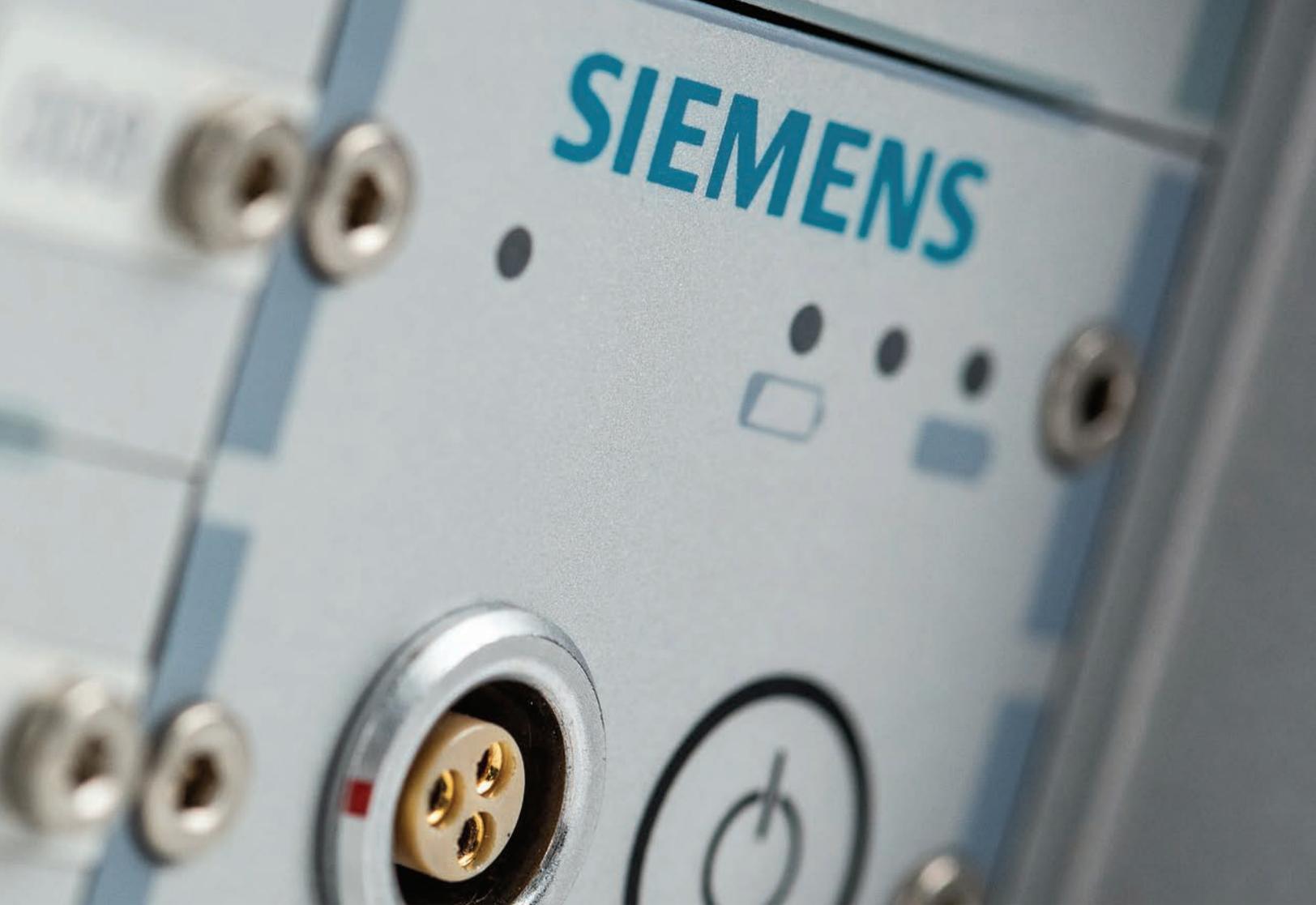


## Investing in reliable hardware

Siemens Digital Industries Software ensures that your Simcenter SCADAS system investment 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 services organization to carry out preventive maintenance. This process reduces the downtime for calibration or repair, and ensures reliable operation and stability during mission-critical applications.

### **Protect your investment**

We provide the service you need to get the most out of Simcenter SCADAS. Annual hardware calibration provides update and adjustment services with an as-found and as-left report, fully compliant with the ISO9001-2015 standard. The hardware maintenance services include the same service and reports, and are complemented with a warranty extension. In the unlikely event that hardware fails, you can 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.



### Simcenter SCADAS benefits

- ISO and MIL-certified components
- Optimal performance over multiple years
- Reduced system downtime
- Systems that withstand vibrations, shocks, water and dust
- A strong services organization that provides preventive maintenance
- Worldwide technical support and services

# Supporting a wide range of engineering applications

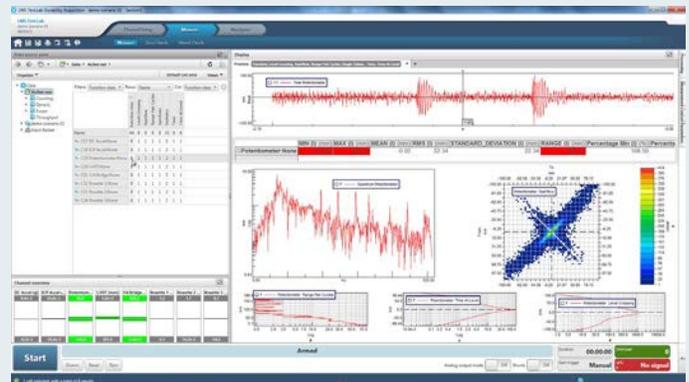
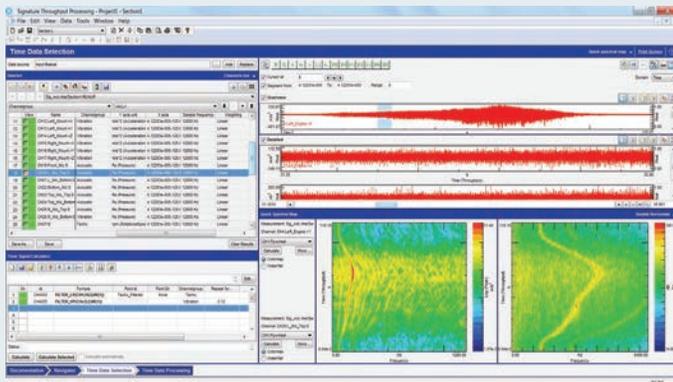
By integrating Simcenter SCADAS with dedicated data analysis software, such as Simcenter Testlab, you can fine-tune your product and collect useful information for colleagues in design and simulation for myriad engineering applications, including:

## Structural testing

- Impact, multiple-input and multiple-output (MIMO) frequency response function (FRF), MIMO sine sweep, stepped sine and MIMO normal modes testing
- Modal analysis
- Operational deflection shape and time animation
- Operational and order-based modal analysis
- Ground vibration testing

## Acoustic testing

- Sound intensity and sound power testing
- Sound quality testing
- Material and component testing
- Array-based holography and focalization
- Interior sound source localization
- In-room and exterior pass-by noise testing





#### Transfer path analysis

- Single reference transfer path analysis (TPA)
- Multi-reference TPA
- Time-domain TPA
- Operational path analysis

#### Rotating machinery testing

- Signature testing
- Time data acquisition and processing
- Order tracking, torsional vibration analysis and angle domain processing
- Powertrain testing

#### Durability testing

- Road load data acquisition and processing
- Multi-physics testing
- Engine durability

#### Vibration control and environmental testing

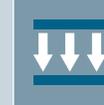
- Closed-loop random vibration and sine testing
- Combined mode testing (sine on random, random on random)
- Sine notching and random response limiting
- Single axis waveform replication
- Shock response spectrum limiting
- High-channel-count data reduction testing
- Qualification and acceptance testing

#### High-speed throughput testing

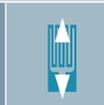
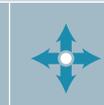
- Turbine testing
- Jet-engine testing
- High-channel-count industrial test benches

# Multi-physics compatibility matrix

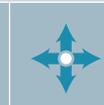
## Structural testing

Sensors											
Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current	
Sensors											
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS	
Modules	V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8			
	VB8	T8	TCK8	RV4	VBDS4	DCH4					
	VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16			

## Acoustic testing

Sensors											
Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current	
Sensors											
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS	
Modules	V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8			
	VB8	T8	TCK8	RV4	VBDS4	DCH4					
	VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16			

## Rotating machinery testing

Sensors											
Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current	
Sensors											
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS	
Modules	V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8			
	VB8	T8	TCK8	RV4	VBDS4	DCH4					
	VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16			

Typical    Optional    Unavailable

## Durability testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current	
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS	
<b>Units</b>				REC	U12	B24	S24	UPS			
<b>Modules</b>				V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
				VB8	T8	TCK8	RV4	VBDS4	DCH4		
				VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16

## Vibration control and environmental testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current	
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS	
<b>Modules</b>				V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
				VB8	T8	TCK8	RV4	VBDS4	DCH4		
				VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16

## High-speed throughput testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current	
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS	
<b>Modules</b>				V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
				VB8	T8	TCK8	RV4	VBDS4	DCH4		
				VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16

Typical    Optional    Unavailable

# Power and precision for structural testing



## Combine Simcenter SCADAS with Simcenter Testlab Structures

Characterizing the dynamics of a structure used to be a long and complex process involving extensive trial-and-error and time-consuming test setups. This is no longer the case. When combining the Simcenter SCADAS systems with Simcenter Testlab Structures, it becomes easier to perform large-scale modal surveys in hours rather than days.

You can focus on identifying root causes of vibration problems and applying powerful analysis tools to explore the best solution for practically every structural weakness. Our modal testing experience, from impact testing of small structures to large-scale campaigns using hundreds of measurement channels, helps you maximize testing efficiency.

Simcenter SCADAS systems deliver quality data and accurate phase matching between accelerometer sensors, which are required for large frequency-range modal analysis. You can gather structural data that results from forced excitation using various input signal types, such as white noise, sweeps and pseudo random; or from operational loads or an impact hammer. By using Simcenter SCADAS, you can efficiently handle several hundred channels by combining a master frame with slave frames.

## Structural testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS

### Modules

V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
VB8	T8	TCK8	RV4	VBDS4	DCH4		
VCF4	CIM2	WFI2	CN4	FR4	ESO64	DAC4	AO16

# Versatile acoustic and sound quality testing



### Combine Simcenter SCADAS with Simcenter Testlab Acoustics

From the signal conditioning of microphones and interfacing with digital heads to the acquisition of sound power levels, real-time octaves and the latest high-tech tools for sound quality engineering, Simcenter Testlab Acoustics helps you conform to the latest international standards and engineering practices.

By directly addressing a wide variety of test-based acoustic engineering challenges that you face on a daily basis, combining Simcenter SCADAS with Simcenter Testlab Acoustics offers a complete and unique solution for acoustics testing and analysis in specific domains, such as straightforward acoustic analysis, material and component testing, sound power and pass-by noise testing, sound source localization, vibro-acoustic engineering and sound-quality and brand-sound engineering.

You can use Simcenter SCADAS systems for acoustic testing campaigns of any scale that include microphones, intensity probes, large acoustic arrays, binaural headsets and digital binaural heads combined with other sensors such as tachometers and accelerometers. Simcenter SCADAS systems can help you generate specific signals such as pink noise, white noise and sine; replay signals and apply filtering.

## Acoustic testing

Sensors											
	Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
	Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS
Modules	V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8			
	VB8	T8	TCK8	RV4	VBDS4	DCH4					
	VCF4	CIM2	WFI2	CN4	FR4	ESO64	DAC4	AO16			

# Understanding the root cause of noise and vibration problems



## Combine Simcenter SCADAS with Simcenter Testlab Transfer Path Analysis

Simcenter Testlab Transfer Path Analysis provides you with a systematic approach to test-based engineering processes and focuses engineering efforts on the components that matter the most. As a method to fully understand vibro-acoustic behavior, the solution assists you in troubleshooting vibro-acoustic issues and setting performance targets for each critical component. Simcenter Testlab Transfer Path Analysis is a highly efficient solution to help you identify noise problems and their origins.

Simcenter SCADAS systems allow you to deliver high-quality data and accurate phase matching between accelerometer sensors as well as microphones and structural and airborne input sources, which are required for transfer path analysis in a large frequency range. This helps you to correctly identify operational loads and both structural and vibro-acoustic transfer functions.

Using Simcenter Testlab Transfer Path Analysis enhances productivity and is easy to use. It supports fast and efficient data processing and results interpretation. The clear graphical displays facilitate the understanding of path contribution. You can interactively modify loads and/or transfer paths and visually evaluate modifications in real-time, comparing multiple scenarios.

## Transfer path analysis

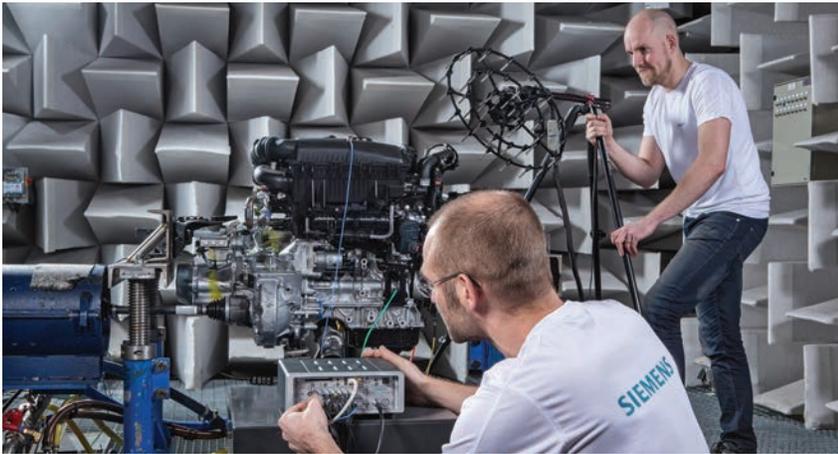
### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS

### Modules

V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
VB8	T8	TCK8	RV4	VBDS4	DCH4		
VCF4	CIM2	WFI2	CN4	FR4	ESO64	DAC4	AO16

# Collecting data for rotating equipment



identify structural resonances. Simcenter SCADAS hardware also allows you to combine torsional vibrations with acoustic measurements to evaluate operational behavior, investigate instabilities in the rotating equipment and identify accuracy and structural integrity problems.

### Combine Simcenter SCADAS with Simcenter Testlab Rotating Machinery

Simcenter Testlab Rotating Machinery provides you with a comprehensive suite of machinery vibration analysis solutions that help you develop quiet, efficient and reliable products. Targeted applications can help you master the complex process of machinery vibration analysis in systems such as engines, compressors, electrical motors, pumps and shafts.

Simcenter SCADAS hardware can help you collect specific data, such as tachometer signals, torsional vibrations, structural vibrations and combustion pressures. After the acquisition, you can identify orders, determine structural operational conditions by separating rotational and structural noise and vibrations, verify the critical speed and

Simcenter Testlab Rotating Machinery offers a comprehensive selection of tools, including waterfall mappings, order tracking, time-data acquisition and processing functions as well as specialized modules to help you analyze and visualize the vast amounts of data that are generated.

## Rotating machinery testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS

### Modules

V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
VB8	T8	TCK8	RV4	VBDS4	DCH4		
VCF4	CIM2	WFI2	CN4	FR4	ESO64	DAC4	AO16

# Reliable systems for durability engineering



reduce the required equipment when simultaneously testing with various sensor types. The Simcenter SCADAS systems are expandable to include hundreds of channels and can be manually operated or run fully autonomously. They are scalable and compact and easily fit in limited space while still handling a large number of channels.

**Combine Simcenter SCADAS with Simcenter Testlab Durability Acquisition**  
 Simcenter Testlab Durability is an integrated, end-to-end solution for load data acquisition. From a single software platform, you have complete control of the full load data acquisition process. The application combines universal, multichannel data acquisition with a full suite of channel setup, measurement, validation, consolidation, reporting and data sharing tools.

Simcenter SCADAS includes hardware versions that withstand harsh environmental conditions such as dust, water, extreme temperatures, shocks and vibrations. By applying universal signal conditioning, these dedicated systems can help you dramatically

## Durability testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS

### Units Modules

REC	U12	B24	S24	UPS				
V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8	
VB8	T8	TCK8	RV4	VBDS4	DCH4			
VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16	

# Secure dynamic vibration control and environmental testing

Image courtesy of ESA.



## Combine Simcenter SCADAS with Simcenter Testlab Vibration Control and Simcenter Testlab Environmental

Simcenter SCADAS combined with Simcenter Testlab Vibration Control provides a complete four to eight channel solution for closed-loop vibration control testing. The vibration control system helps you easily certify and homologate products, ensuring products can operate under external excitation and vibration conditions. Conditions can range from normal to very extreme and include rough transportation circumstances.

Simcenter SCADAS combined with Simcenter Testlab Environmental delivers a complete solution for qualification and acceptance testing on large and sensitive structures including spacecraft, satellites and system prototypes. It is designed for parallel acquisition and online reduction of vibration channels during random or sine closed-loop vibration control testing, in reverberant rooms and for high frequency transient capture in deployment testing. The environmental testing solution also helps you test and validate the robustness of spacecraft design to guarantee load launch survivability by accurately reproducing launch acoustic environment levels in a large reverberation room.

Simcenter SCADAS hardware helps you safely test components as well as delicate systems with reliable closed-loop control of single or multiple axes shakers using built-in self-check features, and both a safe shutdown mechanism and connectivity for a manual hardware emergency shutdown. Dynamic environmental testing can require a large number of channels, possibly spread over various measurement systems. The control equipment is separated from this, but accurately time-synchronized. The solution can also be tuned into other vibration control testing applications such as component lifecycle testing.

## Vibration control and environmental testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS

### Modules

V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
VB8	T8	TCK8	RV4	VBDS4	DCH4		
VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16

# High speed throughput testing and turbine testing

Image courtesy of Airbus Defense and Space.



recording and monitoring of all channels is crucial, leading to an enormous and continuous data stream. Simcenter SCADAS can help you conduct gapless recordings of a large number of channels at high sampling rates, resulting in terabytes of data per day during lengthy campaigns. The robust hardware has integrated signal conditioning for various sensor types, including dynamic strain, tachometer signals, acceleration and temperature.

### Combine Simcenter SCADAS with Simcenter Testlab Turbine Testing

Simcenter SCADAS combined with Simcenter Testlab Turbine Testing provides you with an all-digital solution for complex turbine testing. Turbines and compressors in jet engines or power plants are subjected to stringent performance verification testing. This testing is compulsory for certification and is expensive and extremely demanding. Tests need to be performed properly the first time, measurement data has to be safe and usable and personnel and test object safety must be assured.

Simcenter SCADAS supports the high-speed throughput testing capabilities that are required to analyze the reliability and behavior of turbine engines. When measuring the full engine or larger subassemblies, the cabling becomes complex and all instrumentation typically has to withstand extreme conditions. Yet uninterrupted simultaneous

## High-speed throughput testing

### Sensors

Accelerometer	Microphone	Strain	Displacement	Force	Torque	Flow	Pressure	Temperature	Voltage	Current
Tacho Rotational speed	Analog output	DAC	Digital bus	S/PDIF	Velocity	Camera	Wheel force	Binaural Headset	Artificial Head	GPS

### Modules

V8	VS8	VD8	V24	VC8	VC8-QS	VM8	DB8
VB8	T8	TCK8	RV4	VBDS4	DCH4		
VCF4	CIM2	WF12	CN4	FR4	ESO64	DAC4	AO16





SIEMENS

POWER

BAT1

DATA

REMOTE ON/OFF

BAT2

PWR-OUT DATA SCADAS RS UPS

SIEMENS

CAN3/4

USB2

USB2

Wi-Fi

PWR-IN

PWR-OUT CHAIN3

PWR-OUT CHAIN4

SCADAS RS REC

# Simcenter SCADAS modules



## Sixteen-channel analog output module (Simcenter SCADAS Mobile or Simcenter SCADAS Recorder only)

AO16 is an output module that provides conditioned, calibrated and normalized analog copies of any input signal you capture with the Simcenter SCADAS Mobile frontend.



## Eight-channel universal durability input module

Supports signal conditioning for voltage, ICP, DC-bridge, AC-bridge, AC-LVDT, active sensors, transmitters and potentiometers.



## Dual video camera input module (Simcenter SCADAS Recorder only)

CIM2 enables the acquisition of synchronized video signals on Simcenter SCADAS Recorder frames. The cameras, included with the module, are connected through a local area network (LAN) interface for power and image transfer.



## Four-channel differential charge input module

DCH4 supports signal conditioning and processing to measure signals from differential and single-ended piezoelectric sensors.



## Quad CAN bus interface module

CN4 allows synchronous acquisition of up to four CAN buses in parallel with the dynamic signals measured from the Simcenter SCADAS input channels.



## Sixty-four-channel EtherCAT output module

ESO64 connects your Simcenter SCADAS frame to the EtherCAT digital bus. You can select up to 64 input channels to stream in real time to the EtherCAT network (requiring the corresponding input module to be real-time compatible).



## Four-channel general purpose signal output module

DAC4 runs at a maximum sample rate of 204.8 kHz with useful bandwidth of up to 40 kHz for the generation of sine, sweep, random or user-defined signals.



## Four-channel input module for rotational vibration

RV4 is a signal conditioner for low-speed and high-speed tachometer signals from analog, digital and/or incremental encoder sources. It accurately conditions, acquires and processes tachometer signals to produce time data, angle data or rotational speed data.



**Eight-channel thermocouple module**  
 T8 has eight isolated input channels to acquire dynamic temperature signals with on-board linearization for B, E, J, K, N, R, S and T thermocouples.



**Eight-channel universal NVH input module**  
 VB8-III supports signal conditioning for voltage, ICP, DC-bridge, AC-bridge, AC-LVDT, active sensors, transmitters and potentiometers.



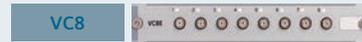
**Eight-channel IP67-certified temperature device**  
 TCK8 extends the capabilities of Simcenter SCADAS Mobile so you can acquire a high number of K-type thermocouple signals. In combination with the CN4 module, up to four TCK8 devices can be connected to Simcenter SCADAS frames to support up to 32 thermocouple channels per CN4 module.



**Four-channel bridge and dynamic strain module**  
 VBDS4 is a bridge, piezoelectric ICP® sensor and dynamic strain amplifier. In bridge mode, it supports full-bridge, half-bridge and quarter-bridge configurations, including bridge completion resistors and shunt calibration under full software control. Its monitoring outputs provide conditioned output signals per input channel.



**Twenty-four-channel voltage/ICP input module**  
 V24/V24M is used to support voltage inputs and piezoelectric ICP sensors or sensors requiring an externally supplied voltage. Each input supports data acquisition in X, Y and Z directions using tri-axial accelerometers.



**Eight-channel input module for voltage, ICP and charge module**  
 VC8 supports signal conditioning and processing for voltage inputs and piezoelectric ICP sensors.



**Four-/eight-channel voltage/ICP input module**  
 V4/V8 support voltage inputs and piezoelectric ICP sensors for four or eight channels. In addition, the VS8 modules provide the same specification as V8, but with additional support for S/PDIF digital audio sources.



**Eight-channel input module for voltage, ICP and charge module for Quasi-static measurements**  
 VC8 supports signal conditioning and processing for voltage inputs and piezoelectric ICP sensors.



**Eight-channel input module for voltage, ICP and charge module with extended range**

VC8 supports signal conditioning and processing for voltage inputs and piezoelectric ICP sensors.



**Four-channel input module for floating ICP and charge module (Simcenter SCADAS Lab only)**

VCF4 supports signal conditioning for piezoelectric ICP and charge sensors. Each VCF4 channel offers the unique combination of floating input and an analog monitoring output.



**Eight-channel voltage, ICP differential input and output module with monitoring output**

VD8/VD8MO have differential and single-ended inputs supporting voltage inputs and piezoelectric ICP sensors for eight channels. The VD8MO offers monitoring output in addition to the functionality of the VD8.

VM8



#### Eight-channel microphone input module

VM8 supports voltage input, piezoelectric ICP sensors and polarized or prepolarized microphones.

WF12



#### Wheel force interface module (Simcenter SCADAS Mobile or Simcenter SCADAS Recorder only)

WF12 is a dual-channel digital interface module used to interface with the KISTLER RoadDyn® 2000 wheel force transducer system. By means of an unshielded twisted pair (UTP) connection, a synchronous acquisition of all relevant wheel-force signals is supported: forces and moments in three directions, angle and angular speed, temperature and power.







# Simcenter SCADAS RS units

## REC



The SCRS-REC collects data from 4 daisy chains of conditioning units, connects to networks (wired or wireless) and synchronizes with other REC units. In addition, it supports up to 4 CAN Busses, 3 Digital Encoders and a GNSS antenna connector.

## U12



The SCRS-U12 combines 12 channels of universal signal conditioning in a single unit and supports piezo-electric ICP<sup>®</sup> sensors, voltage inputs up to 60V, sensors with external supply, full, half and quarter bridges using sense lines (selectable), piezo-resistive sensors, potentiometers, inductive sensors (LVDT, RVDT), RTD sensors, 4-20mA sensors (over shunt), analog tachometer (variable reluctance up to 400Vpp).

## UPS



The SCRS-UPS provides stable buffer power to daisy chains of SCADAS RS units from a 9-54 VDC input supply or 2 hot-swappable batteries and can be activated from button switch or from remote on/off voltage.

## B24



The SCRS-B24 combines 24 channels of bridge signal conditioning in a single unit and supports voltage inputs up to 10V, sensors with external supply, full, half and quarter bridges, piezo-resistive sensors, potentiometers, inductive sensors (LVDT, RVDT), RTD sensors, and 4-20mA sensors (over shunt).

## S24



The SCRS-S24 combines 24 channels of sensor signal conditioning in a single unit and supports piezo-electric ICP<sup>®</sup> sensors, voltage inputs up to 60V, sensors with external supply and 4-20mA sensors (over shunt).

### 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](https://www.siemens.com/software) or follow us on [LinkedIn](#), [Twitter](#), [Facebook](#) and [Instagram](#). Siemens Digital Industries Software – Where today meets tomorrow.

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