TSEP THEMIS

MODULARE HARDWARE, SOFTWARE AND SERVICES FOR CUSTOMIZED T&M SOLUTIONS.

TSEP

Innovation
made
measurable.

REQUIREMENT-SPECIFIC AND MADE IN GERMANY FROM A TO Z

From definition to concept, from planning to implementation,
from commissioning to support - everything from a single source.

Successful family business on the market for over 30 years (f. l.):
David Courtney, Peter Plazotta, Marion Plazotta and Dr. Simon Plazotta

TSEP STANDS FOR QUALITY MADE IN GERMANY. FOR OVER 30 YEARS WE HAVE BEEN DEVELOPING AND REALISING EXCELLENT, CUSTOMER-INDIVIDUAL T&M SYSTEMS. OUR CONTINUOUSLY GROWING TSEP TEAM OF OVER 40 EXPERIENCED DEVELOPMENT ENGINEERS STANDS FOR REQUIREMENT-SPECIFIC AND AFFORDABLE T&M SOLUTIONS.

Optimized solutions for your T&M requirements

The accelerated development of innovative technologies, an increasing number of new standards, test specifications and increasingly complex processes are placing ever greater demands on test and measurement systems. Cost-intensive standard systems and components often prove to be too inflexible and reach their limits.

For this reason, we have developed the THEMIS concept based on established measurement technology standards and proven measurement framework modules, comprising both hardware and software, supplemented with requirement-specific TSEP development services and needs-specific integration.

Take the freedom to implement sophisticated test and measurement systems individually and expand them at any time: quickly, flexibly and cost-effectively.

TSEP THEMIS is made for all companies that want to develop, test and optimize even more agilely and efficiently, optimize and measure in an uncomplicated way. For test experts, developers, engineers, product owners and researchers.

In short, for anyone who knows that innovations and successful products need effective and precise measurements to test and verify specifications, function and quality.

Our customers want to master their test and measurement tasks quickly, efficiently and reliably without having to develop their own resource-intensive solutions. Accordingly, we do not offer catalog products, but implement ready-to-use, plug&play T&M solutions (e.g. measurement and functional test stations) based on THEMIS, tailored to your requirements.

Made in Germany

TSEP

Innovation made measurable.

REQUIREMENT-SPECIFIC SOLUTIONS FOR YOUR TESTING AND MEASURING TASKS
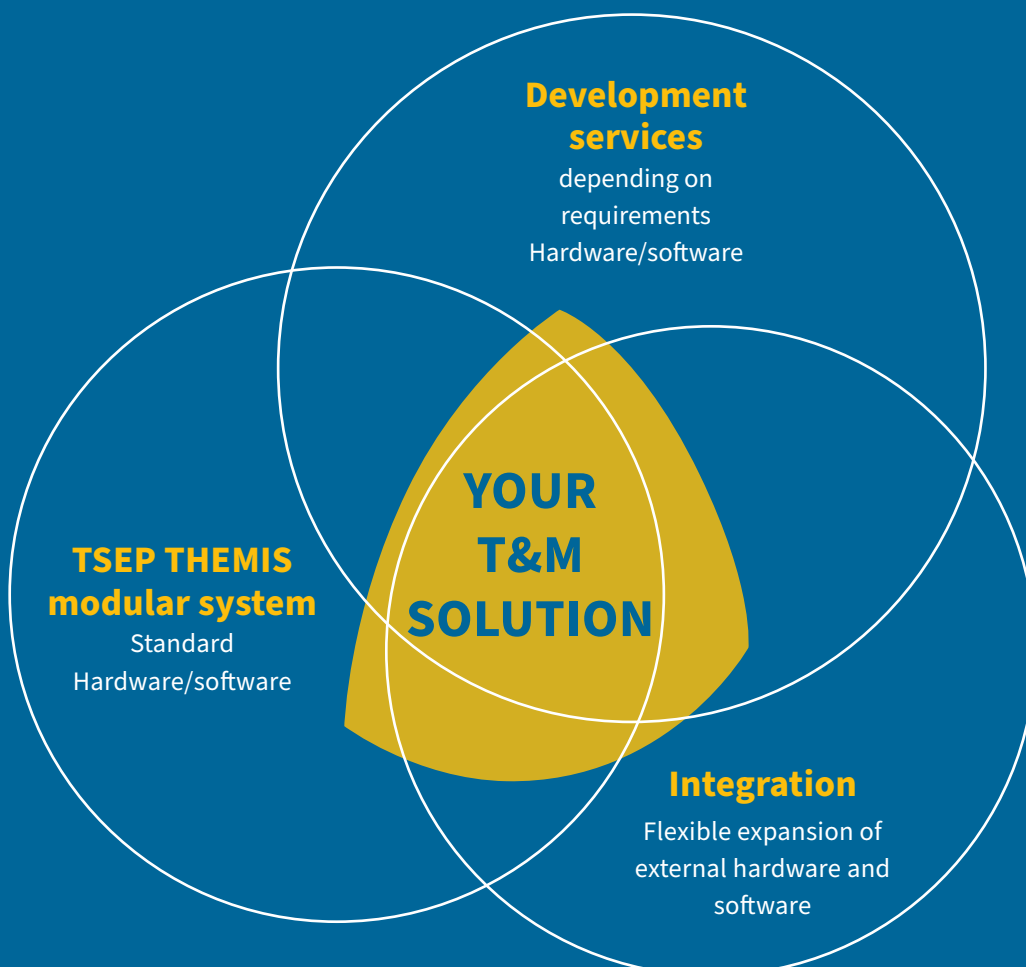
How does that work?
With open architecture, sophisticated modularity and customized development services.

With a system that supports a wide range of standards, masters both static and dynamic measurement tasks and is extremely user-friendly. With maximum flexibility in hardware and software that can also meet future challenges.

And especially with a highly efficient development team that complements and integrates proven hardware and software modules according to your T&M requirements.

Customized cooperation
We accompany you from the idea to the conception and implementation through to the successful deployment of your requirements-specific T&M solution. In doing so, we attach great importance to keeping your overall T&M system open and flexible for future challenges.

Development services
depending on
requirements
Hardware/software

TSEP THEMIS modular system
Standard
Hardware/software

YOUR T&M SOLUTION

Integration
Flexible expansion of external hardware and software

As an expert, you know exactly WHAT your test and measurement tasks look like and WHAT you need for them. We realize the ideal "HOW" for you.

The milestones to your customized test and measurement system

- Our T&M experts work closely with you to record your requirements and document them in the desired requirements management system (e.g. requirements and functional specifications).
- We create a reliable concept for you for detailed planning and cost-efficient realisation of your requirements.
- We implement the concept for you on the basis of tried-and-tested components. We also develop customised hardware and software - depending on your requirements.

- We accompany the final set-up of your test and measurement solution through to successful commissioning.
- The TSEP team will remain at your side afterwards - with competent support and the needs-based expansion of your existing T&M system.

The result: integrated test and measuring systems from a single source

- Flexible, modular, based on standards
- Integrated and user-friendly
- Quick to use
- Cost-effective - functionally and cost-optimised
- Service and support from Germany

TSEP

Innovation made measurable.

THE COMBINATION OF TSEP STANDARD AND INDIVIDUAL HARDWARE AND SOFTWARE AS WELL AS STANDARD PXI/PXIE-COMPONENTS ALLOWS US TO REALISE INDIVIDUAL SYSTEMS QUICKLY AND COST-EFFECTIVELY.

ADVANTAGES OF THE MODULAR TSEP THEMIS CONCEPT

Decisive result quality through:

- Over 30 years of expertise in the development of T&M systems
- More than 40 development experts who are involved in all development sub-areas and are available for you
- Innovative and customised T&M solutions based on a modular principle with proven and tested measurement framework modules (TSEP THEMIS hardware & software) and PCB layout templates
- Application and requirement-specific test and measurement systems
  _ for automated test scenarios with low risk of error
  _ with precise and reliable measurement results
  _ with graphically processed analyses of measured values
  _ for static and dynamic measurement tasks
- User-friendly control via a single interface that contains all functionalities (e.g. SCPI/SCPI 488.2, IVI driver, LabView driver, REST-API etc.)
- Established measurement and communication standards ... and IEEE 1588, which guarantee maximum compatibility and flexibility
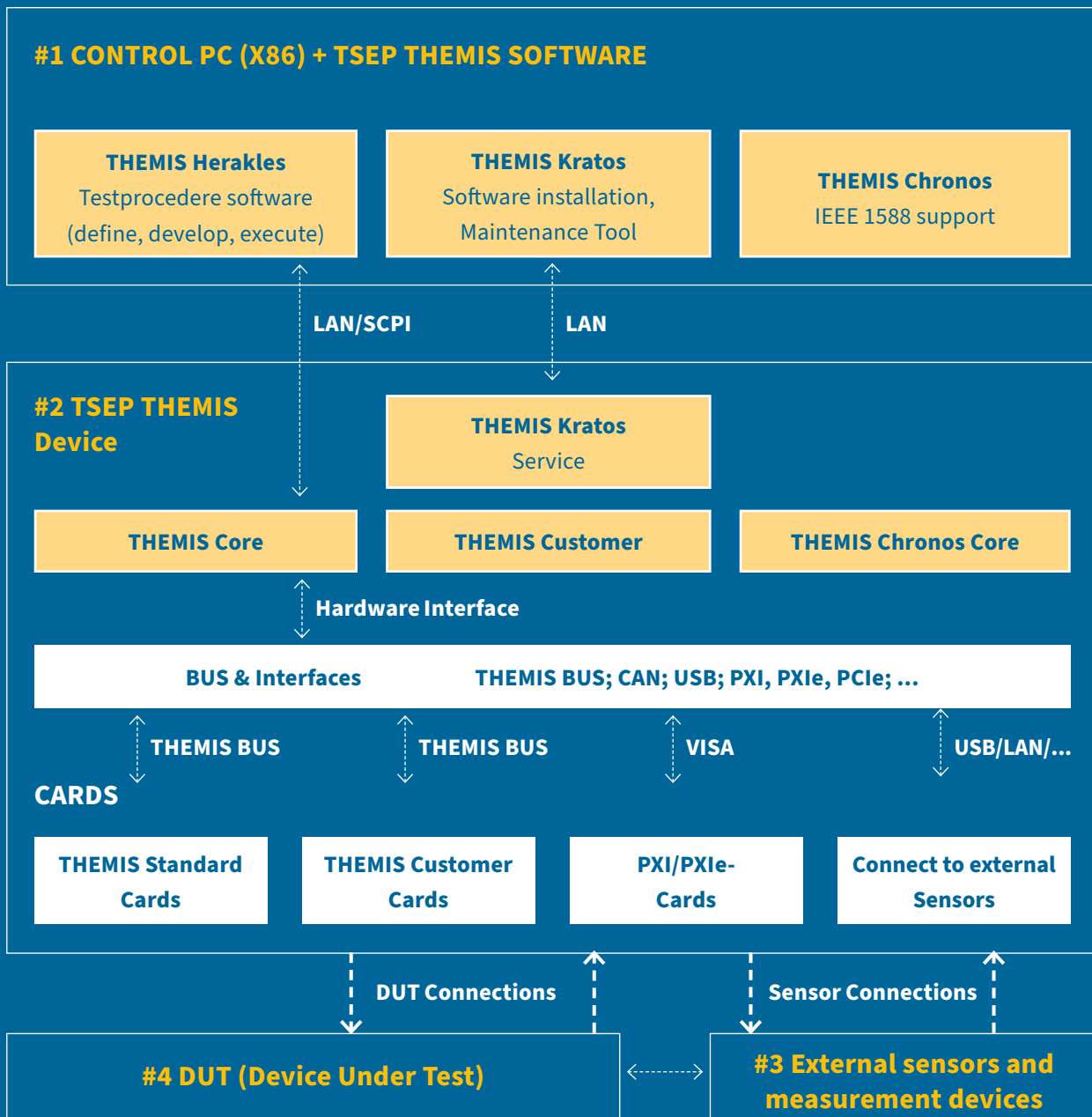- CE-certified devices for the highest safety and EMC standards - also available with LXI certification

Measurable time and cost efficiency:

- The combination of proven T&M hardware and software modules
  _ the development of customised hardware based on proven PCB templates
  _ the development of customised test plans and software based on proven measurement-framework modules
- Hybrid T&M solutions (as required)
- Fast commissioning - without integration effort
- Easy customisation, expansion and reconfiguration of the test environment in the event of changing requirements

Fast and flexible implementation of your test requirements - with the option of using standardised standardised PXI/PXIe systems if required.

TSEP THEMIS ARCHITECTURE AND KEY COMPONENTS

#1 CONTROL PC (X86) + TSEP THEMIS SOFTWARE

THEMIS Herakles	THEMIS Kratos	THEMIS Chronos
Testprocedere software (define, develop, execute)	Software installation, Maintenance Tool	IEEE 1588 support

LAN/SCPI   LAN

#2 TSEP THEMIS Device

THEMIS Kratos
Service

THEMIS Core	THEMIS Customer	THEMIS Chronos Core

Hardware Interface

BUS & Interfaces   **THEMIS BUS; CAN; USB; PXI, PXIe, PCIe; ...**

THEMIS BUS   THEMIS BUS   VISA   USB/LAN/...

CARDS

THEMIS Standard Cards	THEMIS Customer Cards	PXI/PXIe-Cards	Connect to external Sensors

DUT Connections   Sensor Connections

#4 DUT (Device Under Test)   **#3 External sensors and measurement devices**

Demand-specific scaling with open, modular architecture

#1 Control PC + TSEP THEMIS software
The Control PC controls the THEMIS device via a LAN connection (SCPI/IVI Driver). It is controlled either via the THEMIS Herakles software or via a customised software/application (e.g. LabView, NI Test Stand). This executes the test/measurement sequence and the measured values are recorded and processed.

TSEP THEMIS software components
- THEMIS Herakles - covers the entire test and measurement cycle = defines, creates and executes the test/measurement tasks (via script)
- THEMIS Kratos - Software installation and maintenance for the THEMIS device (updates, licences etc.)
- THEMIS Chronos (optional) - IEEE 1588 extension and its configuration and maintenance of the IEEE 1588 extension

#2 TSEP THEMIS Device = central measuring device
The measuring device consists of:
- Cases (rack, desktop, individual)
- Power unit
- CPU board with OS, driver and software
- Various BUS systems and interfaces
- TSEP plug-in modules/cards (see page 20/21)
- PXI/PXIe plug-in cards

TSEP THEMIS software components
- THEMIS Core - software for controlling the THEMIS hardware and providing the standardised interface to the Herakles or customer software
- THEMIS Customer - Software for controlling the THEMIS Customer hardware, the PXI/PXIe cards used and the external sensors and measuring devices
- THEMIS Chronos Core

TSEP THEMIS system components
- THEMIS is compatible with different operating systems and software environments.
- The complete T&M system is controlled via THEMIS and ensures interoperability of the modules.
- Hybrid T&M solutions are possible: by combining TSEP THEMIS components with standard PXI/PXIe components as well as hardware and software for special applications.
- In addition, T&M devices from other manufacturers can be integrated without having to completely rebuild the system. Together, these form your T&M system.
- Modern DUTs require complex test sequences that combine in which measurement and control technology are combined. THEMIS offers a wide range of control cards. For special requirements, we develop customised cards for you.
- Connection of the T&M system via network (Ethernet, WiFi, EtherCAT) or USB (e.g. SCPI, IVI, LXI).
- Thanks to the variety of BUS technologies such as PCI, PCIe, PXI/PXIe, THEMIS BUS and CAN BUS, THEMIS is a future-proof investment for your T&M system that can grow with your requirements.

#3 External sensors and measuring devices
External sensors as well as active and passive measuring devices are naturally part of the overall test/measurement system and are flexibly integrated via standardised and proprietary interfaces (such as LAN, GPIB, USB, CAN, etc.).

#4 DUT = device to be measured
The DUT (Device Under Test) is the customer-specific hardware that is to be measured using the test/measurement setup.

TSEP Innovation made measurable.

TSEP THEMIS SOFTWARE MODULE

Standard software

The TSEP THEMIS modular system offers a selection of standardised, hardware-related, time-critical software components that are available for various (real-time) operating systems such as Linux, Windows or RTOS and can be customised to your individual requirements.

Software modules

TSEP THEMIS Core

THEMIS Core is the central software on our THEMIS test/measurement devices that bundles device-specific functionalities and provides interfaces to the outside world. The module supports all THEMIS basic and PXI/PXIe plug-in cards and acts as a communication centre for the hardware by centrally routing and distributing device requests and sending responses back to the user.

TSEP THEMIS Kratos

With THEMIS Kratos, software applications on devices or THEMIS test/measurement systems are always kept up to date. Installation and maintenance are carried out locally or remotely, regardless of the operating system. THEMIS Kratos includes all the necessary packages and enables licence management as well as service and maintenance work. Service contract customers have access to the web customer portal.

TSEP THEMIS Herakles

THEMIS Herakles enables the audit-proof definition, processing and execution of test and measurement sequences, which can also be flexibly changed by the customer at any time. The module stores measured values either locally or in an external database - alternatively in the cloud with an IoT connection. It offers both real-time monitoring and flexible subsequent evaluation. In addition, the software offers useful features such as comprehensive status management for test plans and the abstraction of subcomponent control using virtual devices, which enables a clear evaluation of all test cases.

TSEP THEMIS Chronos

THEMIS Chronos extends the hardware with IEEE 1588 functionality for time-synchronised measurements. It is controlled via the "IVI Trigger and Sync API" and comprises software components and one FPGA per plug-in card. Measurement results can be provided with time stamps for offline analyses and for "digital twins". TSEP offers the IEEE 1588 multiplexer for non-compliant devices or sensors.

TSEP THEMIS Customer

THEMIS Customer is the control software for customised hardware, external devices and sensors. The module receives requests, distributes them to the corresponding devices and contains all customer-specific functionalities. This component can also contain parts of the control logic for the DUT and pre-process data.

Customised software

In addition to the TSEP THEMIS standard software, we develop customised software modules for your specific test and measurement tasks, including drivers, protocols, GUI and databases, both promptly and cost-optimised. Incidentally, this also applies to cus-tomised hardware developed for you - for more details, see page 16/17. Last but not least, we provide you with expert support on topics such as microcontroller programming, scripting, Phyton, REST API, SCPI, LXI, Digital Twin, etc.
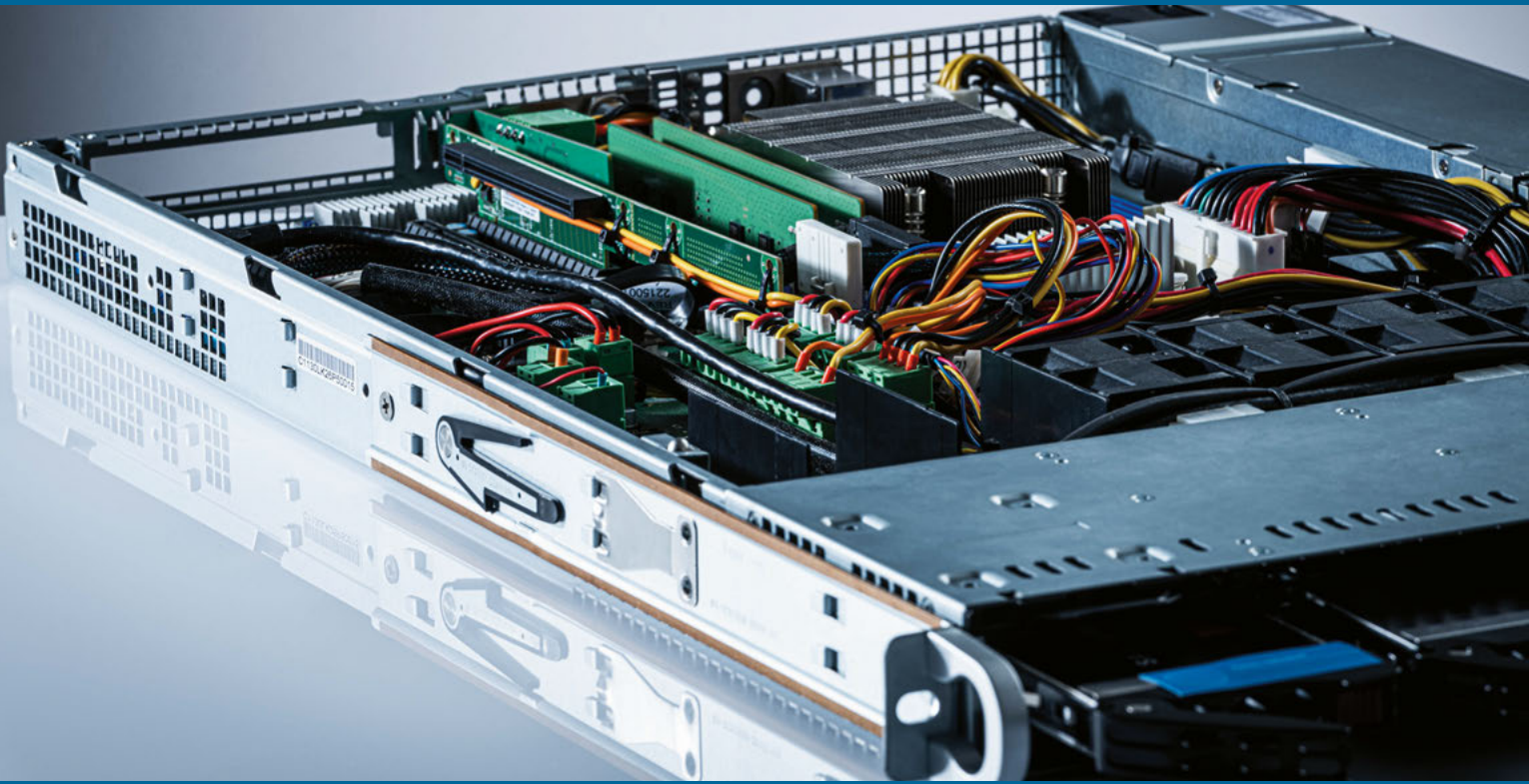
TSEP THEMIS Individual

The implementation and integra-tion of test/measurement systems often prove to be more complex than expected. With our many years of experience and expertise in software development, we cus-tomise software modules to meet your individual requirements.

TSEP

Innovation
made
measurable.

TSEP THEMIS HARDWARE

Standard hardware - cases and modules/cards

The TSEP THEMIS modular system offers a selection of standardised cases, modules and cards, which can be customised to your individual requirements. In addition, we develop customised enclosures, hardware modules and cards for your specific test and measurement tasks in a timely and cost-optimised manner.


TSEP THEMIS standard case

The TSEP THEMIS standard cases - desktop and rack (19"/ 3U) - contain the basic measuring device infrastructure (power unit and CPU unit). Number of free slots for modules/cards: up to 3 (THEMIS Desktop) and up to 7 (THEMIS Rack). If your next project requires a little more capacity, several THEMIS devices can be quickly and easily connected to form one logical device. In addition to the THEMIS standard modules/cards, PXI/PXIe measurement cards and customised plug-in cards can also be integrated.

Do your testing and measuring tasks demand more?
Would you like to integrate additional customised
hardware components into your T&M solution?

For further details, see "TSEP THEMIS Individual Hardware" - s. p. 16/17.
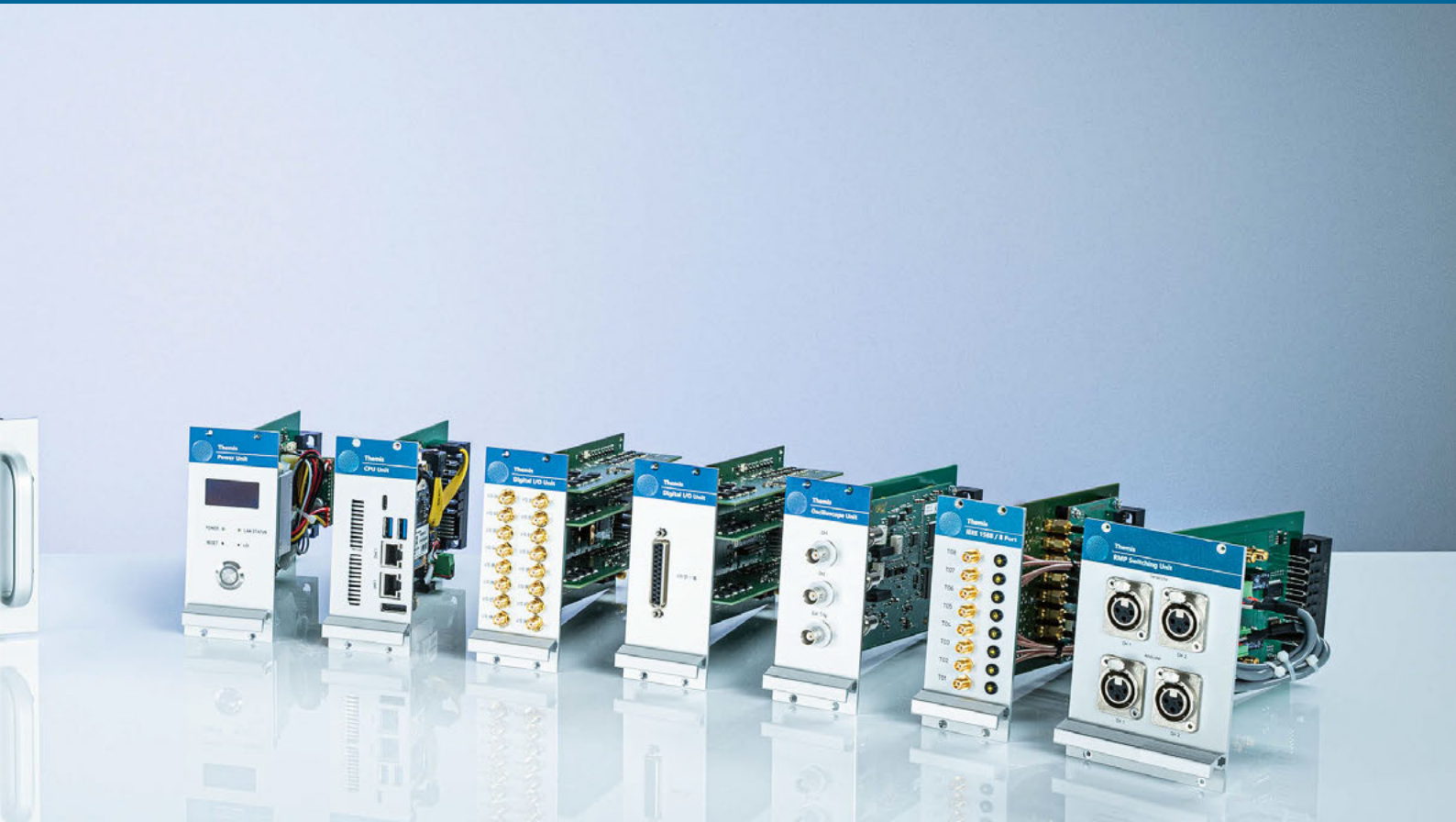
The following off-the-shelf and well-established modules/cards are available:

- TSEP THEMIS Power Unit
- TSEP THEMIS CPU Unit
  with 1588 Support
- TSEP THEMIS Switching Unit
- TSEP THEMIS Signal Switching Unit
- TSEP THEMIS IO Unit

- TSEP THEMIS IO Card Unit
- TSEP THEMIS PXI/PXIe-Backplane
- TSEP THEMIS PCIe Unit
- TSEP THEMIS 1588 Multiplexer
- TSEP THEMIS Oscilloscope

Choose the modules
that best fulfil your
requirements.

Technical specifications for the THEMIS
modular system - s. p. 20/21.

TSEP

Innovation
made
measurable.

... SIMPLY RESHUFFLE THE CARDS - WITH TSEP THEMIS

TSEP THEMIS can be easily integrated into existing measuring stations or systems as a stand-alone component and controlled as a single device.

Thanks to the flexible architecture, several THEMIS devices can be combined into a logical unit so that they act as an integrated system. This allows you to expand your setup in a modular way without replacing existing systems.

Our systems are designed in such a way that they are prepared for future measurement tasks and can be adapted to new requirements at any time. This not only increases the efficiency of your test environment, but also ensures long-term investment security - you do not have to replace the entire system, but can expand it flexibly and cost-effectively.

TSEP THEMIS makes it possible to use PXI/PXIe modules and cards exactly when they are needed, regardless of whether the aim is to cover specific requirements and functions or to expand an overall system: THEMIS can be equipped with a PXI/PXIe backplane so that numerous standardised PXI/PXIe measurement components, such as digitisers, oscilloscopes or network analysers, can be used.

The result is hybrid solutions based on THEMIS standard components - with clear advantages over the usually cost-intensive PXI/PXIe systems. On the one hand, you receive a system precisely tailored to your specific measuring task. On the other hand, you benefit from the low costs for your customised solution, as only the PXI/PXIe components that are really necessary are used.

Would you like to integrate additional hardware into your T&M system?
Talk to us! We will be happy to check your requirements.

THE FLEXIBLE THEMIS CONCEPT IMPRESSES WITH PROVEN, VERSATILE AND EASILY INTERCHANGEABLE INTERCHANGEABLE MODULES AND CARDS.

TSEP
Innovation made measurable.

TSEP THEMIS HARDWARE INDIVIDUAL

Your special applications go beyond the standard?

Are the TSEP THEMIS standard enclosures (rack/desk-top) too small or too large for your requirements?
As an alternative to the TSEP THEMIS standard cases, we develop customised form factors for your specific test and measurement tasks - from "small" (embedded) to "large" with several cascaded THEMIS devices, for example.

Do you need to integrate specially developed plug-in cards into a THEMIS standard cases for your specific measurement tasks? In addition to the THEMIS standard modules/cards, we develop customised modules/

cards for your specific test and measurement tasks, which are integrated into THEMIS standard cases. This customised solution can be expanded and adapted at any time.

Up to 100 % customised solutions, developed for specific measuring tasks

- Customised modules and cards for TSEP THEMIS standard enclosures - in addition to the TSEP THEMIS standard modules/cards
- Customised cases form factors - as an alternative to the TSEP THEMIS standard cases

TSEP THEMIS INDIVIDUAL - CUSTOMISED FORMAT AND TAILOR-MADE FUNCTIONALITY FOR YOUR TEST AND MEASUREMENT TASKS.

Examples for TSEP THEMIS Individual:

- Case form factor and corresponding electronics: Small and performance-specific for demanding tasks. Components developed individually for you, integrated directly on a PCB and installed in a compact case - even without a plug-in card system.
- Modules/cards with special functionalities for THEMIS standard cases. Customised modules/components with special logic & switching functions and THEMIS BUS - for easy integration into THEMIS standard cases (rack/desktop).

Our tried-and-tested measurement framework modules (TSEP THEMIS hardware & software) and TSEP THEMIS layout templates offer ready-made PCB layouts that al-ready contain standard components and serve as a basis for the rapid development of customised modules and boards.

We also use the modular TSEP THEMIS building block principle for the development of TSEP THEMIS Individual. This enables us to realise your requirement-specific measurement and test solution quickly and cost-effectively.

Incidentally, this also applies to customised software developed for you - for more details, see page 11.

TSEP Innovation made measurable.

PRECISE TIME SYNCHRONISATION FOR THE MEASUREMENT TECHNOLOGY OF THE FUTURE

The requirements for modern test and measurement systems have changed significantly over the last 20 years. Traditional, centrally organised systems can only perform the measurement task with great effort and often reach their limits. The main reason for this development is the increasing importance of the "time of acquisition" measurement parameter.

Challenges of measurement technology

Different cable lengths and complex synchronisation processes make precise measurements difficult and increase the susceptibility to errors. Without a uniform, synchronised time base, measurement data cannot be used reliably for analyses and simulations.

- **Correlatable time stamps:**
  In today's measuring systems, it is no longer just a few values that are recorded by a few sensors, but a large number of different measured values. This data is used for analysis (offline evaluation) or to create simulations (digital twin), for example. In order to correlate these measured values effectively, a uniform and synchronised time base is essential throughout the entire measurement system.

- **Time-controlled triggers**
  Conventional measuring systems use trigger signals to trigger or synchronise measurements. With linked trigger signals or widely varying cable lengths of the trigger lines, the effort involved increases considerably. Time-controlled trigger signals make it possible to decouple cable lengths and complex sequence controls, such as those required for a measurement using a frequency sweep.

- **Synchronisation of measuring devices**
  Various reference frequencies (e.g. 10 MHz, 100 MHz) are currently used to synchronise measuring devices. However, this approach only allows a limited synchronisation of the measurements, as the synchronisation only refers to the signal change (edges). Exact time synchronisation cannot be achieved in this way; the measuring devices have a time offset that can only be determined (calibrated) by measurement and is subject to fluctuations during the measurement.

Integrated solutions on the on the basis of global standards

To meet these challenges, THEMIS CHRONOS offers innovative solutions that are based on established global standards and enable precise time synchronisation.

- **Digital time synchronisation**
  With the IEEE 1588 Precision Time Protocol (PTP) standard, THEMIS makes it possible to assign a precise time stamp of +/- 40 ns to measured values from the Themis cards - across all Themis devices used in the measurement system. This creates a standardised time base, which is essential for correlatable measured values.
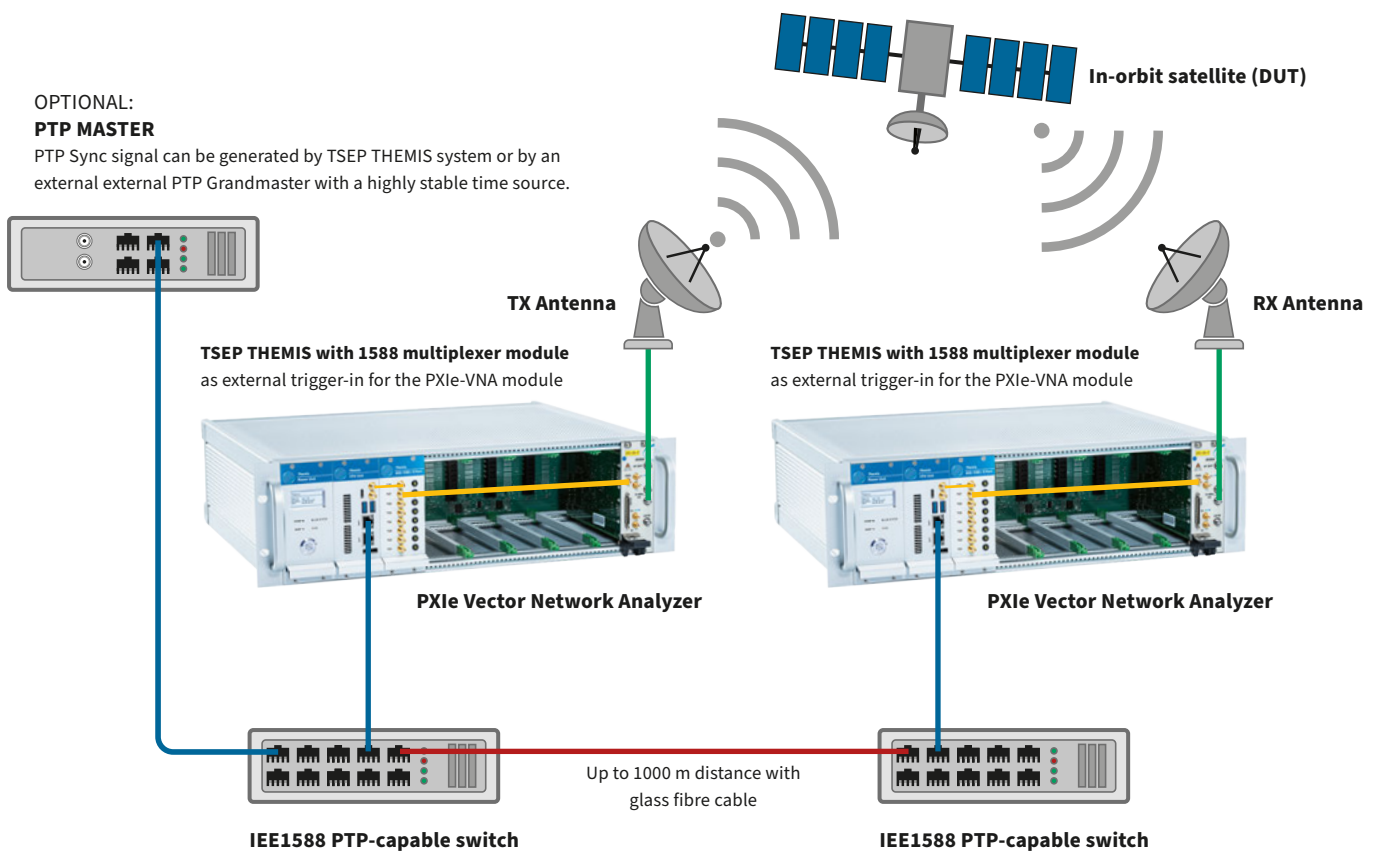
OPTIONAL:
PTP MASTER
PTP Sync signal can be generated by TSEP THEMIS system or by an external external PTP Grandmaster with a highly stable time source.

In-orbit satellite (DUT)

TX Antenna

RX Antenna

TSEP THEMIS with 1588 multiplexer module
as external trigger-in for the PXIe-VNA module

TSEP THEMIS with 1588 multiplexer module
as external trigger-in for the PXIe-VNA module

PXIe Vector Network Analyzer

PXIe Vector Network Analyzer

Up to 1000 m distance with glass fibre cable

IEE1588 PTP-capable switch

IEE1588 PTP-capable switch

Figure Graphic: Setup of a phase linearity and group delay measurement for in-orbit satellite analysis: PTP-synchronised TSEP THEMIS as external trigger-in for PXIe VNA modules

- **Time-controlled triggers**
  THEMIS offers the option of performing time-controlled measurements in the THEMIS cards using the optional Chronos component and the IEEE 1588 PTP standard. Measuring components that do not offer such functionality using the IEEE 1588 standard can be retrofitted with this functionality using the THEMIS 1588 multiplexer. The accuracy achieved here is in the +/- 40 ns range.

- **Standardised control**
  The extended measurement capabilities of THEMIS are based on established standards such as IEEE 1588 and White Rabbit. The "Trigger and Sync API" standard developed by the IVI consortium is used for the configuration and management of time-synchronised triggers and timestamps. This means that devices from other manufacturers that support

these standards can also be seamlessly integrated into THEMIS measurement systems. This makes THEMIS a long-term and expandable investment.

Highly accurate time synchronisation

For applications that require even greater precision, THEMIS offers the optional ATHENA component, which is based on the White Rabbit standard - a technology originally developed by CERN for high-precision timing applications. This allows various THEMIS devices to be synchronised in the picosecond range. With the THEMIS ATHENA reference signal extender, devices from other manufacturers can also be integrated into the time-synchronised measurement system. This option is expected to be available at the end of 2025 and will open up new possibilities for the most demanding measurement technology applications.

TSEP — Innovation made measurable.

TSEP THEMIS STANDARD HARDWARE COMPONENTS

TSEP THEMIS cases

TSEP THEMIS	Desktop (narrow)	Desktop (Wide)	Rack
CASE			
Slots for TSEP THEMIS modules	up to 3 modules	up to 7 modules	up to 7 modules
PCIe	optional	optional	
PXI		optional: 5 slots	
PXIe		optional: 5 slots	
Cooling		optional: 2-6 fans	
User Interface	Display to show the current device status, status LEDs, reset button and power button		
CONTROL UNIT			
CPU	z. e.g. Intel Celeron, Atom, i3, i5, i7		
RAM	from 4GB (Linux) or 8GB (Windows)		
Data storage	from 128GB; storage medium mSata or M.2		
OS	Windows, Linux; RTOS or others on request		
I/O Interfaces	DisplayPort DP++, HDMI, LAN RJ45, USB 3.1 Gen2 Type C (with Power Delivery and DP), USB 3.1 Gen2 Type A		
IEEE1588 Support	optional (TSEP THEMIS Chronos)		
POWER SUPPLY			
Power supply	100-240 V~ 50-60 Hz (120 / 160 Watt)		
Input voltage (max.)	$12 V_{DC}$, up to 10 A		
DIMENSIONS			
Dimensions (W x H x D) without carrying handle/feet	250 x 144 x 244 mm	443 x 144 x 244 mm	449 x 132 x 257 mm
	47TE x 3HE	80TE x 3HE	84TE x 3HE
	(9,8 x 5,7 x 9,6 in.)	(17,4 x 5,7 x 9,6 in.)	(17,6 x 5,2 x 10,1 in.)
Weight without modules	Typ. 3,8 kg (8,3 lb.)	Typ. 4,6 kg (10,1 lb.)	Typ. 5,4 kg (11,9 lb.)

The TSEP THEMIS standard components already cover a wide range of measurement tasks. Do you need additional, customised functions or hardware for your T&M solution? Contact us - we will be happy to check your requirements!

TSEP THEMIS test/measurement plug-in cards

CARDS	PRODUCT DESCRIPTION	ORDER NO.
TSEP THEMIS IO Card Unit	**Control of 8 to 32 GPIOs or triggers**	**TH-IOUX**
	Multi-IO card with 8/16 or 32 GPIOs or triggers. All GPIOs are freely programmable (I/O, voltage level, measurement etc.), voltage level up to 48V.	Variants: TH-IOU8/16/32
TSEP THEMIS IO Unit	**Control of various BUS systems**	**TH-IOU-X**
	Control of external sensors or DUTs via various BUS systems. Support for: RS232, RS485, I2C, SPI, SMBUS, CAN, CAN-FD, EtherCat. Other standard or proprietary BUS systems also available on request.	Variants: depending on BUS
TSEP THEMIS Switching Unit	**N-channel switching card**	**TH-SUX**
	Switching of any signals (1:1) using galvanically isolated relays (per relay: voltage: +/- 48V, current 1A). Each relay is designed as a changeover contact - a defined switching state is established when there is no voltage. Connection via a 25-pin Sub-D connector or SMA connector.	Variants: TH-SU8 TH-SU16
TSEP THEMIS Signal Switching Unit	**8-channel signal switching card (m:n connection)**	**TH-SSU**
	Interconnection of any channels (m:n interconnection) using galvanically isolated relays (per relay: voltage: +/- 48V, current 1A). Each relay is designed as a changeover contact - a defined switching state is established when there is no voltage. Connection via signal-specific plugs (e.g. XLR, SMA etc.).	
TSEP THEMIS 1588 Multiplexer	**IEEE 1588 extension for external measuring devices**	**TH-1588-X**
	Plug-in card for synchronising measuring devices without IEEE 1588 support with time-controlled trigger. There are 2 variants available with 8 and 16 trigger ports.	Variants: TH-1588-8 (8 port) TH-1588-16 (16 port)
TSEP THEMIS Oszilloscope	**Low Value Oscilloscope**	**TH-OSC**
	2 channels for measurement, sampling rate up to 1 GS/s, bandwidth: 10-100 MHz, buffer memory: 8kS - 128MS, integrated function generator and arbitrary waveform generator (AWG), external trigger.	
TSEP THEMIS IEEE Option	**IEEE 1588 extension for THEMIS plug-in cards**	**TH-1588-OPT**
	EEE 1588 extension for all standard THEMIS test/measurement plug-in cards. This enables the corresponding cards to process time-controlled events and triggers using IEEE 1588.	

TSEP Innovation made measurable.

TSEP THEMIS IN APPLICATION
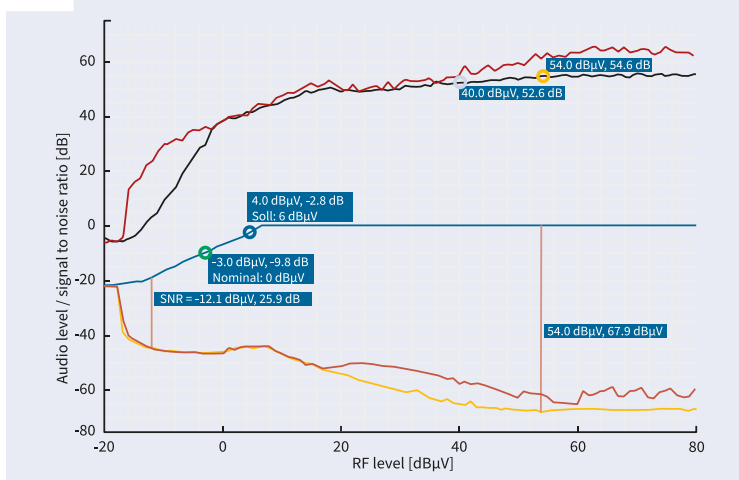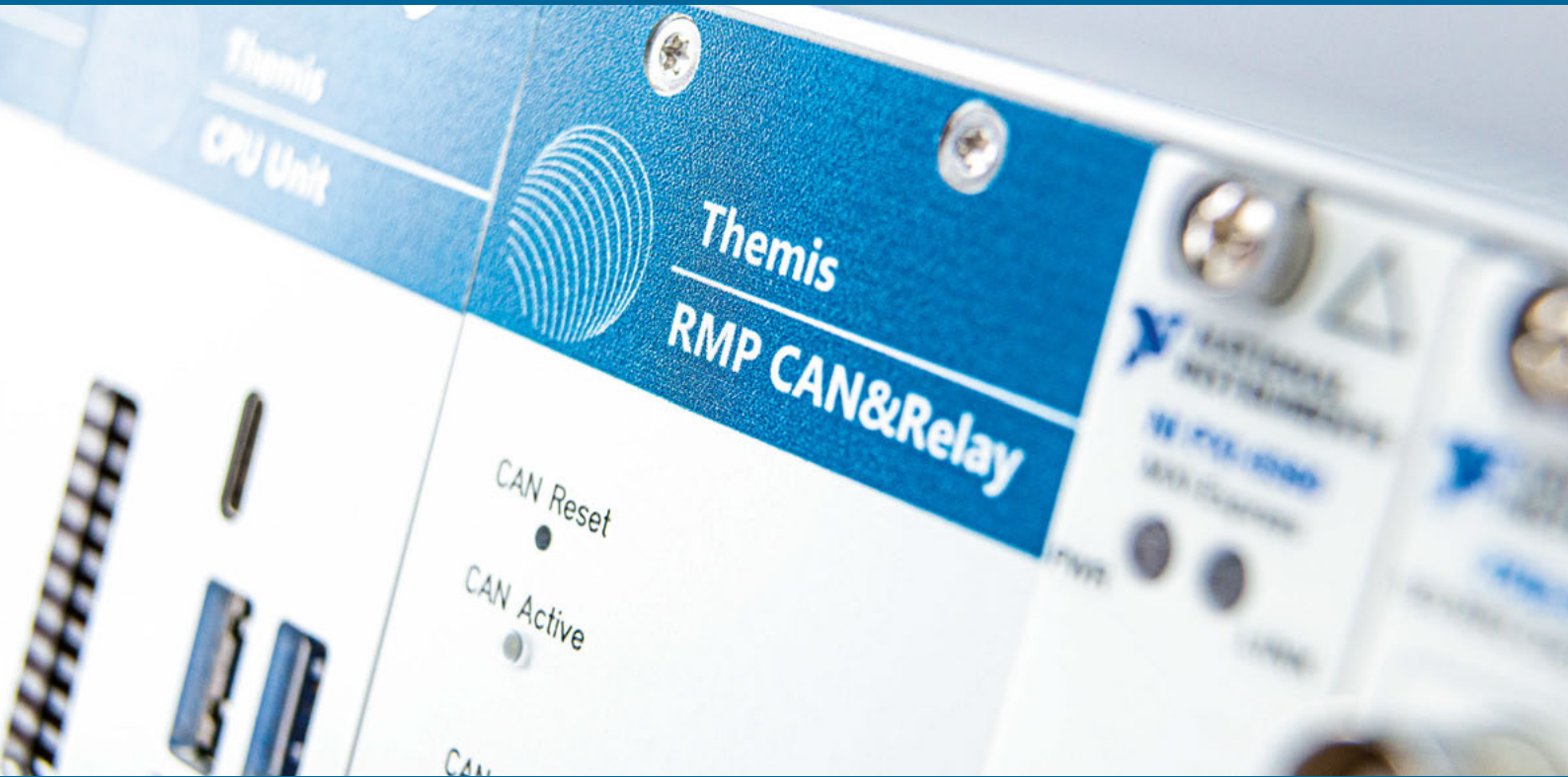
Example of the display of measurement data at a TSEP THEMIS radio measurement station (RMP): RF signal quality measurement with signal-to-noise ratio (SNR) via the RF levels (dBµV).

Application example TSEP THEMIS radio measuring station (RMP)

The challenge

A subsidiary of a German automotive group was faced with the challenge of measuring and verifying a complex entertainment system, in particular the radio subsystem, in accordance with the company's extensive internal and metrologically demanding standards.

As the standard has to be regularly adapted to modified technical conditions every 3 to 6 years, the new measurement system had to be flexible. Although prefabricated standard test systems were able to measure the current standard, they quickly reached their limits when changes were made.

In addition, the measurement setup should not only ensure compliance with standards during development, but also serve to analyse and verify any problems that arise. In addition to a pure T&M system, the customer wanted to be able to react flexibly to changing measurement requirements and system presettings and to create physical preconditions for valid measurements.

Integrated test, measurement and automation solution with THEMIS

The measurement setup designed / developed by TSEP today integrates both standard components such as signal generators, audio analysers or oscilloscopes as well as individual components for connecting the audio channels or CAN-BUS access to the DUT. The core of the system is the tried and tested HERAKLES Testbench from TSEP. The software can be used to define, manage and execute test sequences. HERAKLES controls all internal and external components and provides the measurement results.

The customer can use the testbench to individually define individual test and result parameters and thus verify different standard versions with one software and hardware version. New measurement definitions and sequences can also be easily added to the standard. The automated tests are defined using Python or a TSEP-specific scripting language. Special tools such as debuggers and logging support the development of test scripts.

HERAKLES can stop test sequences and hand over control of the measuring devices to the users in order to analyse the test sequence at any time and verify the parameters determined. This is particularly helpful for analysing errors in the event of unexpected measurement results.

The customised success model

Since 2010, TSEP THEMIS RMP has been the proven solution for measuring / functional testing several radio generations - in accordance with the applicable standard. Even complex problems could be analysed and solved with the flexible measuring station.

The test and measurement system also needs to be flexibly adapted and expanded for future versions of standards and the requirements of future radio generations/product generations. To this end, the car manufacturer continues to rely on the combination of the modular THEMIS concept with TSEP's many years of development expertise: a synergy that enables ideal, future-proof configurations for customised T&M solutions that can be expanded at any time.

TSEP
Innovation made measurable.

FURTHER INFORMATION

TSEP.COM/EN/THEMIS/

Contact

Technical Software Engineering Plazotta GmbH
Hopfenstr. 30, 85283 Wolnzach, Germany
P: +49 8442 96240 0
M: info@tsep.com
www.tsep.com

Technical Software Engineering Plazotta GmbH

Our customers include well-known manufacturers of test and measurement systems as well as users from numerous different industries who benefit from the high efficiency and reliability as well as measurable time and cost savings of our customised THEMIS T&M solutions.

Innovation made measurable.

100001.8001.01