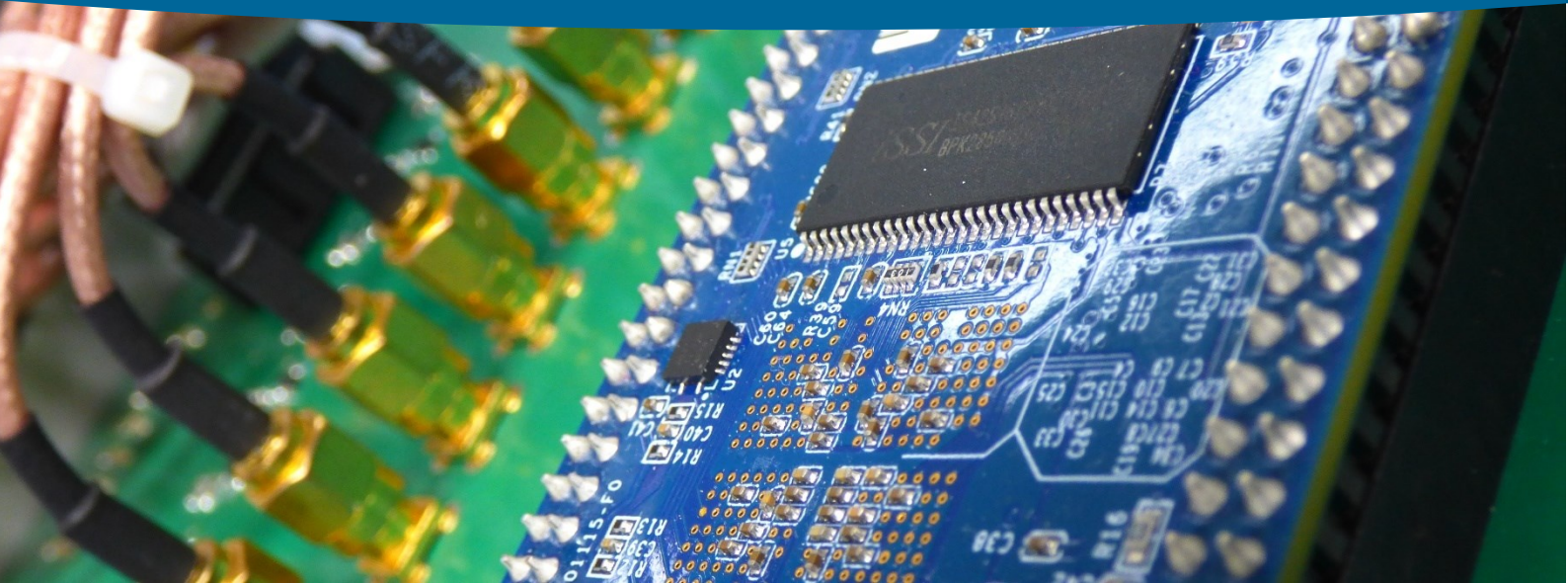# TSEP

Technical Software Engineering Plazotta

Innovation made measurable.

The Experts for Test&Measurement Solutions

For over 30 years TSEP has been developing test&measurement software and hardware for its own or customer-specific products and covers the fields of production, automation, test and measurement, and automotive. We do not only support our customers in the creation of their software components, we also support our customers in the design and implementation of these components. A large part of our work has always consisted of developing hardware-related, time-critical or complex software components. It was therefore natural to develop drivers for different operating systems or to support our customers in their design phases. Real-time requirements are not uncommon in our working field, so developing for real-time operating systems is a common task for us.

Due to the development of hardware-related software, it was logical for us to develop hardware as well. Our customers see it as a great advantage of TSEP to obtain software and hardware from a single source. That's why we started developing our own hardware 15 years ago. In recent years, not only hardware has been developed that were using in customer devices, we have also developed our own hardware and device that were successfully used by our customers.

Services

Software Development

Hardware Development

IT-Consulting

Test&Measurement Products

„Efficient and innovative systems for our customers at an reasonable price, that was and is our mission!"

Peter Plazotta,
CEO and Founder of TSEP

Software Development

Test & Measurement Software

TSEP has been creating test&measurement software for itself and its customers for now over 20 years. TSEP has already created software for the complex visualization of measurement data, their recording and processing for its customers. The implementation of measurement processes such as calibration, implementation of measurement specifications or the development of corresponding measurement scenarios were also implemented for customers. The common programming environments (C++, C# or Python) or operating systems (Windows, Linux, different Realtime OS) can be used for the developments.

Real-Time Software

Under certain circumstances, measurement tasks must run within certain times or have to be started at certain times. The common Windows or Linux operating systems cannot be used or only to a very limited extent for such requirements. For such tasks, TSEP then uses different real-time operating systems that can be bought (Intime, IntervalZero, RTS Hypervisor, etc.) or some open source software. For simple applications on microcontrollers used by TSEP (Cypress), TSEP uses a self-developed OS.

Driver Development

Due to the development of our own hardware, it was actually inevitable for TSEP to also create the corresponding drivers. Today TSEP has several employees who can create kernel drivers for a wide variety of hardware. The developments range from simple USB drivers to highly complex PCIe drivers. New concepts for the drivers, such as user mode drivers or filter drivers, have also already been implemented at TSEP. In contrast to applications, software errors in drivers cannot be tolerated, which is why TSEP has created a QM specification specially tailored to driver development and applies it consistently.

Porting of Software

Porting software is always a challenging task. Regardless of whether between operating systems or processor architectures. TSEP has performed successfully various projects for its customers here over the past 20 years. A special challenge for TSEP was large software packages from customers with several million lines of code (over 5 Million). For these porting's, TSEP has developed a strategy to carry out this work successfully, cost-effectively and within the time frame.

IT-Consulting

Projectmanagement

TSEP has managed projects for itself and its customers for now over 25 years. In recent years TSEP has completely switched to agile project management (Scrum) and has convinced many customers of the efficiency of this approach. TSEP uses the Jira tool internally for control purposes, while the corresponding introduced tools (such as IBM RTC or similar) are used by customers.

Evaluation of New Technologies

One of the biggest challenges within software and Test & Measurement is the development and evaluation of new or improved technologies. TSEP supports its customers in this process to include these technologies in their products. TSEP also creates the corresponding test implementation for evaluation and evaluates it in the customer environment.

Requirement Analysis

One of the most difficult tasks in software development is defining the requirements for the develop product. TSEP advises and supports customers in finding the right and necessary requirements. TSEP benefits from its more than 30 years of experience in the creation of software. When analysing the requirements, TSEP relies on different methods and tools to determine these efficiently and target-oriented.

Testing

Testing of hardware and software components has been an integral part of TSEP for now over 20 years. This procedure ensures a constant quality of the work and products at TSEP. For this purpose, various software was purchased from TSEP and developed in-house. This resulted in the TSEP being able to test quickly, cost-effectively and on time. Our customers were so convinced of this concept that the TSEP test division has been carrying out more and more tests on behalf of customers for years.

Hardware Development

Test&Measurement Hardware

TSEP has been developing measurement hardware in-house and for customers for years. This ranges from a small microcontrol-board that is used to record measurement data to a complex device (Kerberos, Step Attenuator) that has a complex functionality and consists of several components. TSEP develops these products completely in-house and has highly qualified partners in Germany for the manufacture of the products. TSEP also develops reference designs for its customers, which then are integrated into the customer-specific products in different forms.

Fig. 1: Kerberos

Test Systems

TSEP also creates complex test systems for its customers, in which component parameters are recorded using measurement technologies. Until 2019, these components were custom-made and 100% customized. In order to be able to offer solutions for customers even more efficiently and thus more cost-effectively, TSEP decided in 2019 to develop a modular system for such test systems, and the product Themis was born. Themis is a modular system for test systems in which customer-specific hardware with standard measurement technology (PXI cards) can be used. Themis will be available from the end of 2020 and will be delivered to customers in early 2021.

Fig. 2: Themis

µController Development

TSEP has been developing micro-controllers for a wide variety of tasks for 15 years. TSEP primarily relies on the Cypress PSoC micro-controller series, which are extremely scalable, have programmable hardware (analogous to an FPGA) and allow simple hardware switching to be carried out. In recent years, more and more Atmel micro-controller developments have been carried out at TSEP. In the last 10 years, a three-digit number of different projects have been implemented, from simple sensors to complex antenna controls (rotor).

Fig. 3: Themis individually

FPGA

FPGA developments have become more and more important at TSEP in recent years, as customer requirements have become more complex and simple solutions with micro-controllers were no longer possible. Upcoming TSEP product developments also made it necessary to focus more strongly in this direction. That is why TSEP 2020 has started to devote itself more and more to FPGA development. To this end, the development team has been strengthened accordingly. TSEP is busy with several in-house product developments, especially in the area of the Xilinx Zynq environment.

Fig. 4: IEEE 1588 -Multiplexer

Test&Measurement Products

Kerberos

Kerberos is a hardware and software solution for the verification of the LXI functionality of measurement and testing devices. TSEP has been working on the LXI standard for over 15 years and is also an active member of the LXI consortium. TSEP worked closely with the LXI consortium to develop TSEP Kerberos. The goal of TSEP Kerberos is to achieve more coverage of the LXI Standard compared to the LXI consortium's approved LXI Conformance Testsuite. To ensure matching results between the two test solutions, several devices from various LXI members were tested against both test solutions. The current version of TSEP Kerberos has been proclaimed as an official test environment and LXI self-certification device by the LXI Consortium.

Themis

With Themis, TSEP now has a modular test and measurement concept in its portfolio to be able to offer its customers a basis for flexible test and measurement systems. Themis is equipped with a PXI-compliant backplan and can thus combine existing standard PXI measurement boards with proprietary in-house developments for highly specialized measurement tasks. Thanks to the modular chassis, Themis can be expanded and scaled at any time. It grows with your tasks! Themis is certified according to the industry standard of the LXI consortium and supports all functionalities to communicate with other measuring instruments and systems via Ethernet (LAN). This allows Themis to be easily integrated into existing LXI-based T&M systems.

Chronos

Precise timing in event-driven processes in all areas of industry and especially in all technical fields has been a prominent issue since ever. To reduce time latency between two events a precise understanding of common time is essential. The IEEE 1588 Standard provides a mutual protocol to synchronize clocks of various devices within an Ethernet Network. TSEP focuses with the solution Chronos on the key performance indicator for every IEEE 1588 application: The accuracy of the time synchronization. This modern implementation of the IEEE 1588 standard combines a high precision in the offset time data with a deviation of +/-25 nanoseconds, time-synchronous hardware trigger, and the flexibility to define and to exchange different control algorithms, Best Master Algorithms, PTP Profiles, and bus systems. Chronos is available for multiple platforms as Windows, Linux, and various Real-time Operating System.

Poseidon

In today's test and measurement area, there is a need for standardized and fast communication between measurement devices. The SCPI 488.2 standard and its successors define such communication. The product Poseidon from TSEP provides an implementation this standard for different operating systems. The innovative design aims for the optimization of command execution on all systematic levels. Poseidon provides an easy to integrate, flexible and reliable framework. Additionally, Poseidon offers a tree-like data structure of SCPI-Commands and has a highly efficient algorithm to optimize the command execution, which grounds of an access statistic.

About TSEP

The TSEP team consists of more than 30 qualified and highly motivated employees with various professional qualifications, from trainees and Junior Developers to Senior Developers and Project Managers with IT-Specilist, Bachelor, Master, and PhD degrees. We have been implementing cost-efficient and innovative products for our customers in their focus for more than 30 years! TSEP operates successfully worldwide in several countries and is active in the international consortiums.

Cooperation with TSEP

Using the inhouse expertise TSEP has built up a complex infrastructure regarding hardware (server, computer, measurement instruments) as well as software (security, version control, project management) to be a reliable and professional partner. An excellent connection to the Internet enables TSEP to exchange easily big data packages. TSEP works on the basis of work contracts at fixed price or with agile commission.

For more information visit www.tsep.com or contact us.

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