



CASE STUDY

Examples of implemented projects



MAIN COMPETENCE AREAS





LOW-LEVEL EMBEDDED DEVELOPMENT



FIRMWARE FOR POWER PC PPC440 SP/EP/SPE/GP

Configured peripherals:

- Ethernet
- TLB MMU
- UART
- SPI
- DDR SDRAM Controller
- GPIO
- Interrupt Controller

SOFTWARE IN C++ FOR POWERPC

Participation in the implementation of software in C++ for laboratory equipment, which was run on PowerPC PPC405GP and PPC440GX microcontrollers.



LOW-LEVEL EMBEDDED DEVELOPMENT

PORTING WINDOWS EMBEDDED COMPACT 7 TO EVB BEAGLEBOARD

- Board Support Package (BSP) preparation
- Preparation of peripheral drivers

IMPLEMENTATION OF A REMOTE FIRMWARE UPGRADE SOLUTION

Development of a remote firmware upgrade solution including a complete Flash memory interface support for the M32R microcontroller (entirely in C).



LOW-LEVEL EMBEDDED DEVELOPMENT



PORTING OF INDUSTRIAL IEC-61850 STACK FOR SCIOPTA RTOS

Preparing and developing of OSAL adaptation layer (Operating System Adaptation Layer) for industrial IEC-61850 stack for a real-time operating system SCIOPTA, used as a communication standard between elements of energy substations.

Demo and example applications have been developed for OMAP AM1808 platform.

TEST ROUTINES FOR RTOS SCIOPTA - SIL3

Development of test routines and scenarios for software test according to SIL-3 (IEC-61508) safety level, for the vendor of real-time operating system with a safety kernel SCIOPTA.

Testing of selected SCIOPTA modules needed to receive safety certification.

Tested modules :

- FEC (Fast Ethernet Controller)
- I2C
- RTC
- UART
- CAN

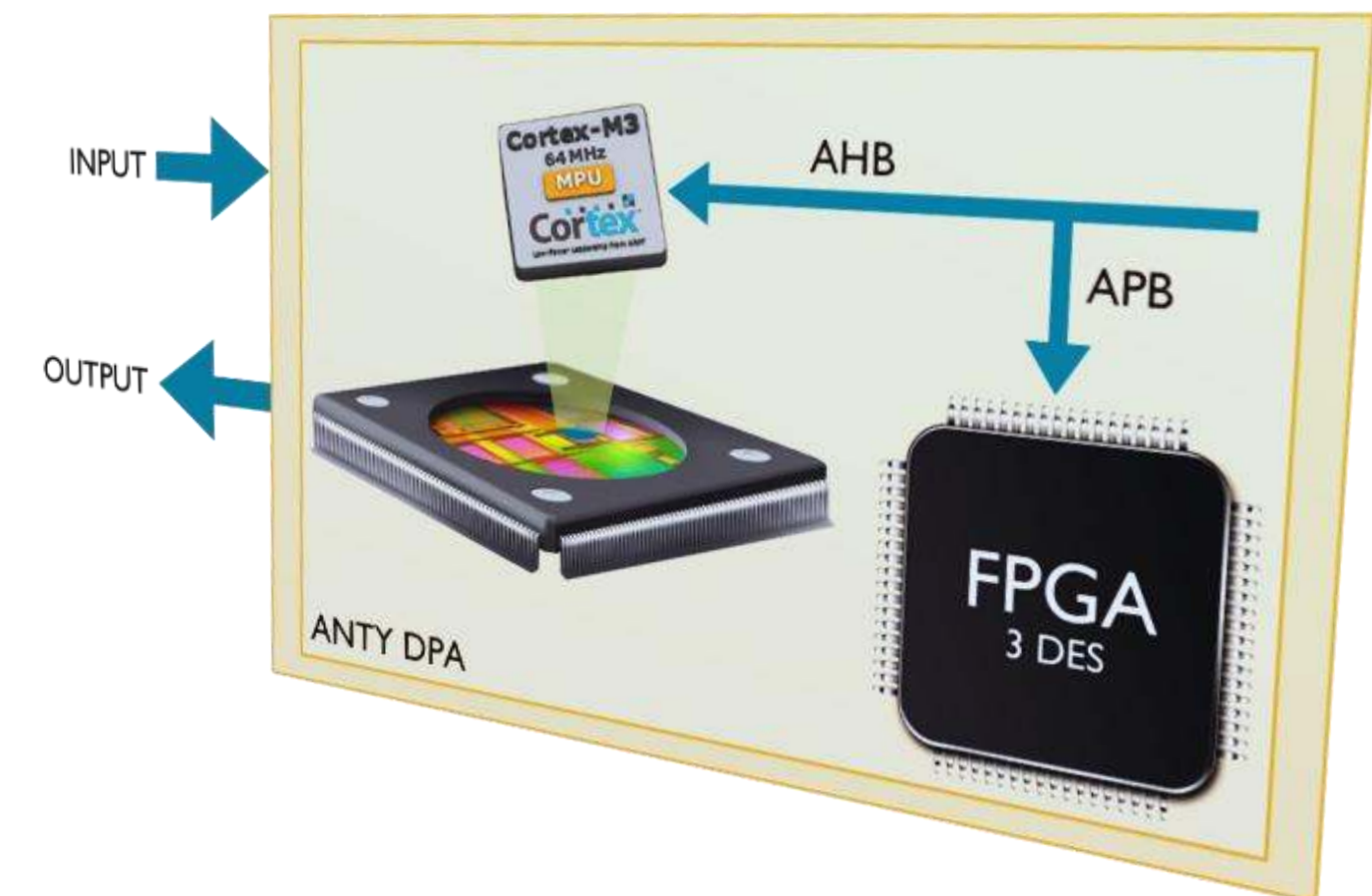
Tested architectures :

- MPC5121
- MPC5643

CRYPTOGRAPHIC SOC BASED ON FPGA

The main task of the cryptographic unit was the implementation of encryption and decryption algorithm 3-DES to provide additional safety mechanisms for the process of encryption and decryption against DPA attacks.

- Very demanding on optimization – low resources in the FPGA logic space
- Protection against Differential Power Attacks project – GRYFTEC's custom solution
- Implementation of the Triple DES Algorithm (3DES)
- System has been designed in accordance with EAL4+ test requirements
- FPGA chip: Microsemi SmartFusion2 SoC (ARM Cortex-M3)



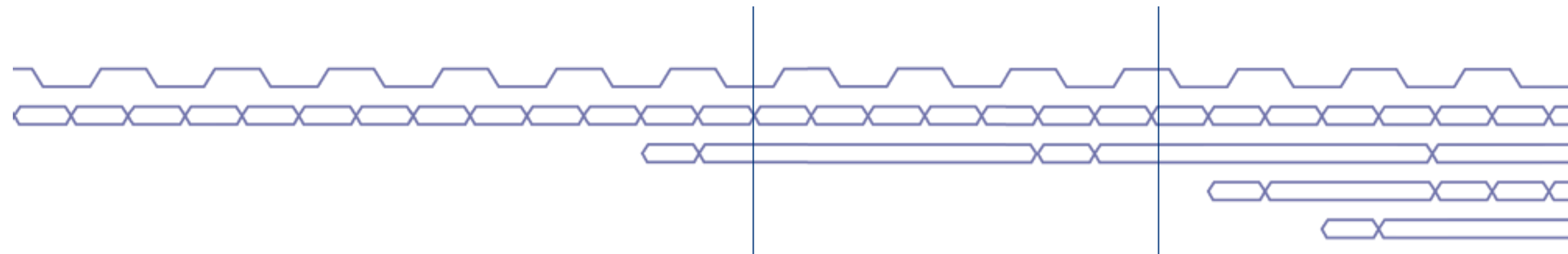
VHDL IMPLEMENTATION OF 128-BIT DIGITAL CIRCUIT

Fast parallel data processing unit, for trace device implemented on FPGA device (ALTERA APEX). The design realized parallel processing of input data at a high frequency, of about 100 MHz and utilized about 350k system gates. Trace information from the target CPU, given in different interface standards, was processed in real time.

NEXUS ANALYZER INTERFACE

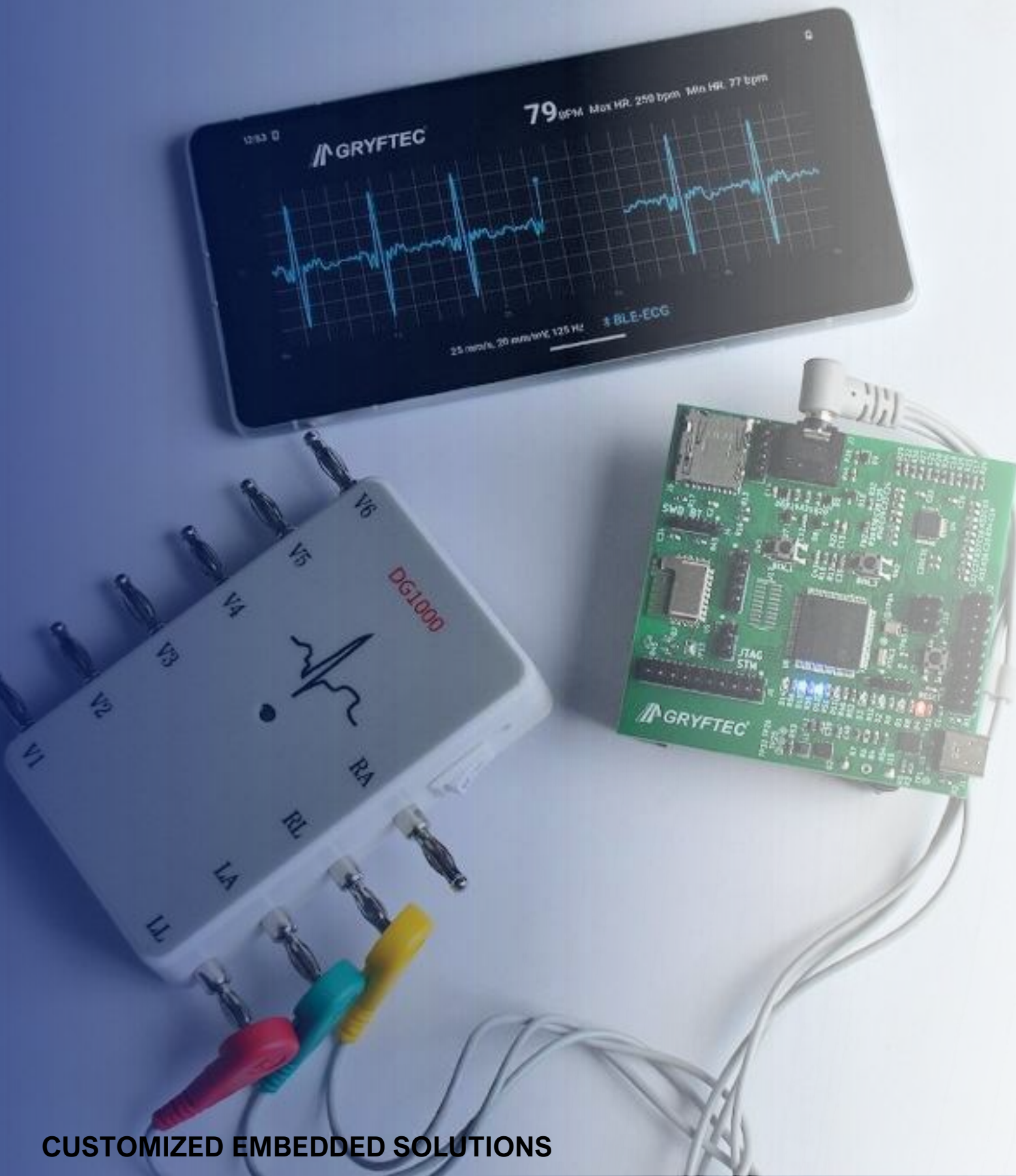
Development of an analyzer interface tracing program for microprocessor system according to the NEXUS standard (IEEE-ISTO 5001-2003):

- Frequency: 200 MHz
- Amount of gates: 150k
- DR memory support
- FPGA chip: ALTERA Cyclone-II





HARDWARE DEVELOPMENT

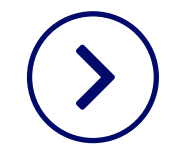


A CUSTOM BOARD FOR A WIRELESS SYSTEM FOR REAL-TIME ECG AND RESPIRATORY IMPEDANCE MEASUREMENT

As part of our research and development efforts, we designed a custom board for a wireless system for real-time ECG and respiratory impedance measurement.

Our solution integrates:

- STM32L476144 (ST) – 32-bit ARM® Cortex®-M4F MCU, low-power consumption, handling data processing, communication, and wireless management.
- ADS1292R (TI) – 2-channel, 24-bit ADC with ECG front-end and respiratory impedance measurement; high-precision and integrated signal filtering.
- BlueNRG-2 (ST) – BLE 5.3 wireless SoC providing stable, secure and energy-efficient wireless transmission to mobile devices.
- Cross-Platform mobile App – dedicated data visualization, parameter analysis, user-friendly and intuitive interface.



FUNCTIONAL SOFTWARE DEVELOPMENT FOR INDUSTRIAL DEVICES

COMBUSTION ENGINE MEASUREMENT DEVICES

We successfully delivered software solutions for three engine monitoring devices, based on a hardware platform provided by our client.

The devices acquired data from hardwired sensors in a narrow time window and delivered the results via CAN bus ensuring high accuracy and reliability. Our development process covered all critical stages from specification, software development and testing on multiple stages (unit, software, device).





DESKTOP APPLICATION DEVELOPMENT

DEVELOPMENT OF TNA SYSTEM - SKIPPER

Time and attendance system custom-built in alignment with the company requirements, including features for efficient company management.

Key features include:

- work time recording
- task management
- reporting
- invoicing of services based on tasks
- employee absence planning
- procurement management
- equipment inventory management

The system is written entirely in C# .NET.





DESKTOP APPLICATION DEVELOPMENT

INTEGRATION OF IBM RATIONAL RHAPSODY with ICD debugger

Development of a driver, enabling communication between Rational Rhapsody and an embedded system without the need of an external communication channel, requiring only a debugger and JTAG.

Providing the OSAL (Operating System Abstraction Layer) layers for OSE and eCos operating systems.

Implementation of additional functionalities such as FDX, breakpoints, source code listing and Test Conductor.



DESKTOP APPLICATION DEVELOPMENT

ICS - CONTROL ORDERS, STOREHOUSE, USER ACTIVITY

ICS - an application for managing the flow of orders and contracts in the company, which allows for the estimation of resources, products, and delivery times.

Some advantages include the extensive filtration system and information retrieval, in addition to the option of setting automated email notification events for new orders and deadlines.

PF-DB - DISTRIBUTED PROJECT MANAGEMENT

PF-DB - complex database application for managing software modules performed by developers working remotely on a shared project.

The application allows to define software modules, semi-automatic determination of task parameters, developer allocation, reporting and tracking of progress on the module.

➤ TESTING OF EMBEDDED DEVICES



TESTING OF COMPLEX MARINE automation system

Our team was responsible for the development, testing and maintenance of a device which incorporated various interfaces, including CAN and Ethernet.

➤ TESTING OF EMBEDDED DEVICES

DEVELOPMENT AND TESTING of Human Machine Interfaces

We developed and tested multiple HMI software for commercial displays used for engine monitoring and automation.

In numerous HMI projects we established device testing to operate and monitor combustion engines (mainly for marine applications). Additionally, in some projects, we only test systems our clients developed.

We used semi-automation to decrease the test execution effort due to development needs. All HMI devices were connected via CAN interface.





TESTING OF EMBEDDED DEVICES

TESTING OF ENGINE CONTROL AND monitoring devices

We devised testing methods for several control and monitoring devices in both diesel and natural gas combustion engines. We covered the test specifications, development, automation, execution and the testing environment.

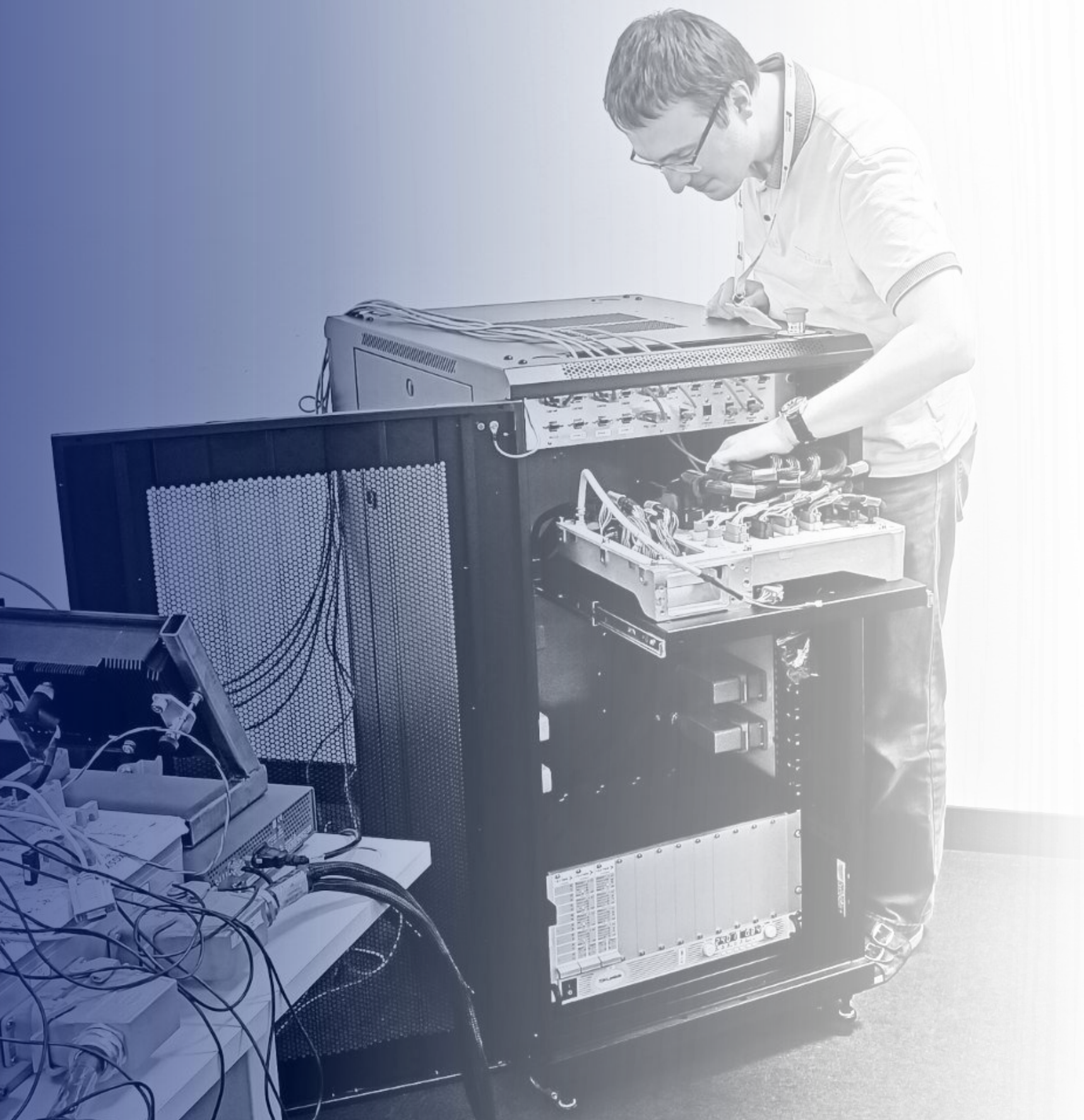
Our testers work according to the ISTQB® philosophy using the V-Model. Our service is completely independent of development, depending on project needs.

We use the following tools to interface with the tested device:

- National Instruments Test Stand
- Vector CANoe/CANalyser/vTestStudio



TESTING OF EMBEDDED DEVICES



DEVELOPMENT OF ENGINE MODELS

In this project, our team was tasked with developing and maintaining engine models that run on a hardware simulator delivered by the client.

The development was conducted using MATLAB/Simulink.

WHY US?

For two decades, GRYFTEC is working with clients from various industries, providing comprehensive engineering services tailored to their needs anywhere from design and development to optimization, integration and documentation.

Whether you're planning to create a custom solution from scratch or improve the existing one, we will assist you every step of the way.

Choosing GRYFTEC for your project or concept partner will help your organization to:

- reduce costs of software development
- choose the best testing tools
- reduce potential risks at the early stage and the time to release
- increase the system reliability
- maintain a high level of quality.

GET IN TOUCH



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