

IT-Security | Software | Embedded

SPEKTRUM INGENIEURGESELLSCHAFT

Services 2019

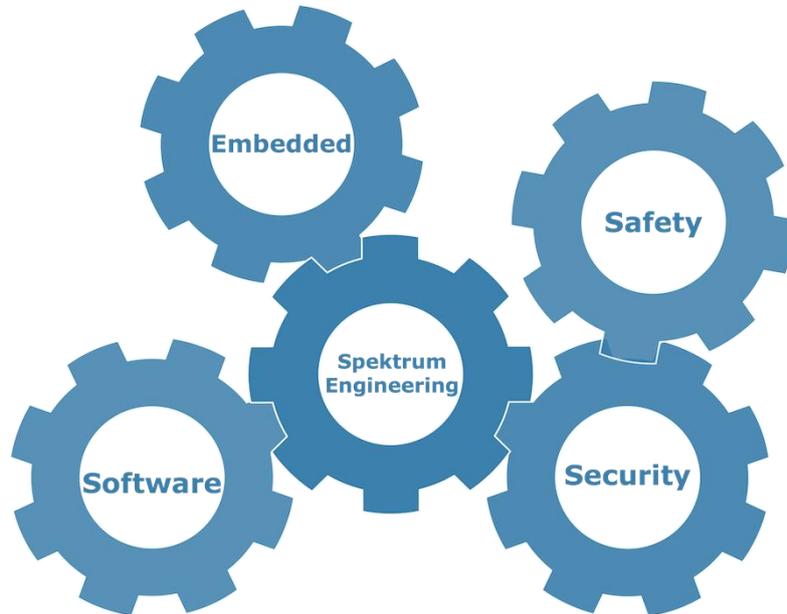
Exposé

The Spektrum Ingenieurgesellschaft was founded in 2014 in Germany. We have specialized on the development of modern IoT and Industry 4.0 solutions to drive our customer's success. We deliver fully integrated solutions to provide an overall satisfying user experience.

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Welcome



The Spektrum Ingenieurgesellschaft was founded in 2014 in Germany (Hessen, Main-Kinzig-Kreis). Our Engineering Office focuses on the development of software and systems according to the customers' needs. We deliver embedded systems, software for industrial control systems and the appropriate concepts to guarantee a high availability during operation. We also focus on functional safety and IT-security for our components and implement our concepts accordingly. We offer services in the following domains:

- Industrial IT-Security
- Engineering & Software
- Industrial Control Systems
- System Safety
- Maintainability

Industrial IT-Security

Nowadays the IT infrastructure of companies is very complex and seldom simple to maintain. The same applies for industrial plants, where the control components (sensors, actuators) are interconnected as well. Preventing espionage, sabotage and manipulation of these systems is important to ensure a high availability and a flawless operation. Guarding the own company and the own industrial plant against these risks, requires the planning of appropriate countermeasures beforehand. We support our customers by performing a risk analysis, searching for vulnerabilities and implementing the necessary changes.

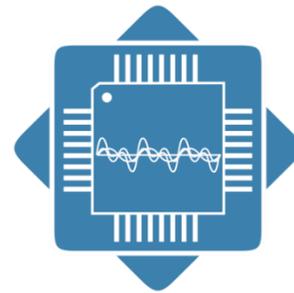


IT-Security & Data-Security has the aim to protect (sensible) information while it is transmitted, stored or processed by electronic components. Spektrum Ingenieurgesellschaft is developing concepts and software which prevent our customers from being victims of cyberattacks and suffering from the consequences. We offer:

- Analysis and validation of critical company IT-Infrastructure
- Analysis and validation of industrial IT-Infrastructure: Industrial control systems, industrial manufacturing plants, Industrial IT-Infrastructure
- Risk analysis and threat management
- Security Lifecycle Management
- Penetration Testing and analysis of the current infrastructure (Insider/Outsider Attacks)
- Requirements engineering and planning before establishing a new company IT-Infrastructure
- Implementing security components and threat management systems
- Case-based risk analysis when using Cloud-Infrastructure, SaaS & Industry 4.0 applications

Engineering & Software

Spektrum Ingenieurgesellschaft develops software and systems in various fields of computational engineering. Independently of the type of software – software for embedded systems, software for industrial control systems or end-user applications – we support our customers from the beginning, starting with the requirements analysis until the final rollout. Of course, we take care for the system and software maintenance and perform servicing tasks whenever required.

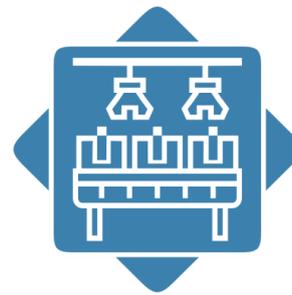
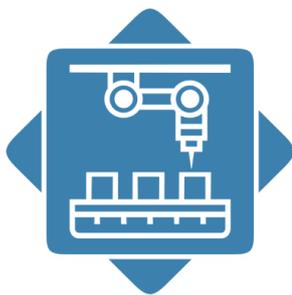


In parallel to our development and engineering tasks, we take care for reliable, technical software documentation and provide end user manuals, administrative manuals or documentation for service technicians. Our services include:

- Project Management & Consulting
- Software design and application development according to the customers' needs
- Software for embedded systems, industrial control systems, end-user applications, distributed client/server applications
- Development of GUIs and HMIs
- Requirements engineering and system specification
- Depending on the project: choosing a process model: SCRUM, AUP, V-Modell, etc.
- Software development for Linux, Windows, macOS & Apple iOS
- Web Apps for Smartphone, Tablet and Notebook
- Designing appropriate Database layouts and schemes to flexibly store and retrieve data (sensor data, operational data, business relevant data)
- Languages & Tools: Python, C/C++, SQL, Assembler, Machine Learning Techniques, Computer Vision
- Technical Software documentation, end-user manuals, administrative- and service manuals

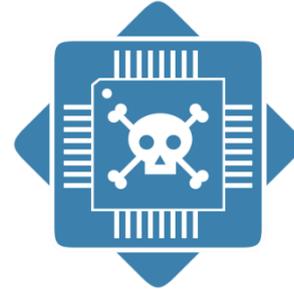
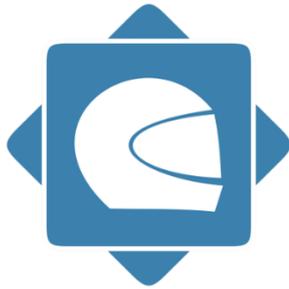
Industrial Control Systems

The development of individual, tailored software for the industrial sector raised importance with the introduction of concepts related to Industry 4.0. Processing and evaluating data delivered by industrial plants require new components and methods to satisfy the customers and their often-varying needs. Therefore, Spektrum Ingenieurgesellschaft offers software development for industrial control systems including concepts and applications to monitor and store important process-related-data for immediate evaluation and analysis. This allows to track the plant and react immediately in case something undesired has happened.



- Requirements Analysis
- Project Management & Consulting
- Process Development & Engineering
- Software Development, Implementation, Simulation, Evaluation and Test
- Systems Engineering (choosing the appropriate sensors, actuators and other required parts)
- Software development for PLCs: Siemens SIMATIC S7-1200, S7-1500
- Frameworks & Tools: C/C++, Python, Embedded Linux, TIA, STEP7, SCL
- Hardware and Software development: PCB design and electrical component placement allows our customers the integration of the whole control unit as an embedded system
- Process-visualization using interactive P&IDs and developing the HMI
- Device communication & M2M: Profinet, Ethernet, AS-Interface, RS485, Modbus-TCP, MQTT, OPC-UA, RESTful-API, etc.
- Data acquisition and system state monitoring with the help of remote access modules (GSM/3G/LTE/LAN, etc.)
- Introducing mobile devices to support monitoring and maintenance tasks by developing interfaces and APIs for these devices
- System commissioning on customers' premises
- Technical Software documentation, end-user manuals, administrative- and service manuals

System Safety



System safety is a major task to cope with when developing or engineering components which are known to be used in safety-critical applications. Safety-critical applications hereby describe systems which cause – in case of a failure – serious harm to humans/animals or damage the (surrounding) environment. Therefore, safety-critical applications must run reliably starting from the date of their commissioning and have to be either fail-safe or fail-operational during their operation. Both aims can be achieved by developing these systems according to safety-related standards. For example, hardware failures can be avoided by using redundant modules whereas software reliability is achieved by implementing mechanisms which are based on majority voting.

We, the team from Spektrum Ingenieurgesellschaft, have the know-how, ability and knowledge about the appropriate tools and utilities to analyze arising risks and to integrate the demanded safety inside our products. We assist our customers with the following services:

- Requirements analysis regarding safety based on SIL (Safety Integrity Level)
- Analysis about the required functional safety
- Functional Safety according to DIN EN 61508, DIN EN 61511 and additional standards (according to the project's requirements)
- Risk analysis for the forthcoming operation
- SIL (Safety Integrity Level)
- FMEA (Failure Mode and Effects Analysis)
- FTA (Fault Tree Analysis)
- ETA (Event Tree Analysis)

Maintainability

A reliable and safe operation of software-based systems or complex infrastructures often is a challenging task. Predefined parameters have to be monitored and checked continuously to predict failures and to define maintenance intervals. We, Spektrum Ingenieurgesellschaft, identify these parameters, define the appropriate service intervals and give servicing-recommendations.



Our products can be equipped with remote-access-modules which allow to check the system's status independently from their physical location. Distributed or decentralized systems can log their operation-critical data to a central location and the responsible department can access and check the data, as well.

We offer the following services to support our customers:

- Software related analysis regarding execution time, best suited hardware architecture, memory usage and algorithm efficiency
- Measurement and analysis of data exchange (performance/network throughput) between distributed systems, identifying the bottleneck
- Prediction of failures by monitoring the operation and evaluating the critical parameters, notifying the corresponding department and defining servicing-cases
- Simulation and high-stress load test before installing the system and productive launch
- Defining tolerance parameters and warning levels
- Automatically notifying the responsible department in case of a failure or reaching a critical alarm level
- Additional parameters according to the project's requirements

Upon request, we offer our products with a remote-access-module and take care for the operation, service and maintenance.

Legal Note

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