

Software Industry Location

## IT Solutions made in Dresden: Key for the Industry

**Technologically, everything in the modern world depends on software. Robotics and Electronics have long been successful industries in Dresden. The strength of Dresden as the location for these industries is its close connection to the software and hardware industry – and Dresden’s focus on the technologies for this industry.**

Machine tool, heating system, automobile, washing machine – the list is endless of today’s conveniences that cannot function without software. Dresden realized early that IT solutions significantly stimulate technological development and consequently society’s progress. Dresden scientists had already been pioneers in computer technology when the industry was not even called that. In 1949, Nikolaus Joachim Lehmann of TU Dresden designed an autonomous computing control-and-storage unit based on a magnetic drum. In 1963, Lehmann introduced a table computer, the digital universal computing automat D4a based on transistors with integrated input and output. The computing automat was the size of a TV and considered to be the first PC worldwide.

### **Dresden as Electronics and Software Location, Strong through Tradition**

In the 1960s, TU Dresden was one of the first German Universities to introduce a full-time course of studies known as Computer Science. (In the beginning it was called Machine Based Computing technology.) Its graduates had the best career prospects in the region: During GDR-times, the Robotron produced office and computing machines. Its headquarters were located at the city’s center, directly across from the new City hall. Up until now, the close connection between software and hardware expertise continues to be the strength of the electronics and software industries in Dresden.

### **IT Solutions for Industrial Production**

AIS Automation Dresden is a successful provider of IT solutions geared toward manufacturing. Founded in 1990 with a staff of eight, the company began by building control systems for facilities in the field of vacuum technology. Later, AIS Automation Dresden expanded its portfolio with solutions for traffic and railway technology, and in manufacturing automation. When the semiconductor industry became established in the region, the company added systems for factory automation. The systems no longer control single machines or plants, but complete production processes. They are used in the automobile industry, the semiconductor industry, and in solar technology production. Today, AIS has 135 employees and has become a

system- and software house high-in-demand as a software specialist for manufacturing automation and plant control systems world-wide.

### **Digital Economy is Saxony's most dynamic Sector**

The software sector is an important engine driving Saxony's economic development. Since 2010, it has reported an average yearly growth of 7.7 percent and remains the undisputed leader among all of Saxony's industry sectors. With 2,700 companies, more than 20,000 employees, and a yearly revenue of 2.5 billion Euro, the software industry is not only the most dynamic sector, but also a driving force for innovation in all other industries.

The industry association Microelectronics Silicon Saxony unites key players in the software industry. Organized in groups, Saxon enterprises and research institutes collaborate on global topics like the 'Internet of Things and Services,' 'Industry 4.0,' and issues concerning energy-efficient production and mobility for the future. The close connection between hardware and software will also be of great significance to the future of communications systems. This development reveals that software technologies continue to revolutionize traditional industries in Saxony.

### **Software to Control a Virtual Production Line**

A perfect example of how software has changed industries is the semiconductor sector. "Manufacturing Excellence through Software Solutions" is the motto of SYSTEMA, which focuses on the integration, automation and optimization of processes and procedures in manufacturing. SYSTEMA is part of the European Project "Advanced Distributed Pilot Line for More-than-Moore Technologies (Admont)" recently formed by ECSEL (Electronic Components and Systems for European Leadership). Its aim is to bring together available machinery and capacities of key players of the Dresden semiconductor cluster into a pilot line. The individual technology modules are not positioned in a common clean room, but are located at the facilities of each of the participating companies and research institutes. High-performance software is a prerequisite for production using such distributed equipment.

With more than 26 professorships, 300 employees and 1,800 students, as well as 200 PhD students, TU Dresden is one of the largest in the software field Germany-wide. The faculty, which is part of the federal government's Excellence Initiative, is a central partner in the Excellence-Research Association 'DRESDEN concept', another part of the government-funded Excellence Initiative.

Dresden software experts are also participating in the Excellence Cluster 'Center for Advancing Electronics Dresden (cfaed)', which is searching alternatives to the classic silicone chip. As part of the 'Highly Adaptive Energy-Efficient Computing HAEC' research, Dresden computer

scientists are collaborating with the TU Dresden faculty for Electrical Engineering and Information Technology, as well as the Excellence Cluster “cfaed” to develop highly-efficient systems.

### **TU Dresden plans Software-Research Center**

In the future, Dresden computer scientists will play an even bigger role. Together with its partners, TU Dresden plans to establish a software research center of international stature. The research center shall develop concepts for the evaluation of large data amounts ('Big Data'), complex chips, software and hardware combinations ('Embedded Systems'), as well as the 'Internet of Things', the interconnected and highly-automated factory of the future ('Industry 4.0') and high-speed data transmission.

### **Speeding up the Mobile Internet. Mission: Real-Time Capability**

TU Dresden is also targeting subjects like real-time capability and data communication. In the project 'FAST – Fast Actuators Sensors and Transceivers – Technological Breakthrough through Real-Time Capability', researchers are working on drastically increasing the speed of wireless communication systems. The goal is to get as close as possible to its physical limits, light speed. The FAST-project is part of the Federal Ministry for Education and Research (BMBF)'s initiative 'Twenty20 – Partnership for Innovation'.

Dresden's software enterprises are also working on IT-solutions to make the world even 'smarter' in the future with an emphasis on various sectors; Robotron Datenbank-Software Dresden, for instance, concentrates on the development of database-supported information systems for the energy sector, and industry and public administration. The owner-run company, founded in 1990 as a spin-off of a department of a former GDR electronics combine, brings a vast amount of experience concerning efficient management and evaluation of large data amounts. It currently employs more than 430 employees.

### **Software-Solutions for the Smart City**

The city of Dresden, as it aims to become a 'smart city', profits from the region's software expertise. At present, Dresden is a stellar example of how traffic can be controlled intelligently, and it functions as a model for other municipalities. In cooperation with TU Dresden, the city's administration has developed the Traffic Analysis, Management and Optimization System, VAMOS. VAMOS links all of the more than one-thousand regionally available traffic detectors as well as the diverse traffic control and signaling systems of the road network and the surrounding motorways. This system automatically evaluates current traffic conditions, maintains optimized traffic flow, and controls the city's traffic.