## Technologies of Digitalisation – Made in Saxony-Anhalt

In Saxony-Anhalt, diversity and dynamism inspire developments - some IT companies are now among the world's best with their solutions and products. Key technologies are important drivers of innovation and secure Saxony-Anhalt's strong and competitive economy.

> **Big Data**

> **Cloud Computing**

> **IT-Safety**

> **Virtual & Augmented Reality**

> **3D- Printing**

> **Artificial Intelligence**

> back to home page Digitalisierung

> to success stories, applications and examples

## Big Data

### Big Data – the pile of data available in the company – or – how analysis programs derive customer-relevant information from large amounts of data.

The efficient use of Big Data means a decisive competitive advantage for companies. It requires intelligent algorithms, a strategy and core issues to draw „digital" added value through the Big Data project.

**Datameer** is a global IT company that was founded by a former student of the Martin Luther University Halle and successfully expanded to California, the famous Silicon Valley. The core business is analysis programs that derive customer-relevant information from large amounts of data. Despite its worldwide success, Datameer continues to invest in the expansion of its location in Halle (Saale), because it wants to take advantage of the excellently trained, committed and team-oriented IT students from Halle (Saale) and the surrounding area.

The Otto-von-Guericke University Magdeburg is home to the world's largest **SAP University Competence Center (SAP UCC)**. It operates and supports SAP solutions for more than 500 institutions in Europe, the Middle East and Africa - from vocational schools to elite universities, research institutes and industry partners. Here, science and industry benefit from the latest technology in teaching, research and co-innovation.

back to top

## IT Safety

### There is no such thing as "one hundred percent security" and there probably never will be.

According to the definition of the German Federal Office for Information Technology Security, IT security is "a state in which the risks that arise during the use of information technology due to threats and weaknesses are reduced to an acceptable level with the use of the appropriate measures." For digitalisation to be able to succeed, cyber security is an essential prerequisite, and the number of companies operating in this area in Saxony-Anhalt is growing accordingly.

For example, the company AV-Test GmbH has become a world-leading provider of IT security and anti-virus research services; the company DIGITTRADE GmbH is developing and producing external hard disks and USB sticks with hardware encryption, as well as certified solutions for the storage of sensitive data on mobile storage media. It therefore comes as no surprise that IT security and data protection are key focal points of the "Digital Agenda" which is currently being developed in Saxony-Anhalt under the aegis of the Ministry of Economics, Science and Digitisation.

## Businesses and universities in Saxony-Anhalt are working at full pelt on solutions in the large-scale building site of IT-security

"One in every two companies in Germany is affected by digital attacks, which result in some 52 billion Euros of damage per year," highlights Franz Weisbrich. Franz Weisbrich is an industrial engineer and the executive chairman of the company "Sengi IT", a start-up from Halle. Four young professionals, graduates of business administration and computer science, founded Sengi IT with the help of the start-up service at the University of Halle. "We offer a highly secure cloud storage service for decentralised teams," explains Franz Weisbrich. The cloud solution is easy to use and provides employees with secure access to company data, also when they are on the move. The data is encrypted, split into small parts and then stored in various independent data centres in Germany. In cases of attempted theft, attackers are unable to make head or tail of the "snippets". "And no one knows, not even ourselves, which data is stored where," emphasises Franz Weisbrich.

Sandro Wefel, a computer scientist at the University of Halle, describes the topic of IT security as being a "large-scale building site". A university, for example, is particularly susceptible to attacks due to its structure. "Our networks are protected differently from companies; they are more open so as to ensure the freedom of our teaching and research. In addition to this, many devices are connected to our systems which have not been designed for security, such as robots. And then there is the fact that employees and students work with their own devices, which are susceptible to transferring malicious software onto the university network," explains Dr. Wefel.

## Research and development for greater safety

In a project developed together with Harz University of Applied Sciences, Dr. Wefel is hoping to bring about added security. Users will be able to identify themselves in the online university services with a smart card which is very difficult to forge. It is envisaged that only a card reader and a PIN will be required and the use of a password will be omitted. Equipping employees and students with chip cards, however, is currently too complex. Dr. Sandro Wefel hopes that the results of the project can be implemented by 2020 at the latest on the basis of the distribution of an electronic ID card which could then be used as a smart card.

There can be no doubt that the situation is urgent. Private and public organisations are now dependent on IT systems in all their areas of business and people are using them more and more frequently in their daily lives. And at the same time, the threats are growing: data theft, sabotage, espionage, technical system failures and the misuse of systems by changing the published content, for example. The threats often go unnoticed and are usually only recognised in the event of damage, and they come in many forms. Malware such as trojans, computer viruses, and also ransomware, botnets and identity theft are currently causing damage that runs into the billions of Euros.

The BSI describes a new kind of the threat in its current situation report: "The increasing extent of digitisation and networking due to developments such as the Internet of Things, Industry 4.0 and Smart Everything is offering cyber attackers new potential areas of incursion almost every day, as well as extensive possibilities to spy on information, sabotage business- and administrative processes, and to enrich themselves at the expense of third parties with the use of criminal methods." With simultaneous freedom of information, solutions for the areas of data protection and data security will not only continue to experience a boom in Saxony-Anhalt; the search portal  of the federal state of Saxony-Anhalt also lists in excess of a hundred projects from the last years in which researchers and businesses have addressed the issues surrounding IT security, whether it is in the fields of agriculture, healthcare, tourism or motoring.

back to top

# Cloud Computing

## European Data Hub in Biere

Digital business processes generate masses of data, the new currency of the economy. In order to turn the „rough diamants" into truly „high-calibre diamonds", you need a place to store and evaluate them, a data control centre. Deutsche Telekom has developed Biere near Magdeburg into a European Data Hub with a consistent cloud partner strategy. Nowhere else in the world are leading providers of cloud technology side by side in a data center. This makes beers unique and attractive for customers and partners.

### The Fort Knox of the data is located in Saxony-Anhalt
The history of the Data Center Campus Beers: The foundation stone for one of Germany's largest and most modern cloud data centers was laid in 2012, followed by the opening in 2014 and expansion in 2016.

### Huge demand for German Cloud
Since Edward Snowden's revelations, the need for cloud solutions for German data protection has grown rapidly. In 2015, for example, Deutsche Telekom generated revenue of EUR 1.3 billion across the group with cloud services - an increase of 30 percent. Since German SMEs in particular have a pent-up demand for secure cloud solutions, the group continues to expect high demand for the so-called "German Cloud".

### Expansion of Daten-Fort-Knox until 2018
Against this backdrop, Deutsche Telekom will invest a three-digit million euro sum and start building Beer 2. Construction work is expected to start this year when all the necessary permits have been obtained. The presumed completion of the building is planned for 2018. With Beer 2,150 percent more capacity is then available. Depending on demand, further expansion stages are possible. With Daten-Fort-Knox in Beere, Deutsche Telekom is underpinning its cloud strategy and aims to achieve a leading position in the European cloud market by 2018.

> The "Fort Knox of data" is in Saxony-Anhalt

> The German cloud is growing: Deutsche Telekom continues to develop Germany as its IT base

> Deutsche Telekom is challenging the market – for clouds, networks, and security

back to top

# Virtual and Augmented Reality

Concepts from Saxony-Anhalt are helping the technology to achieve its breakthrough. These days, augmented reality (AR) is an indispensable part of the process of digitalisation for companies and researchers alike. Visualising objects in virtual form saves costs, time and effort. This is because AR enables the precise visual and spatial visualisation of invisible characteristics and projects directly in their actual environment. Companies and research facilities in Saxony-Anhalt are working both on and with AR solutions.

> **more about virtual and augmented realty concepts from Saxony-Anhalt**

The three-dimensional representation, simulated by computer, has become an integral part of good customer service for modern architectural offices when selling houses and apartments. One extension is Augmented Reality. Real images are combined with objects created by the computer. Examples of this can be found particularly in the games sector, in the tourism industry, for example in mobile phone apps with GPS and service information, as well as in medicine in surgery planning.

## The factory of the future and the workbench 2.0

A lot is happening right now in the laboratory of the Fraunhofer Institute for Factory Operation and Automation IFF in Magdeburg. Test rigs for the research projects, with their robotic arms, cameras, projectors and computers, are everywhere to be seen. "It is important that we look into research for industry, for instance, in terms of the actual context, and see how augmented reality can be used in applications on a meaningful basis and also be integrated into work processes to perfection," explains Dr. Simon Adler of the Fraunhofer IFF. Each application requires a specific degree of accuracy for the superimposing. At a scale-oriented and fully functional 3D replica of an industrial system, Dr. Simon Adler holds a tablet next to the system, which has just reported an error. "The warning signal flashes on the tablet just above the point where the error actually occurred. In addition, an error code isolates the possible fault. We basically use the augmentation in three areas: for seeking and finding, for orientation and for evaluation," explains the scientist.

## The enhanced X-ray vision for the field of medicine

Situated right next to the Fraunhofer IFF in Magdeburg is the futuristic building of the Experimental Factory – or EXFA for short. EXFA is the research and transfer centre for application-oriented research and development on the campus of the Otto-von-Guericke University of Magdeburg, and it is also the home of the research campus STIMULATE. Here, interdisciplinary teams are investigating and developing image-guided methods of diagnostics and treatment which focus on the disease patterns with the highest degree of social relevance today.

In one of these labs, junior professor Christian Hansen is standing in front of an operating field on at artificial torso. With 3D glasses and a laparoscope, he is examining how minimally invasive surgery in the liver and the kidneys can take place in the future. "We use raw data from imaging techniques such as MRI and CT. On this basis, we create three-dimensional images and superimpose them with the stereoscopic video images of the living object," says the degree-qualified computer visionist, explaining the research project which started just a few days ago. The 3D image of the endoscope is superimposed with a virtual image of the organ, its vessels and the tumour via a high-resolution display. It is similar to shining a torch into a darkened room: only the genuinely necessary information is brought into the field of view. "All of this happens before the surgeon makes their first incision in the organ. The challenge is in achieving the high degree of precision which is required. After all, the technology will go into use on the living patient in the operating theatre, whose organs are constantly moving and changing shape – for example, through the patient's breathing and their heart beat," explains Hansen. It is thought that the procedure will find use both in the planning of operations and during a laparoscopy.

## More success stories and applications from Saxony-Anhalt

Thanks to faster, more powerful processors, graphics cards, sensors and cameras, faster Internet connections and innovative possibilities in software development, countless new possibilities have opened up for VR and AR in the private and industrial sector - some examples from Saxony-Anhalt:

> On the road in several realities - 2tainment GmbH is making use of the endless possibilities of AR and VR technologies

> How black and white squares create a living T-Rex - A start-up from Magdeburg breathes new life into QR Code

> The online agency Virtiv is the first licenced agency in Saxony-Anhalt which is allowed to work for Google Business View

back to top

# 3D- Printing

## How 3D printing changes our economy

Shoes, T-shirts and mobile phones from the 3D printer: In the future, consumers will simply produce their desired products themselves on site. This challenges economic processes. But professional 3-D printing brings opportunities: prototypes and small series can be produced in a high quality, cost effective and fast. Rapid prototyping also creates high-quality end products, trade fair models and spare parts at various stages of development. 3D printing solves what is not possible in classic manufacturing in terms of filigree.

> **more about 3D-Printing**

### Success stories, applications and examples

Layer by layer to success. Read here about applications, ideas and solutions of companies from Saxony-Anhalt.

> Market leader in 3D printed metal parts: citim supplies all over the world

> Practice before the operation: medical models from the 3D printer

> Printing the future - Merseburg University and network research additive manufacturing

> From aluminium to zinc - A start-up from Magdeburg develops, refines and sells metal powder for additive manufacturing processes

back to top

# Artificial Intelligence

# Artificial intelligence in industrial maintenance

The digitisation of the economy is continuing to progress. Multifunctional and high-precision sensor systems, modern network technologies and novel algorithms create the basis for the use of forward-looking, software-based maintenance strategies for modern machinery and production plants. The mapping of the high complexity of such production systems into meaningful and fast control and analysis algorithms can only be achieved on the human-cognitive level with a very high economic effort. Intelligent algorithms offer a cost-effective and quickly realizable alternative.

Indalyz Monitoring & Prognostics (IM&P) GmbH is a software company focused on the implementation of predictive maintenance software solutions for machines, plants and vehicles. The software product developed especially for this purpose is based on Prof. Dr. Michael Schulz's many years of research work on artificial intelligence, complex systems and dynamic structures.

> find out more

> back to home page Digitalisierung

> to success stories, applications and examples

Add page

## ICT

## Contact

Andrea Voss
Senior Manager

+49 391 568 99 29

andrea.voss@img-sachsen-anhalt.de

## Contact

Mandy Bunge
Strategic Marketing

+49 391 568 99 73

mandy.bunge@img-sachsen-anhalt.de

## HERE+NOW.

ICT

Impulsemagazine ICT