42/32

The Softwarepark Hagenberg Magazine | Edition 2017

softwarepark hagenberg

Automotive Computing

SHAPING THE FUTURE

**Softwarepark Hagenberg –
A dynamic pacemaker**

Mobility is becoming more and more important for humans. Technologies are rapidly evolving, and Softwarepark Hagenberg is a dynamic pacemaker in this process.

Research has been carried out here for nearly 30 years, standards have been defined which set the tone and tempo across the world – also in the field of automotive computing, which significantly influences and sustainably simplifies our lives. Independence, networking and interaction are the magic words, a dedicated team of researchers and scientists are actively shaping future trends.

The Johannes Kepler University has been in motion for five decades, the software park is an essential part of it. Facilities such as the recently founded Linz Institute of Technology are valuable partners on the common path. Their international expertise and practicality have always characterised all areas and sites of the JKU.

Our graduates are in demand on the job market and are the ones shaping Upper Austria. Important foundations are laid in Hagenberg.

Photo: JKU

Photo: SWPH

**The network location –
where ideas
turn into successes**

As a hub for research, education and business, Softwarepark Hagenberg networks decision-makers, visionaries and entrepreneurs. In order to turn ideas into success, the software park brings motivated people with innovative spirit together with successful companies with experience.

For us, 2017 is all about „automotive computing". With this in mind, Softwarepark Hagenberg is presenting an exciting series of events for IT experts on the question „What new challenges does the mobility of the future pose to IT today?", a new course at the University of Applied Sciences Upper Austria Hagenberg campus and also the first issue of the new „4232 | The Softwarepark Hagenberg Magazine".

Networking is not only a key topic at Softwarepark Hagenberg, it's also a key topic in the field of automotive computing. Whether vehicles are in communication with each other, with the infrastructure or even with other traffic users – the right networking is important!

Learn more about the mobility of the future and enjoy your time reading.

We look forward to meeting you at our exciting events.
Let's network!

Rector Univ. Prof. Dr. Meinhard Lukas
Rector of the Johannes Kepler University and
Head of Softwarepark Hagenberg

Dr. Sonja Mündl
Softwarepark Hagenberg Manager

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GET AN EDGE IN KNOWLEDGE

Find out more about current topics in the IT & software industry with the Softwarepark Hagenberg newsletter.
Sign up at www.softwarepark-hagenberg.com/en/newsletter-registration/

WHAT NEW CHALLENGES DOES THE MOBILITY OF THE FUTURE POSE TO THE IT OF TODAY?

EVENT SERIES FOR IT EXPERTS

AUTOMOTIVE COMPUTING
IN SOFTWAREPARK HAGENBERG

16TH MARCH | 22ND JUNE | 14TH NOVEMBER 2017

DRIVER ASSISTANCE

Vehicles are increasingly developing into highly complex, mobile IT systems. The amount of IT in vehicles and in the transport infrastructure today is already very high and will continue to rise steadily in the future. In order to enable autonomous as well as networked and cooperative driving, vehicles are increasingly being given the ability to interact with objects in their environment, in the road infrastructure and traffic management systems.

Computer-based methods for the virtual development of vehicles as well as the planning and implementation of innovative services in car-to-car (C2C) and car-to-infrastructure (C2I) communication are becoming increasingly important.

As part of the Softwarepark Hagenberg event series for IT experts, „Automotive Computing", you – together with the companies, research institutes and educational institutions of Softwarepark Hagenberg – will learn more about the new challenges that future mobility poses to IT today in lectures given by international experts, in order to gain a deeper knowledge of these topics and discuss possible solutions together in the subsequent discussions and workshops.

In his keynote speech at the opening event on 16 March 2017, Dr. Christopher Schwarzlmüller spoke about „The future of driver assistance systems". Softwarepark Hagenberg managed to pin him down for an interview:

Dr. Schwarzlmüller, you're in charge of „assistance systems development" at Bosch Deutschland. Can you tell us a bit about your main tasks in this areas?
I am currently working on image-based driver assistance systems that avoid collisions with other road users. I am responsible for developing algorithms which are capable of classifying vehicles in an image.

What percentage of a car do assistance systems comprise now and how much will this figure rise in the coming years?
If you take the total cost of a vehicle as a reference, the cost of electronics in a new car is about 30% according to a study by PwC. A large part of these electronics is required for driver assistance systems. By 2030, the percentage of the total cost will rise to 50%.* On one hand this is certainly due to the fact that mechanical components are being replaced and, on the other hand, because organisations like EURO NCAP are advancing the development of driver assistance systems by evaluating cars in special tests (for example emergency braking on pedestrian dummies). Moreover, EU laws will be passed with the aim of further reducing road accidents. For example, the Electronic Stability Program (ESP) became mandatory for newly registered vehicles on 1 November 2014.

Networking vehicles has all kinds of benefits. In your opinion, who will benefit and who will lose out?
In my opinion, the network providers (fast networks are the prerequisite for networked vehicles) as well as all traffic participants will benefit from it. Potentially, it is possible to achieve smarter traffic management (avoiding congestion, finding parking spaces more quickly, etc.) and reduce the number of accidents (e.g. by cloud-based wrong-way driver warnings).

Automated cars are already highly developed and some are even on the road. How will the way we drive change in the near future as a consequence? Will we forget how to drive?
That depends largely on how legislators react to this technology. However, it seems that monotonous and annoying driving tasks are gradually being taken over by driver assistance systems. An example of this is a parking assistance system. Depending on the legal situation, the driver is responsible for the longitudinal movement (accelerating, braking) and the system takes care of the angle of approach and takes over the latitudinal movement (steering). It could be the case that we soon forget how to park. Although it will still take a few years until automated systems take over for the driver. The driver will, however, have the option to deactivate a system. It is exciting to consider how long the development takes and what it will actually be like.

Is the driver of the future only „externally controlled", or is regular driving still possible or useful?
Regular driving (i.e. driving without the use of assistance systems) will continue to be possible since the driver has the option to deactivate the system. Yet there are situations where it is simply no fun to drive yourself. Take driving in traffic jams as an example. Here, the driver can hand over control to the system. Conversely, there are of course situations in which you do want to have direct control of the vehicle.

Could new technologies in cars or in the infrastructure make roads safer for other road users, such as pedestrians or cyclists?
Definitely. There are studies which show that in 90% of accidents the driver is at fault. Almost 50% of road accidents could be mitigated or prevented using driver assistance systems which are currently available. The response times of driver assistance systems are significantly quicker than those of human beings. Cars are already able to apply the emergency brakes if pedestrians or cyclists are detected. Systems like this are already available on

SYSTEMS OF THE FUTURE

An interview with Dr. Christopher Schwarzlmüller,
Bosch Deutschland GmbH, Assistance Systems Development.

the market. It is also quite conceivable that sensors near a pedestrian crossing detect pedestrians, and all the cars within range are informed of this. Consequently, drivers would be warned of the hazard well in advance.

The amount of electronics or computer-control in a vehicle is currently relatively high and will probably continue to rise. To what extent does this have an impact on reliability and safety in a car of the near future?
In principle one can say that this leads to an ever-increasing complexity. When developing such systems, many processes have to be adhered to (e.g. ISO 26262 – Functional Safety). The goal is to eliminate all errors and remove the risk of malfunction through redundancy or other mechanisms. A further objective is to reduce the large number of control units by introducing central control units which perform their tasks. This measure results in complexity being further reduced.

To what extent does IT security play a role in networked vehicles?
It plays a central role. Just imagine if someone were to bypass a car's security measures and control it remotely. It is very important that the systems cannot be externally manipulated. There are already methods to ensure this security.

Do these IT developments necessitate specific training opportunities? If so, why?
Well, for example, in technical mathematics degrees, there is the possibility to go deeper in cryptology. It is also possible to go deeper into this area as a computer scientist. The new course „Automotive Computing" offers further opportunities for education in the relevant fields.

Dr. Christopher Schwarzlmüller
Bosch Germany, Assistance Systems Development

Photo: Foto Wallner

"Almost 50% of road accidents could be mitigated or prevented using driver assistance systems which are currently available. The response times of driver assistance systems are significantly quicker than those of a human being."

Dr. Christopher Schwarzlmüller was born in Wolfsberg, Carinthia on 19 December 1982. Here, he studied industrial engineering at the secondary technical school. Following this he studied computer science at the Alpen-Adria-Universität (AAU) in Klagenfurt. After completing his studies, he worked as a project assistant at the AAU in driver assistance systems. In 2011, he earned his doctorate in this field and completed the Bachelor's degree in Technical Mathematics and Data Analysis. Since January 2012 he has been working as a developer of driver assistance systems at Robert Bosch GmbH in Germany.

GETTING GOALS FASTER

RISC Software reveals optimisation potential in the automotive industry.

Photo: IStock.com

RISC Software GmbH deals with the optimisation of production and logistics processes in the automotive sector, with the goal of making them efficient and cost-effective. This includes the organisation, planning and control of complex production and logistics flows up to the last mile as well as the potential of light construction in the automotive industry for efficient energy use.

Improving production & logistics

In the ongoing research project IPPO – Intelligent Networking of Forecast, Planning and Optimization for the Design of Sustainable Transport Chains – it is demonstrated how efficient and innovative algorithms can be used for information, communication and position detection. The aim of the research project is to increase planning security for freight forwarders in order to achieve increased use of sustainable transport means, while reducing energy consumption. This is made possible by new algorithms and methods for the networking of forecasting, planning and optimisation and shown on the example of automobile distribution. Together with Fraunhofer Austria and company partner, Hödlmayr, RISC Software GmbH is developing an information system which allows logistics specialists to plan and implement reliable and sustainable transports.

To do this, it is necessary to expand the planning horizon or to define it more precisely in order to respond to a changing order situation at an early stage.

Optimising vehicle construction

The use of lightweight construction in vehicle manufacturing makes it possible to get the greatest additional potential for optimisation out of the automotive industry. Lightweight construction plays an important role, whose relevance in terms of e-mobility is untapped. The advantages are obvious: a reduced dead weight requires a lower energy input, thus lowering emissions. Moreover, the load capacity can be increased and the vehicle dynamics improved. It is particularly important that the optimal geometry and the best possible use of specialised materials for the overall structure are considered during the earliest possible construction phase.

With the help of multidisciplinary structural optimisation systems, lightweight structures can be optimised respectively to different design parameters. Examples of design parameters include, among others, cross-sections of individual components or entire component groups, but also layer thicknesses and routings of fibre composite materials. RISC Software GmbH is able to draw on many years of experience with optimisation systems. The implementation of modern, efficient calculation methods on current hardware platforms, in particular, is a unique feature.

www.risc-software.at

Paid contribution

GLOBAL PRODUCTION

Successfully bringing the future to the streets with STIWA.

„Internet of Things" or „Industry 4.0" are not only hot topics on the market in the automotive industry. The underlying technology at work here is M2M, which refers to the automated communication between end devices such as machines, automatic units and components.

Dominating global production with M2M

The STIWA Group has been working with networked production for more than 20 years and is successfully using its solutions for its production customers across the globe. The Manufacturing Software division based in Hagenberg develops and distributes software solutions for the operation and optimisation of production facilities. More than 1,200 licences are used worldwide, with more than 60% of sales being generated in the automotive industry. Since production in this industry is spread out across the globe, streamlined and fully automatic data management is necessary for efficient production. In globally distributed production, components or parts are passed from machine to machine and processed step by step. The data resulting from this is assigned to the product, which can influence downstream process steps. This opens up new possibilities. For example, the automatic adjustment of a process can ensure product quality, and reductions in cost can be achieved by avoiding taking multiple measurements. „STIWA software solutions ensure that M2M communication works. If each part carries its data backpack with it, the potential of automatically controlled processes can be fully exploited", says Robert Schoßleitner, head of the Manufacturing Software division. All data is available at the place where the rules based on it are applied.

Engineer Robert Schoßleitner
STIWA Group, Head of Manufacturing Software

Photo: STIWA Group | Atzlinger

„Processes based on M2M are one of the foundations of global, economic manufacturing."

Increasing economic efficiency

In the automotive industry, quality assurance and reducing consequential damage are of central importance, especially when you consider recall campaigns of well-known brands. M2M contributes significantly towards lowering costs or not incurring them in the first place. In this way it is automatically ensured in each production phase that only correct parts are fed with a machine's correct status. This prevents manufacturing errors. If suppliers report that they have received bad parts, they can be located with blacklists during the production chain and withdrawn from the production process. As the follow-up costs increase with each production step – all the way to recalls for whole batches – the consequences of damages can thus be significantly reduced. „Processes based on M2M are one of the foundations of global, economic manufacturing. With STIWA software solutions we are able to provide optimal support to discreetly manufacturing companies", says Schloßleitner.
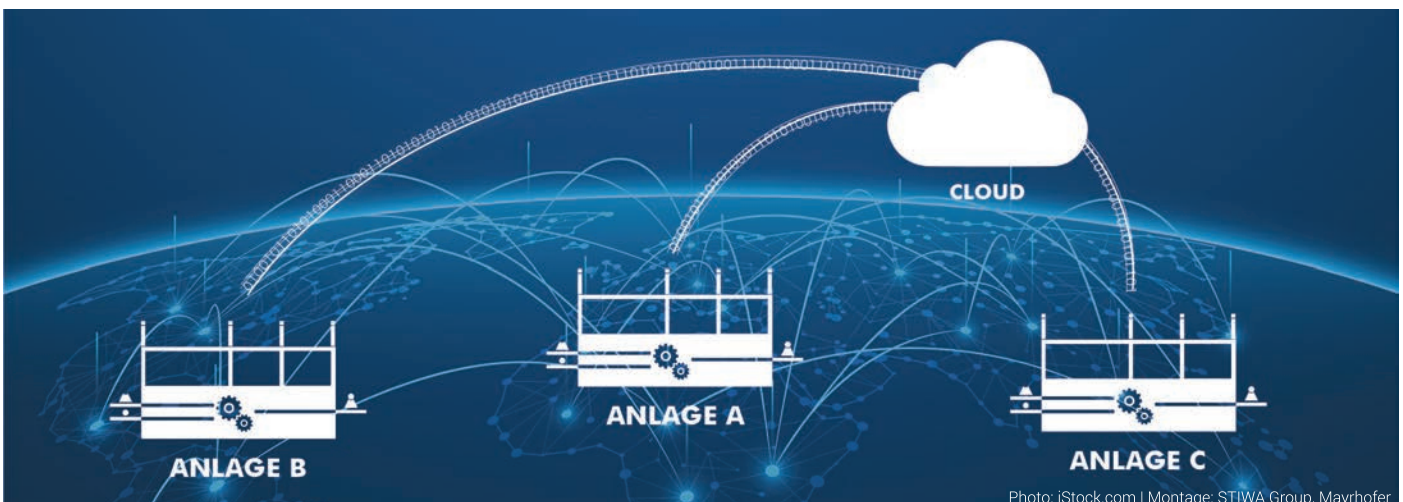
www.stiwa.com

Photo: iStock.com | Montage: STIWA Group, Mayrhofer
Paid contribution

DRIVE (OR BE DRIVEN)

Is automated driving the future of road traffic?

The thought of letting go of the wheel is a tough one for lots of people. Yet, it seems that automated driving is the future of road traffic – or is it? This topic is being extensively researched at the University of Applied Sciences Upper Austria in Hagenberg.

Imagine being able to take your time getting up in the morning, eating breakfast and then driving to work without sitting in traffic because you are notified when to leave and which route to take! On the journey you are warned in advance about the location of an accident and are accordingly redirected, so that you arrive at the office on time only having used a small amount of fuel! A pipe dream? In fact, this might be an occurrence which takes place in the not too distant future! According to experts, automated driving is the future of road traffic. But there are two concepts; autonomous driving, where the car utilises information that it can collect itself; and cooperative driving, in which cars communicate with each other and with a smart infrastructure. Exactly this is not only being worked on in Silicon Valley, but in Hagenberg too. Gerald Ostermayer, a professor at the Department of Mobile Computing, and his team are researching the Upper Austrian contribution to this global topic in two projects: „Connected Vehicles" (project partner: EU Regional Funding Program, ERDF IWB 2020) and „aDrive" (project partners: FFG Programm Industriesnahe Dissertation).

Networking as a key

„Wireless radio communication and software are the keys to enabling vehicles to exchange data with each other and receive information on traffic, road conditions and hazards." says Gerald Ostermayer.

**University Prof.
DI Dr. Gerald Ostermayer**
Leader of the research group „Networks & Mobility"

Photo: FH OÖ

„Primarily it's about an efficient use of the road network. Our research is making an important contribution towards it!"

This important exchange of information is being researched as part of the „Connected Vehicles" project – in an interdisciplinary approach and across three subject areas. „Primarily, we're looking at the efficient use of the road network. Our research is making an important contribution towards guiding vehicles through traffic in real time – through dynamic rerouting, for example, when accidents occur or when traffic jams begin to form", explains the leader of the research group „Networks & Mobility". The second focus of the research in „Connected Vehicles" is the line of communication between vehicles, which is being investigated using new methods. The third topic concerns the delicate balance between data security and operational security, i.e. security and safety. „If, for example, a braking manoeuvre is performed too late because the data was externally manipulated or because it wasn't decoded in time or correctly, this can of course have fatal consequences", comments Ostermayer.

To err is human

Ostermayer and his team in Hagenberg are also working on modelling the way humans drive. Within the context of the „aDrive" research project, they are investigating the following question: how do people behave at the wheel of a vehicle in very specific situations? This information is particularly important to investigate mixed traffic situations. And we will be involved in these situations for a long time to come. Ostermayer is convinced that „not all drivers will provide data from their vehicles, not everyone will drive with a GPS device, and Ferrari drivers will always want to drive themselves." For this reason, his research group is investigating various scenarios: those with autonomous cars, with cooperative cars, with neither autonomous nor cooperative cars, and combinations thereof.

Research which benefits everyone

Ultimately, every individual and the general public can benefit from this „if companies are able to derive a business case from the results of our research and put things into practice", adds Ostermayer. In any case, the knowledge gained will flow into teaching at the University of Applied Sciences and thus benefits the students in the near future, according to plans at least, even within the framework of a new course at the Hagenberg campus called Automotive Computing.

NEW DEGREE AT THE UAS

Automotive Computing.

Photo: iStock.com

In autumn 2017, a new six-semester undergraduate degree course will be offered in Hagenberg which is devoted to the topics of IT in cars and networking in road traffic.* It is called „Automotive Computing" and was co-ordinated by University of Applied Sciences (UAS) Upper Austria professor Gerald Ostermayer, who explains the course in more detail:

What is Automotive Computing about?
Ostermayer: It deals with the ICT aspects of the networking of vehicles. In networked mobility, communication, efficiency, security and infotainment all play a role. Software is a central part of this development. This is what we're offering in Hagenberg.

What is the main focus of the new course?
Automotive computing is very interdisciplinary, that is to say cross-disciplinary. The students acquire know-how in software engineering and automotive engineering as well as technical and natural sciences. Automotive engineering is related to areas such as functional safety, vehicle-specific IT systems and the ecosystem of transport, but also related legal frameworks and standards as well as ethics. In addition, topics such as safety in automotive systems, business management, innovation management and social competence play an important role too.

What are some of its other features?
Projects start from the 2nd semester and a range of specialisations from the 3rd semester. The latter topics include areas such as „automated driving", „the modern vehicle" and „services", and cover topics such as e-mobility, mobile connectivity, usability, Internet of Things, and more.

What about the job opportunities?
A survey of 32 companies, including vehicle manufacturers and suppliers, IT companies as well as companies from the fields of engineering, development and road and traffic management, have rated the professional opportunities at home and abroad as „very good" and „quite good". The demand for graduates from the Automotive Computing degree is high.

Which professions are open to graduates?
Graduates are the link between the world of traditional software development and road-based mobility. They are thus excellently suited to developing software for IT systems and services that enable networked driving and other services. In addition to software development they can also be used to carry out thorough evaluations, make comparisons and select systems. Consequently, graduates are in general demand not only with vehicle manufacturers and infrastructure providers, but also with IT companies.

What further education opportunities are there?
For instance, at the University of Applied Sciences Upper Austria you can study Master Energy Informatics in Hagenberg which is especially for e-mobility and the Master Automotive Mechatronics and Management courses in Wels.

www.fh-ooe.at/ac

*Subject to approval by AQ Austria

Paid contribution

HIGHWAY TO HELL

Are networked vehicles really a threat?

We have many years of research to thank for making driving more and more safe by developing innovations such as airbags and ESP systems. Today, these safety measures are standard and, like so many other practical accessories, not having them is unthinkable. With the arrival of extras such as integrated navigation systems and online-capable audio players, the automotive industry has also crossed the threshold of digitisation and thus unwittingly launched a new trend: car hacking.

New trend: car hacking

In 2011, the first major breakthrough in the field of car hacking was announced: two safety researchers described how it was possible to deactivate a vehicle's brakes by exploiting a bug in the audio system. However, this weakness – which was exploited through a direct connection with the car – was dismissed by manufacturers as far-fetched. Until 2015, when two security researchers proved in a spectacular hacking attack that a vehicle can be controlled remotely via the internet. This is made possible by the now complete networking of all control units and the use of standard software in vehicles.

The ever-increasing number of software components in use which are connected to the outside world via WiFi, Bluetooth or mobile communications, opens the door to unauthorised access to control units. Limes Security has devoted itself to this area: as a consulting company for security in industry and software, Limes Security is helping to secure the way towards digitalisation.

Industrial product manufacturers can subject their products to a preventive hacking test by Limes Security in a bid to detect and close security gaps before they become a problem with customers. Limes Security is able to provide the entire industrial value chain with security.

In this way, operators benefit from Limes Security's expertise in safe operating concepts, security acceptance tests as well as safe procurement. System integrators in particular are able to rely on Limes Security's consulting when it comes to secure system architecture. „The digitisation of the industry is just beginning", says Thomas Brandstetter, Managing Director of Limes Security.

The digitisation of the industry is just beginning.

Whether in the B2B area with industry 4.0 or in the consumer area with the Internet of Things: existing products are expanded with software components, systems are equipped with even more logic and all the while the extent of networking rises. This creates new potential in the areas of productivity and flexibility, but only on the premise that these systems cannot be manipulated.

This risk must therefore be identified and minimised in time using expert know-how – the right „airbags" should be provided in order to prevent write-offs by digitisation, even in the case of a crash.

www.limessecurity.com

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SMART PROCESSES

PenTribe develops an intelligent online marketing model.

PenTribe International has been honing the sense for optimisation of existing and new internet online platforms, social networks and search engines for more than 5 years. The result is „intelligent" processes, which analyse the many dimensions of an online representation in key figures.

In doing so PenTribe is decisively closing the gap between technology potential and process quality of online marketing and sales tasks. This saves high costs and generates efficiency in customer contact.

PenTribe's customers are thoroughly consulted about contexts, informed about unrealistic promises, provided comparative figures and equipped with concepts for processes and key figures. A highly modern hub of (calculated) 15 petabytes of online data helps in the process.

Consistent visibility and key figures required a process model

No company is able to avoid the wide array of online presence questions (online visibility) and online ordering processes. PenTribe's analysis results enable business owners to consciously steer towards their objectives.

Competitive intelligence supplements Industry 4.0 in communication

PenTribe's „Competitive Intelligence" concept compares the client's online marketing strategies with the marketing, sales and communications activities of its market players – locally and globally. The results of the analysis open the client's eyes to a wide range of measures – at all levels of the online world, since it provides 3 essential pieces of information: (1) Who are my competitors (online)? (2) What are my (potential) customers buying /looking for from my competitors? (3) What communicative market share does the competition have in comparison?

In a region with more than 400 hotels and accommodation companies, PenTribe was able to position a company at the top of the online competition, so that bookings were generated directly using customer requirements, and expensive online advertising expenditures became virtually superfluous.

As success in the market is increasingly determined by a company's online strategy, PenTribe helps its customers through the Competitive Intelligence portfolio, including tools and independent consulting with factual analysis.

www.pentribe.net

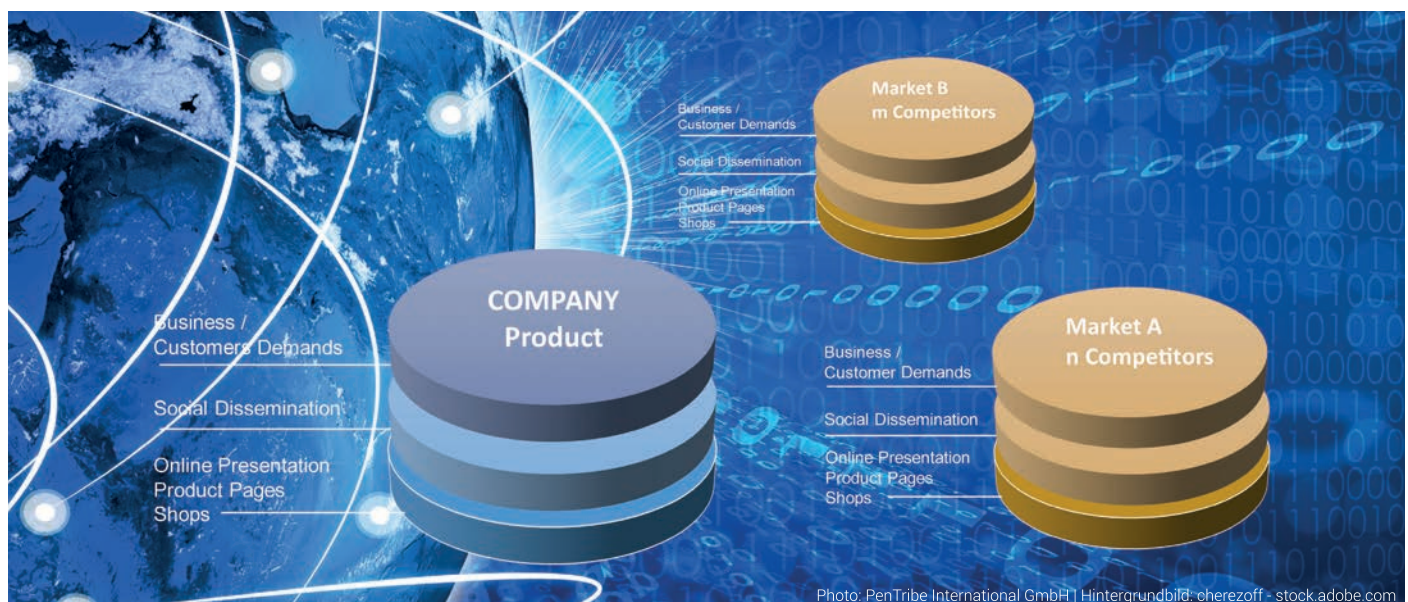## Optimising online visibility in multiple dimensions

Photo: PenTribe International GmbH | Hintergrundbild: cherezoff - stock.adobe.com

Paid contribution

DIGITRANS

Test track for autonomous driving in Upper Austria.

DigiTrans is a project of Automotive Cluster (AC) whose aim it is to explore a test region for automated and networked driving in the upper region of Austria (Linz - Wels - Steyr). The project addresses requirements from industry and infrastructure operators, including digitisation and logistics aspects.

Dr. Michael Strugl, MBA
Economic Affairs

Photo: Land OÖ

„We will figure out the next steps for future mobility in Upper Austria from the results of the DigiTrans trial."

www.automobil-cluster.at/digitrans

The core consortium of DigiTrans comprises the Automotive Cluster of Upper Austria's business agency Business Upper Austria, the AIT – Austrian Institute of Technology GmbH, LOGISTIKUM Steyr - University of Applied Sciences Upper Austria, and IESTA - Institut für innovative Energie- & Stoffaustauschsysteme e.V (Institute for innovative energy and material exchange systems). As part of the „Connected Mobility Initiative" (ICM), the DigiTrans project is designed to set up and operate a test environment consisting of a research, development and evaluation structure for automated driving in Austria. DigiTrans focuses on the needs and applications of commercial and special vehicles, especially in the area of logistics hubs and on the common infrastructure utilisation of test environments for autonomous driving. The DigiTrans test track for goods mobility is open to all vehicle manufacturers and service companies who are engaged in a new goods mobility with assisted and self-driving vehicles to test requirements with regards to system tuning and integration with new, automated solutions. The project ran from December 2016 until the end of May 2017.

Advert

HIGH LIGHTS

2017

16 MARCH 2017
Opening event of Softwarepark Hagenberg
IT expert series Automotive Computing
amsec IMPULS

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05-06 APRIL 2017
Security Forum 2017
University of Applied Sciences Upper Austria Campus Hagenberg

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17 MAY 2017
STIWA Jazz Forum: Dickbauer Collective
amsec IMPULS

22 JUNE 2017
2nd event of Softwarepark Hagenberg
IT expert series Automotive Computing
University of Applied Sciences Upper Austria Campus Hagenberg

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17-19 JULY 2017
Hagenberg Kids Uni
University of Applied Sciences Upper Austria Campus Hagenberg

27 SEPTEMBER 2017
Classic Forum
amsec IMPULS

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19 OCTOBER 2017
career fair FH>>next for IT and media
University of Applied Sciences Upper Austria Campus Hagenberg

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14 NOVEMBER 2017
3rd event of Softwarepark Hagenberg
IT expert series Automotive Computing
Schloss Hagenberg

13 DECEMBER 2017
STIWA Jazz Forum: Tingvall Trio
amsec IMPULS

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