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#RUHRMOTOR18

NEWSPAPER FOR THE 18TH CAR-SYMPIOSIUM
IN BOCHUM ON 8 FEBRUARY 2018

” WHY CAN WE DO IT?
BECAUSE WE LEARNT
HOW TO DO IT HERE IN
BOCHUM ”
INGPULS

INGPULS
AN INTERNATIONAL
REPUTATION

AUKTORA
A DRIVING
FORCE

VW INFOTAINMENT
VW'S YOUNG
WILD ONES

BOCHUM
THE ENABLER
CITY

NEW ROADS TO THE
AUTOMOTIVE FUTURE

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WITH VW-CEO
MATTHIAS MÜLLER
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EDITORIAL

Dear Visitors to the
CAR-Symposium 2018

You are now reading the brand new edition of #RUHRMOTOR18, Bochum's contribution to this year's CAR-Symposium. This year, once again, our magazine shows you that companies in Bochum are good at innovation – and that their inventive talent will have a sustainable impact on our automotive world.

Come and find out for yourself just how efficient Bochum's automotive sector companies are - and how some have found their own special niche enabling them to excel on the market. These companies deliver the proof: if you have good ideas and can put them into practice, you will find all the support you need in Bochum.

This is because Bochum is the Enabler City. Because we are good at structural change. Because we have transformed ourselves from a city of steel and coal into a city of knowledge workers. Because the universities and companies all work together on innovative solutions. And because we, as a city, have recognised that you have to set yourself clear targets if you want this constant change to succeed. Or, as the managing director of Ingpuls put it: "Why can we do it? Because we learnt how to do it here in Bochum!"

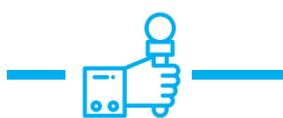
Welcome to our Enabler City
and enjoy reading these
articles.

Best regards
Thomas Eiskirch
Lord Mayor of the
City of Bochum



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Interview with **VW's CEO Matthias Müller**, Keynote Speaker at the CAR-Symposium.

»The future is driven by electricity«



Mr Müller, Volkswagen AG is committed to sustainability and is investing billions in electric mobility. But the greatest guarantee for sales in the successful year of 2017 was still SUVs and conventional vehicles with combustion engines. Is that some sort of contradiction?

Indeed, there is strong demand for these versatile and comfortable vehicles at the moment. We would be bad business people if we didn't satisfy this demand. I'm also pleased that our brands now deliver attractive SUVs in all classes and, by the way, with consumption figures that are often much better than our competitors. This year Audi will be presenting its very first fully electric SUV. We are convinced that the future will be driven by electricity. By 2025 we expect every fourth new car from the Volkswagen Group to be powered by electricity, which means we are talking about up to three million vehicles per year. But that also means that better and more efficient combustion engines will also be with us for quite a while longer. Luckily, we earn good money with the current models which enables us to fund huge investments in the mobility of the future.

By announcing investments over the next five years amounting to 34 billion Euros – much more than originally planned – in growing electric mobility, developing batteries and autonomous driving, you have definitely stepped up the pace. Are you worried about severe penalties if the EU introduces new CO₂ limits for new cars in 2021?

I expect a company like Volkswagen to lead the way when it comes to how vehicles will

be powered in future. No other company has as much leverage as we have with our strong group comprising twelve brands producing more than 10 million cars each year. Any breakthrough is not going to come from the self-proclaimed pioneers. It will come from whoever gets a new technology onto the roads in a relevant number of vehicles. Volkswagen has set itself the aim of becoming a world leading supplier of sustainable mobility – and to set an example to the world when it comes to the environment, security and integrity. Electric mobility is one of the key factors for achieving the environmental protection targets which the world community signed up to at the Paris Convention.

Almost half the world's electric cars are registered in China. By 2025, with their Chinese joint ventures, Volkswagen AG wants to invest around 10 billion euros there in industrialising e-mobility. Will the Chinese competition force their way onto the German market otherwise?

If you look at the air pollution in cities like Beijing, it is clear why the Chinese government has to act now. Road traffic is one important aspect. This will see China as a pioneer and driving force behind electric mobility. We will play our part in this and work together with our Chinese joint venture partners on a whole series of electric vehicles so as to be able to offer attractive products in all the important segments on the demanding Chinese market. You mention the approximately 10 billion Euros of investments which we will be providing for investments there in our second home market together with our partners. We will also benefit from the experience and developments in China back here in Europe and in the other markets around the world. We take the new market players – whether they are in Asia or in California – very seriously. But we have every reason to take on the competition with confidence.

Around a year ago the largest German car manufacturers announced that they wanted to start working together on producing so-called rapid charging points for electric vehicles by the end of 2017. What became of this project? And what are the politicians doing to push the topic of e-mobility?

"Ionity", a joint venture company, has been installing rapid charger points along the main traffic arteries since the summer. This is special because, for the first time, car producers such as Daimler, BMW and Ford

have come together to work with petrol and service station operators. And Audi and Porsche are involved for Volkswagen. The first chargers are up and running and 100 more will be added this year. In the medium term we will be providing many thousand and charger points at attractive sites along the autobahns and main roads. We have to put the work in up front – but it is clear that setting up a charger infrastructure for electro-mobility is a task for us all and politics must also play a role. None of us can afford to lose any more time.

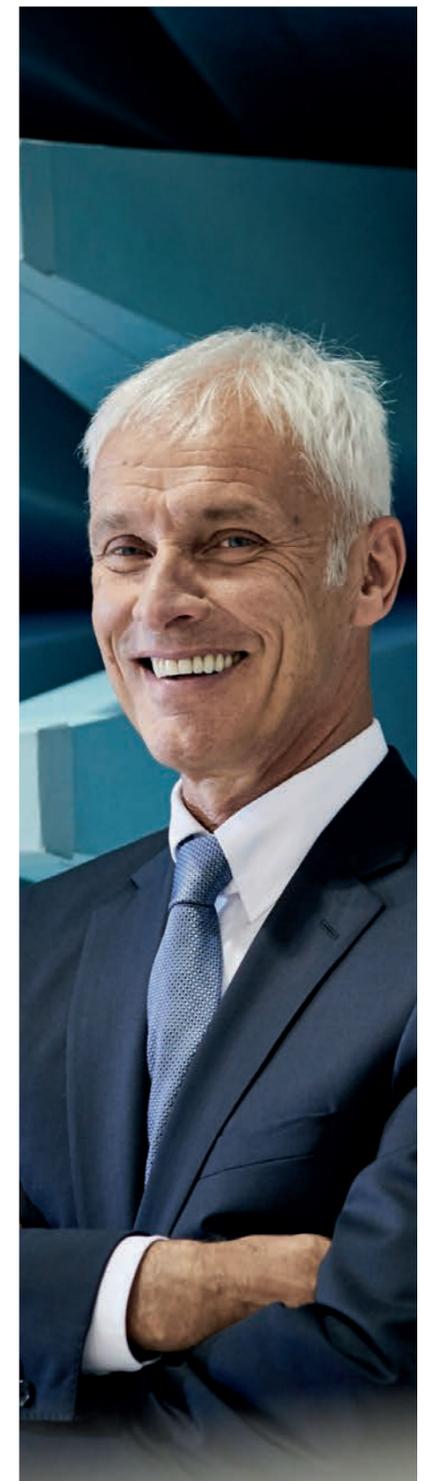
Automobile companies will be earning their money by doing more than just selling cars in future, they will be offering more and more services related to the car. Volkswagen AG recognised that much earlier than many of their competitors and are developing their own digital control devices in their subsidiary VW Infotainment in Bochum. Are any more companies like this in the pipeline?

This is a very important topic. In my opinion the future success of Volkswagen depends on two questions: Can we manage to enter the electric mobility market? And can we manage to transform ourselves from being just a vehicle producer to become a provider of sustainable mobility solutions? This includes new services in cars like the ones VW Infotainment is developing. But above all it also includes new mobility solutions. The need to transport people and things from A to B, that will always be there, or increase even. And the wish for individual mobility will always be there too. But more and more people won't need their own car for that. So we will have to find suitable solutions for this as well. Our subsidiary MOIA has specialized in this area and this year will be starting up a shuttle service in Hamburg using its own electric vehicles for up to six passengers, who can book places via a smartphone app. To answer your question: yes, I expect that there will be even more spin-offs like this. Small, fast and agile units which can drive these future-related topics forward.

It is not only the internationally active car corporations which are impacted by change, numerous small and medium-sized suppliers are too. How can they get involved in shaping this transition successfully?

Our corporate strategy is not called "TOGETHER" for nothing. The times when we in Wolfsburg thought we had to and could do everything on our own are long gone. And our long-term partners from the clas-

sic car-making world are still very important. We are deliberately involving them even more and earlier on in our development processes. We also search out the best partners from the worlds of software and IT to strengthen ourselves in certain special areas which are not traditionally part of our normal core expertise. It is good to see that we are also in demand as contact partners for these companies. Just a few days ago we entered into a cooperation with the Californian company Aurora, one of the leading developer teams for autonomous driving systems. Together with these new and old partners we are shaping the future of mobility.





Bochum has had quite a turbulent history: first of all, in the 1970s, the mining industry disappeared from the city, and then 30 years later, the Opel factory closed down and we saw the last cars produced here in this, the fourth biggest city in the Ruhr Region. "Structural change" was once again on everyone's lips. But Bochum has never been a city to look back wistfully at the past. Bochum looks ahead. It's always been like that. And will always be like that in future too. Because Bochum is good at structural change, Bochum is "the Enabler City".

The Enabler City

Bochum might be getting another title soon too. The "Gigabit City Bochum" initiative sees Bochum striving to become the "fastest city in Germany". By the end of this year, practically all citizens and companies in the city will be able to benefit from a broadband connection with a speed of one gigabit per second – 2.5 times faster than all the fastest internet connections available to private customers so far. "By extending the broadband network, Bochum is raising the bar of its already very good digital infrastructure to yet another level", says Ralf Meyer, Managing Director of the Bochum Office of Economic Development. "Modernising the cable network operated by Unitymedia and extending the fibre optic infrastructure will make networked applications and services much more viable in future, especially for smart municipal infrastructures and Industry 4.0".

At the moment, 1,400 addresses in Bochum's municipal area count as having a poor internet service (less than 30 Mbits per second). That is why the city is planning to extend the optic fibre network to a total length of more than 600 kilometres. Federal and state government are both supporting this plan with more than 5.6 million Euros because they too know how important location factors like this are for small and large companies alike.

Connecting business and science

Bochum realised this a long time ago and has always promoted networks involving the worlds of science and business. 15,000 companies call Bochum their home nowadays, with many of them sited close to the

nine universities within the city. "We foster entrepreneurial spirit, create the right atmosphere for start-ups and are open to innovative ideas", explains Meyer. "In Bochum innovative companies encounter a well-functioning infrastructure and clever settlement structures."

As the second biggest university city in NRW with more than 56,000 students, this Ruhr Region metropolis also boasts the Institute of Electromobility - one of the most renowned and trendsetting research institutes in this field in Germany. And the city is also a pioneer in many ways when it comes to practical applications in this field. Among others, the Deutsche Post selected Bochum for a ground-breaking pilot project: since August 2016 they have been delivering parcels in the city centre in their almost silent, climate neutral electric vehicles. e-cargo, a company for municipal electric mobility, is also developing a novel city centre logistics concept together with the City called "Green Place", which all parcel services can make use of. And they have already found their first partner in GLS.

Back to the future

Indirectly this sees the automotive industry returning to Bochum. Or even better: the future of the automotive industry! Close to the universities, many small specialized companies have set up providing expertise

"We foster entrepreneurial spirit, create the right atmosphere for start-ups and are open for innovative ideas."



“In Bochum innovative companies encounter a well-functioning infrastructure and clever settlement structures.”

which the whole sector relies on more than ever as vehicles become more and more digitized and the development of alternative drives is forced ahead. For example, the company Ingpuls, set up by 3 young engineers in 2009, is the only company in the world to manufacture shape memory alloys (SMAs) in serial production for the automotive industry. “And we can only do that because we learnt it in Bochum”, as Dr. Burkhard Maaß, co-founder of Ingpuls tells us.

Companies like Auktora, the specialist for developing electric power trains for electric motors, and Escrypt Embedded Security by ETAS, founded as a spin off from the Bochum Horst Görtz Institute for IT Security, advise automotive companies across the world. From Bochum, Auto-Intern delivers diagnosis adapters for vehicles to the whole of Europe and beyond. And the Wolfsburg car manufacturer Volkswagen also benefits from the many excellently educated university graduates from Bochum. In just three years, the Volkswagen subsidiary VW Infotainment doubled the number of its staff from 200 to almost 400 IT specialists. Directly next door to the Ruhr University Bochum Campus they have developed an online-connectivity-unit which will go into production for the parent company this year.

MARK 51°7 - a success story

The marketing of this huge site where Opel Kadetts, Astras and Zafiras used to roll off the production line and which is now known as MARK 51°7 is progressing well. In the just three years since the Bochum Perspektive 2022 GmbH took over the 68-hectare site from car manufacturer Opel and began to dismantle the automobile factories, several large companies have already set up here. Deutsche Post DHL is investing an eight-figure sum in constructing one of the most modern parcel centres in Europe on the MARK 51°7 site. As of autumn 2019, it will be possible to process up to 50,000 parcels per hour here. And just two months ago the latest success was announced by Bochum Perspektive 2022: high tech service provider DEKRA has bought a 16,000 square metre plot on the site of the former Opel factory too. This test specialist will soon be letting us know exactly what they intend to do on MARK 51°7. “office 51°7” was the very first company to locate on the former Opel site and they have already celebrated their opening ceremony. This modern office building is the new home for construction company Goldbeck West and two IT specialists.

And that was just the beginning of it all: during 2018 at MARK 51°7, we will see work begin on developing the

second construction phase on this huge site. Several other investors have already expressed an interest.

The Lord Mayor Thomas Eiskirch is particularly proud of the Ruhr University Bochum’s plans to set up at MARK 51°7. Their site here will become home to the Research Centre for Engineering Smarter Product-Service Systems (ZESS). This research building will be the first anchor point for knowledge-intensive companies and non-university research establishments in this quarter. Bochum’s Lord Mayor Thomas Eiskirch hopes that this university involvement will attract more research-related companies and institutions in future: “This development space at MARK 51°7 will become a melting pot for knowledge work and provide a significant anchor point for a vision of the future of Bochum.”



THE ENABLER CITY

Please find more information about the topics in this article at:

- www.gcb.ruhr
- www.bochum2022.de
- www.bochum-wirtschaft.de
- www.mark-517.de

“MARK 51°7: melting pot for knowledge work“





Raw materials like titanium and nickel are cast and processed at the Ingpuls production facility.

Workshop with an international reputation

“Nowadays, intelligent materials are changing the future of our products, and the future of humankind“

Burkhard Maaß / Ingpuls



Engineers Christian Großmann, André Kortmann and Burkhard Maaß can do something which nobody else can do. In the whole world. And they can do it “because we learnt how to do it here in Bochum”. It would be difficult to acknowledge one’s commitment to Bochum in any stronger terms. And that is why, after completing their studies in mechanical engineering, the three entrepreneurs were not tempted by well-paid positions at established corporations but decided to set up their own company - Ingpuls - while they were still working on their doctorates at the Ruhr University Bochum.

Nine years have now gone by and the small consultancy firm has grown into a serial producer of shape memory alloys (SMAs) which is in demand throughout the world. From their first production hall in Bochum-Werne they supply international customers in the aerospace and oil industries as well as the automotive sector with, among other things, actuator springs. “When they are subjected to heat, these springs remember their programmed shape”, as Dr. Burkhard Maaß explains. “This can be used to automatically open and close fluid valves, for example. Complex component assemblies can be constructed much more simply, and you save on valuable resources as well - which in turn reduces system weights.”

Shape memory alloys have been around for more than 50 years, and for more than 20 years they have been used in state of the art medical technology where they are used in stents. “But the few established manufacturers were still not able to customize the alloys to suit the various switching areas and system requirements which are needed in automotive applications today,” as Maaß explains. That is until the company founders had the opportunity during their studies and doctorates at the Institute of Materials at the Ruhr University Bochum to do research into the development of application-specific SMAs for a range of applications.

After the company was founded in the year 2009, there was a rapid increase in demand from the automotive industry in particular for their consulting services and development in the context of SMAs. Once their developments were successful, they quickly began to focus on industrialisation as well. Their first order for an automotive series in the year 2015 saw a new chapter opening for this up-and-coming technology company. The initial procurement and commissioning of their first production line with their own machine park, from casting to final component, in December 2016 marked the starting point for mass production at Ingpuls in Bochum. In the first year of production they already succeeded in reaching a significant milestone by producing more than one million actuator components. A real vertical take-off and an enormous achievement for a start-up company. On the way to becoming the world leading supplier of shape memory alloy technology, the company now employs around 30 staff, which includes engineers educated in the region and former Opel employees, too. With the backing of this team, Ingpuls is constantly driving developments in SMAs ahead. They have already gained so many follow-on and serial production orders that they had to begin making plans for a second pro-

duction hall just six months after starting their first series. Realistically, the second production hall should be up and running in about 18 to 24 months. In Bochum, of course. The three founders have often been offered large amounts of money for their company. “There have been lots of offers, including offers from Dax-listed multi-billion corporations”, says Maaß while showing us round the production facility. “We turned down all of the offers to make sure we didn’t put our mission at risk.” Because Maaß and his two co-founders of Ingpuls have a clearly defined aim: “to establish shape memory technology across the globe”. But they want to set a good example as well and prove that “factories are not just closed down in Bochum. On the contrary, here, in the middle of the Ruhr Region, and coming directly from your studies or doctorate work, you can found a company which revolutionizes our previous technologies in a profound way”. In future, SMAs will be found everywhere where switch systems and control processes are needed. Technological progress and new production strategies mean intelligent metals have become attractive for customers from a cost point of view as well. And on top of that, they reduce space requirements, complexity, system weights, energy consumption and, last but not least, emissions. All of these are arguments in favour of the accelerated growth of this technology and this company.

These three shooting stars, who won the “Senkrechtstarter – Vertical Take-Off” founders prize awarded by the Bochum Office of Economic Development in 2010, have not patented their individual manufacturing processes for various serial components with nickel-titanium-alloys. “We would then have to reveal our recipes which are the key behind the success of our company,” says Maaß. The established companies on the market, “which we are streets ahead of when it comes to material technology, would probably have nothing against that”. But in this way their know-how is protected and Ingpuls continues to expand. Materials scientists and entrepreneurs, Dr. Maaß, Dr. Großmann and Dr. Kortmann, know that the fact that they have gained a major German automobile manufacturer as a customer is a very special quality feature. Because, as Maaß states confidently, “anyone who knows how to play by the rules of the automotive industry and can deliver high quality on schedule, can also successfully supply every other kind of sector in the world with SMAs.”

“Why can we do it? Because we learnt how to do it here in Bochum.”



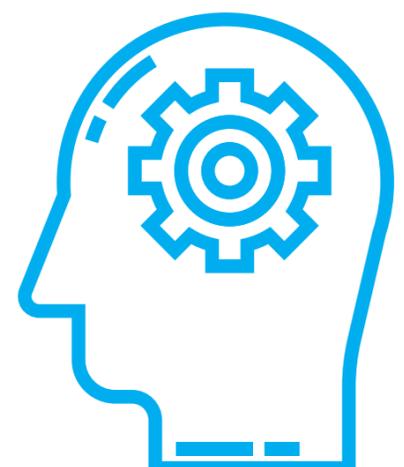
Components being treated with nitrogen for testing.



INGPULS

Smart Materials & Engineering – Products based on SMAs

www.ingpuls.de





Benjamin Geiger, Tim Kohlmann, Andreas Stevens, Matthias Wiemers and Thierry Wilmes got to know each other while they were all studying at the Bochum University of Applied Sciences. During their studies, and later as project leaders, they worked on the SolarCar and in the years 2011/2012 they were part of the team which drove 40,000 kilometres around the world in this sporty little speedster. Today the yellow and white car with its roof made of solar panels and lots of stickers stands in the company's own lab and workshop in the EnergieEffizienzZentrum (EEZ) Bochum. That is also where AUKTORA is located, the young company of the five university graduates.

Driving round the world like that has cemented their relationship. And created space for visions. That is why the five young men, after several research projects at the Institute for Electro Mobility, dared to become self-employed and set up the company AUKTORA, which when translated basically means something like "drive". And in this case it is a very suitable name as well, as this engineering and development services provider, where mechanical engineers, electrical engineers and mechatronic engineers all work hand in hand, advises and supports companies with the development of electric powertrains especially designed for electric mobility.

But, just like during the SolarCar project at the University of Applied Sciences, "our focus is not just on the car, it is much more on the process", says Thierry Wilmes. This refers above all to having agile project management that the founders have taken over from the field of software development. "Usually," explains Tim Kohlmann, "specification documents are already out of date before they are even finished". Especi-

ally in the field of drives technology for cars as development cycles are getting shorter and shorter. At Auktora twelve colleagues now work in so-called "sprints" on each prototype from the planning phase through to development and manufacture. "That doesn't just create the greatest amount of transparency", Thierry explains. "In this way we can also enable the customer to intervene at any stage of the development process, so we can react quickly and innovatively to new developments." Or to put it in another way: "If the car industry is like a heavy oil tanker, we are the tug that pulls it into the harbour."

This model is much appreciated. During their start-up phase they were often misunderstood as a producer of electric motors, but now the young company has clearly established itself as a development services provider "for anything to do with electric mobility that moves". Large car producers number among AUKTORA's customers, as do suppliers and producers of commercial vehicles. And these young engineers from Bochum are not alone here. In the ruhr-

valley association, in which more than 50 innovative start-ups from the region and three universities have joined together, they and their customers benefit from the interdisciplinary cooperation involving all the different stakeholders.

There is just so much potential in the form of well qualified engineers in the Ruhr Region. "This is a biotope of brilliant minds", is something the mechanical engineer Kohlmann and mechatronic engineer Wilmes are sure of, and not just because of their own experience. As business people, they continue to work closely with the Institute for Electro-Mobility at the Bochum University of Applied Sciences and try to convince students "not just to migrate south". Because even if they don't drive around the world in the SolarCar anymore, these young entrepreneurs still have a lot of room for their visions. In the end, the Ruhr Region is changing in line with the way the automotive sector is changing – "until at some point this is the metropolitan region in Germany and perhaps the automotive industry returns".

A driving force

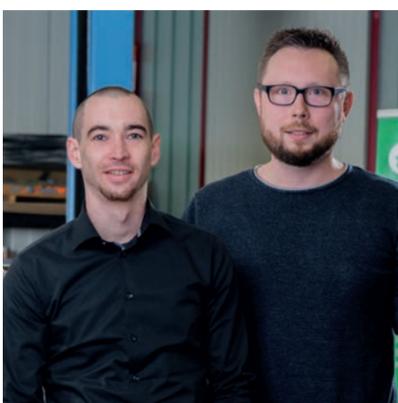


AUKTORA

As a technology company in the electric mobility sector, AUKTORA is an independent development and engineering services provider for electric vehicle drives.

www.auktora.de

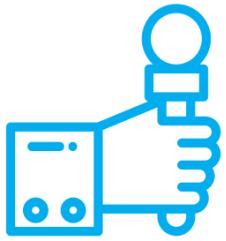
AUKTORA is at the
CAR-Symposium at Stand 45.



Thierry Wilmes (left) and Tim Kohlmann.



Section of an electric mobility prototype for the off-road segment.



3 QUESTIONS PROF. FERDINAND DUDENHÖFFER



“A platform for the future of the sector.”

Prof. Dudenhöffer, two years after the diesel scandal was first reported, the automotive industry is still facing what must be its biggest challenges and need for change yet. Can the CAR-Symposium set the course for the future?

The CAR-Symposium doesn't really set the course for anything. That would be presumptuous to make that claim. What we want to do, is to provide a platform. A platform for discussion and for exchanging experiences between important companies, top managers and our students – for the future of our sector, if you like. The products of the future, i.e. autonomous driving, emission-free driving and the sharing economy all play key roles here.

What lessons have industry and politics learnt from this scandal?

I believe that we have all understood that we have to take more responsibility. We are very proud to be able to welcome the CEO of Volkswagen AG to our symposium. The company is hardly recognizable since “Dieselgate”. It is now a modern, open company with clearly democratic structures, a clear vision for the future and a whole range of innovative ideas for the mobility of tomorrow. Large parts of the industry are on a journey into a new age. This isn't just apparent at VW, Daimler or BMW, but also at the many important suppliers of products and services to the industry. It is difficult to see what sort of vision the politicians in Germany have. Our leading politicians seem to have become pure pragmatists, with the aim of staying in office, but not of achieving sustainability. Look, if the boss of the largest German car manufacturer says let us cut back the tax relief for diesel fuel and invest more in electric mobility and then FDP politicians can't think of anything better to say than “Judas of Diesel”, or the Chancellor continues to propagate the myth of diesel as a climate saver, then I don't think our politicians have learnt anything from the scandal.

All of the large car manufacturers have announced they want to invest more in developing electric mobility. Is this change of mind too late?

No, you don't have to worry about the car manufacturers in my opinion. Our CAR-Symposium shows that very well. The car manufacturers and suppliers present a full range of innovations. The companies all work internationally. China is setting the pace. But we do have to do more when it comes to the infrastructure in Germany, our universities, our internet infrastructure, our transport infrastructure, and our innovative capability.



BACKGROUND

#RUHRMOTOR18 is published by the Bochum Office of Economic Development. We deliver services for all Bochum companies. We help start-ups to get off the ground, are in constant contact with the local business community and implement innovative settlement concepts. We are Bochum's biggest car park operator and the parent company of Bochum Perspektive 2022 GmbH, which is responsible for reactivating and marketing the former Opel site now known as MARK 51⁷.



More information:

www.mark-517.de

www.ruhrmotor.de

www.bochum-wirtschaft.de

www.bochum-reportage.de

www.bochum2022.de



Everything in stock



From Bochum, Opel delivers millions of spare parts to all the European Opel and Vauxhall dealers every year.

This is a building of superlatives: almost twelve football fields would fit into the new Opel Automobile GmbH distribution centre in Bochum, from which, every year, they dispatch millions of spare parts weighing around a total of 240,000 tonnes to Europe as well as South Africa and South America.

By erecting these halls of such gigantic proportions, the car manufacturer from Russelsheim has kept its word and continued its commitment to Bochum. "The Opel Distribution Centre in Bochum is the central hub for our European supply chain and is thus very important for ensuring we maintain our competitiveness", emphasises Jens Klupiec, Director Aftersales Warehousing, Supply Chain and Logistics. Bochum is now Opel's largest logistics facility for supplying spare parts and provides a third of the automobile producer's overall warehouse capacity.

Opel Automobile GmbH invested around 60 million Euros in building one of the most modern distribution centres in Europe. This meant moving 190,000 cubic meters of earth on this site at the former Opel Works II in Bochum-Langendreer before construction could begin. 700 new jobs were created as well.



Since the grand opening of the new building last September, which was enjoyed by 5,000 visitors, day in, day out, the staff ensure all of the 5,200 European Opel/Vauxhall dealers are supplied with the right parts quickly and reliably. So everything has to be kept well under control. They store dozens of each of the more than 100,000 different items on their solidly built shelving, which would be 19.1 kilometres long if put end to end – and by chance is just about the distance between Bochum's Ruhrstadium and the Veltins Arena at Schalke.

"Our highly modern Opel Distribution Centre links up our supplier and distribution chain", explains Jens Klupiec, "and thus increases efficiency and effectivity while ensuring maximum flexibility. This highly modern distribution centre stores spare parts for the complete European Opel and Vauxhall vehicle stock – from the smallest screws and wipers for the Adam model, to the engine block for the Zafira and spare parts for collectors' cars such as an Opel Manta from the 1970s.



"Bochum is the central hub."



Fault finders

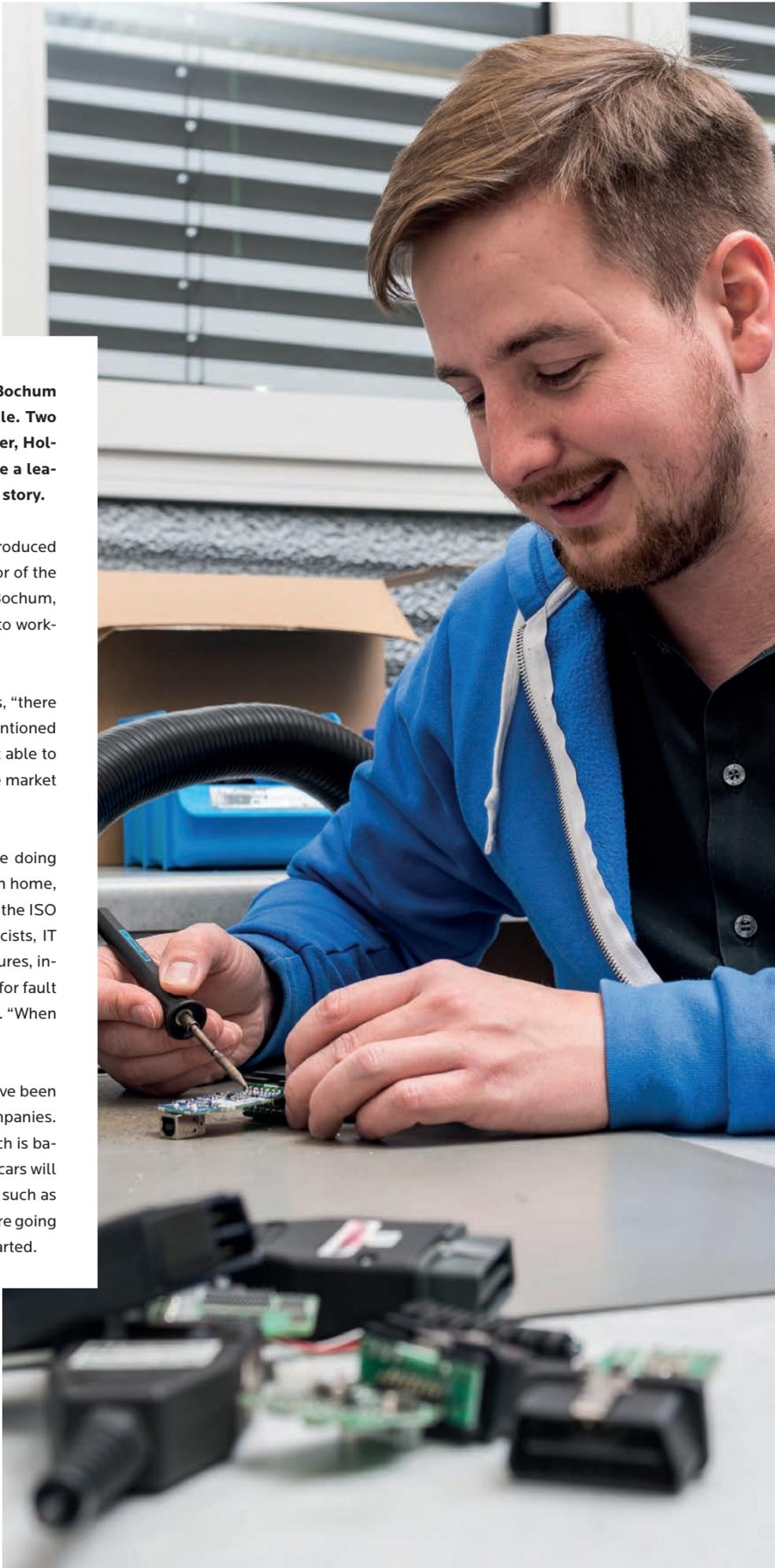
It all began with a Golf. Way back then, Odin Holmes, an exchange student from Oregon at a Bochum grammar school, and his pal Benjamin spent their time tinkering around with the old vehicle. Two young men interested in cars. Nothing else. Who would have thought that just a few years later, Holmes, together with Benjamin Menküc, would found his own company in Bochum and become a leading European supplier of diagnosis tools for vehicle fault analysis. A classic self-made-man story.

Today, 17 years after developing the first diagnosis adapter, more than 50,000 control devices produced by Auto-Intern are being used throughout Europe, estimates Stephan Bökelmann, deputy director of the company. Most of them are for cars in the Volkswagen fleet. Although Multiscan adapters from Bochum, equipped with VCDS software from the American manufacturer Ross-Tech, have also been sold to workshops in the USA, India and Africa.

“After the market had rectified itself quickly at the beginning of the 2000s”, Bökelmann continues, “there are now really only two suppliers.” One of them produces in South Africa, the other – as already mentioned – in Bochum. The reason for this development is “that most manufacturers at that time were not able to adapt their hardware to the new CAN-bus systems (Controller Area Network).” This came onto the market in 2004 and connects up to 100 different control devices in a car. Odin Holmes was able to adapt.

And this self-taught expert, who stumbled across the software from Ross-Tech by chance while doing some car tuning with his friend and more or less constructed hardware for diagnosis adapters from home, now continues to carry out research and development as an entrepreneur; he is also a member of the ISO standardisation committee for the programming language C++. In the facility in Bochum, physicists, IT specialists, electrical engineers and car mechanics are all working away on new diagnosis procedures, including ones for electric motors. Because Bökelmann reckons that in just ten to 15 years systems for fault recognition will be installed in all cars and that diagnosis data will be transmitted using a SIM card. “When that happens”, he concludes, “our device will have lost its reason for existence”.

So, in addition to the production of the multiscan adapters, the men and women at Auto-Intern have been focusing on their own developments in the context of their own research projects and for large companies. For example, they have been working on so-called “speculative” or automated maintenance, which is based on permanently checking all the physical processes in a car. This new technology means that cars will not have to be serviced at fixed intervals as they are now, but according to very individual aspects such as driving style, wear and tear, number of kilometres driven and many other influencing factors. “We are going to continue tinkering away”, says Bökelmann with a smile. Just like back then, when everything started.



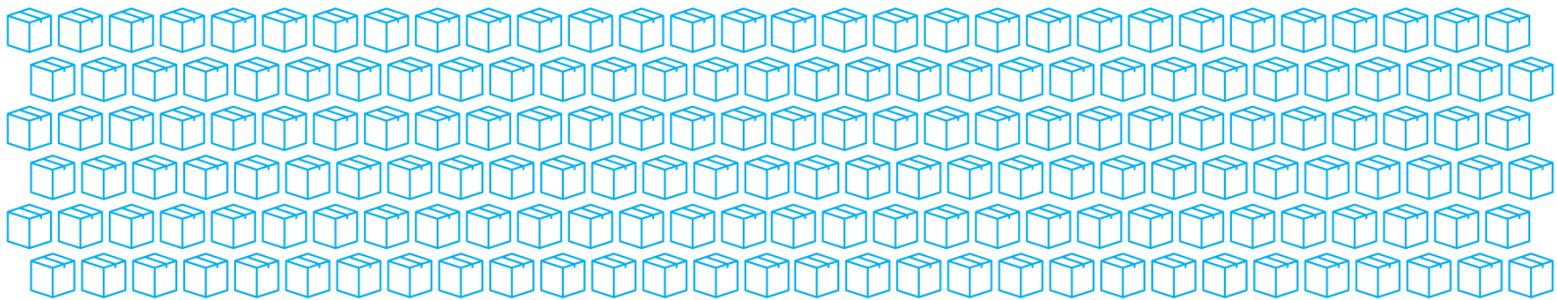
Stephan Bökelmann working on a diagnosis adapter.



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150 parcels by bike



“Green Place” brings electric power to city centres 



“What we’d always had in mind was an urban logistics concept that all the parcel services could use equally, that would incorporate electric mobility and make a positive contribution to the (inner) urban landscape into the bargain,” CEO Dirk Fromme explains the idea behind e-cargo, a company providing local e-mobility for Bochum. The result was the Green Place concept.

Green Place pools the activities of several parcel services at a central point in the city centre. Parcels destined for customers around the city are deposited here for pick-up and distribution by electric delivery bikes. Fromme’s strategy is based on three elements: In addition to the commercial aspects, Green Place also ties in social and ecological considerations. That’s why, for example, the company director is keen to avoid “just sticking a huge shipping container somewhere in the city centre”. Instead, micro depots are installed like street furniture, where couriers can collect their deliveries to complete the last miule within a 2-3 km radius. By blending into the urban landscape, the depots should also meet the approval of the public. “They could even be equipped with photovoltaic panels or green roofs,” adds Angela Amatulli, a student of Sustainable Development and employee of e-cargo, with added benefits for the community.

“We find a suitable location, then plan and install the micro depots, equip them with electric delivery bikes and provide the couriers with all the maintenance and support they need,” Fromme sums up the business model in a nutshell. Users pay a monthly flat charge for the complete service package.

The scheme aims to provide a sustainable and above all environmentally responsible alternative for the parcel delivery sector in our towns and cities. In other words: fewer diesel vehicles, less noise, less particulate matter and nitrogen oxide pollution in city centres. In the not-too-distant future we will see more and more cycle couriers replacing the vans that currently clog up the towns of the Ruhr. This can already be observed in Bochum, where e-cargo first developed the concept and began a successful collaboration with parcel logistics company GLS several months ago. UPS recently became the next major player to sign up. Bochum has shown that “by using e-bikes rather than vans, drivers save up to an hour a day,” Fromme continues. This is down to the extremely high frequency of delivery stops in city centres. And online trade is a growing market. In Bochum city centre alone GLS delivers around 150 parcels with e-bikes every day, which amounts to some 3000 parcels a month. Green Place has been developed to serve four parcel delivery companies for the time being. “This means we’re able to

free up the city centres of the Ruhr to the tune of about 12,000 parcels per month with our eco-friendly city logistics concept,” adds Amatulli. To begin with, it’s the Ruhr that is benefitting from the scheme.

However, as demand grows, more and more local authorities are getting in touch. But e-cargo’s plans go even further. Only recently they were able to get one of the largest German rental firms for mid-size commercial vehicles on board as a partner (around 8,000 vehicles). Together they intend to switch the entire logistics chain to electric vehicles. In Dortmund, for example, they are currently working with GLS on testing the 100% electric Maxus which, thanks to its impressive capacity and range, fulfils the conditions required for parcel delivery in an urban setting. e-cargo also advises local authorities and municipal enterprises including utilities, technical maintenance, central services and construction departments on converting their vehicle fleets to electric. “We assist our clients with status assessments, needs analysis, procurement, vehicle introduction and monitoring. Our advantage: quick access through our partners to the type of electric vehicles needed (e-vans, electric flatbed trucks in various configurations, and electric delivery bikes) means that we can put the transition into effect at short notice,” adds Dirk Fromme.


E-CARGO
 Electric delivery bikes
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Simone Kipp works as a test engineer at VW Infotainment



Simone Kipp and Ernst Zielinski have been working for the same company for a good year and a half now. Today they are meeting for the first time – and are on first name terms from the start. “That’s part of our company culture,” explains Tobias Nadjib, Executive Officer of Volkswagen Infotainment. He and his colleague, Bernhard Krauße, also Executive Officer and Spokesman, are no exception to the rule. “We’re what you might call “the young wild ones” within the big Volkswagen company,” Nadjib says of the philosophy of the product developers based in Bochum. Krauße expresses it a little bit more pragmatically: “Thanks to our innovative team structure we’re quicker and more agile than the parent company. And that’s so important at a time of breathtaking progress in vehicle digitization.”

However, the parent company in Wolfsburg benefits not only from the excellent working atmosphere in Bochum, but also from the good infrastructure of the area. Located at the Ruhr University campus, Volkswagen Infotainment have been working on the development of their own online connectivity unit that will link the control devices in all VW vehicles to the company’s secure backend in the future. Although, when we say in the future, we actually mean before the end of the year. The device is to go into serial production by the end of 2018 at the very latest.

And that’s just the beginning. The company is growing fast: Having started off as just 200 engineers when Volkswagen Infotainment took over a smartphone manufacturer back in 2014, it now employs more than 400 highly trained men and women from 26 nations in its offices, workshops and labs. “We have 10 new colleagues starting every month,” says Tobias Nadjib. These include numerous alumni of the neighbouring university. “Because our asset,” adds Bernhard Krauße, “is the brains of our staff”.



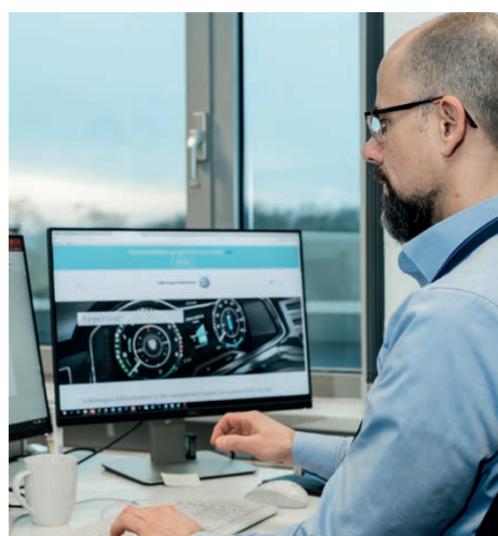
VW’s young wild ones

The brains, in other words, of people like Simone Kipp and Ernst Zielinski. Physics graduate Kipp joined Volkswagen Infotainment in August 2016 and works as a test engineer. Zielinski, a 45-year-old specialist for communication technology, was already employed by the predecessor company. Today he represents his new employer in the 3rd Generation Partnership Project (3GPP), a global collaboration for standardization in mobile phone technology on which most applications are based. At the end of the working day, he often entertains his colleagues as a guitarist and singer in the company’s own band. Content-wise not much has changed for him, however, apart from the fact that “when we were developing smartphones we focused more on user aspects such as displays. With the car of the future, it’s now about redefining the relationship between the customer and the product.”

Kipp and Zielinski have no regrets about their career move. On the contrary: Both praise the great teamwork, exceptional dedication and special innovative spirit in the company. “The whole subject of connected vehicle technology is incredibly exciting,” says Simone Kipp, “and above all future-oriented.” Alongside 17 other staff in the Connected Car Enabler Verification section, the 34-year-old checks that the complete effect chain of all the components involved in the Volkswagen Car-Net Services, including the online connectivity unit, works reliably.

After all, that’s what it boils down to in the end. “That’s what we’ll be judged by, when our product goes into serial production at the end of the year,” says Bernhard Krauße. The eyes of the entire international automobile industry will be on Bochum, while Kipp and Zielinski will probably have started work on the next generation. “I can’t tell you any more than that,” explains Tobias Nadjib and laughs. Only this: “We’ll keep growing.” In this vein, the new hangar for testing prototype vehicles was officially opened at the end of January. And Nadjib and Krauße are currently in negotiations with Bochum City Council concerning premises for new offices and workshops.

Ernst Zielinski is a communication technology specialist



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“The success of the new, smart automobility will depend entirely on whether it’s adequately protected from misuse and theft.”

Timo Gendrullis, Escrypt



ALWAYS ONE STEP AHEAD OF THE HACKERS

“There is no safety without security.” This maxim sums up why IT security is becoming more important in cars as well as in every other aspect of our lives. And in a world of increasingly connected mobility, it even “serves to protect life and limb,” as Timo Gendrullis puts it. The engineering graduate is Head of Consulting & Engineering at Escrypt. The Bochum embedded security specialists advise all the major car manufacturers worldwide on issues relating to IT security, from risk analysis to secure updates, and develop software products to protect vehicles against cyber attacks. “Because if you’re vulnerable to attack, you’ll also be open to blackmail,” explains Gendrullis. And scenarios in which car thieves use laptops to short-circuit vehicles or hackers can take control of a car travelling at 130 km/h are no longer science fiction.

This is something the founders of Escrypt recognised early on, earlier than many automobile manufacturers. Established back in 2004 as a spin-off of the Horst Görtz Institute for IT Security at the Ruhr University of Bochum, Escrypt comprised just a handful of staff who joined in the race of technical progress against po-

tential attackers. Today Escrypt belongs to the Bosch Group and employs more than 90 staff at its Bochum branch alone. It also has branches in the UK, Sweden, the USA, Canada, India, China, Korea and Japan.

The reason for the company’s tremendous growth is obvious. The more functions and convenience a car offers, the greater its vulnerability to attack from outside. A standard new car today may have up to 60 electronic control devices installed, small computers that communicate with one another via the vehicle’s electrical wiring. “Every individual component must be secure, and authenticated real-time data exchange guaranteed at all times,” explains Timo Gendrullis. Ideally IT security should therefore be integrated in the chip, for example in the form of so-called hardware security modules in which Escrypt stores encryption functions via a software stack.

All this goes to show how important it is to take IT security into account during the development of a vehicle. Above all, though, IT security must be preserved throughout the lifecycle of the car,



right up to its disposal at the scrap yard. Escrypt's integrated Intrusion Detection and Prevention System works in a similar way to a virus scanner, identifying and documenting attempted attacks in the vehicle, evaluating the data via a cross-vehicle cyber security backend, and then supplying the vehicle with security updates. "We always have to stay one step ahead of the hackers," says Gendrullis of his fascinating job.

Security testing, security products for embedded systems, backend services, organisational advice and ongoing support for customers – at Escrypt they have recognised that IT security requires end-to-end solutions. And they've been thinking beyond the automotive sector for some time now. Because in the automobile future of autonomous and networked vehicles, our cars will be driving in the Internet of Things. With this in mind, the company from Bochum recently presented its latest development for secure data exchange between networked vehicles and traffic infrastructure at the CES 2018 Consumer Electronics Show in Las Vegas. The boundaries between smart mobility and smart city are becoming blurred, as IT security evolves into IoT security. Timo Gendrullis also sees a social mandate here: "The success of the new, smart automobility will depend entirely on whether it's adequately protected from misuse and theft." In this respect, the Escrypt staff see themselves as pioneers. IT security from the Ruhr area should help drivers all over the world to feel a little bit safer in the future.

Escrypt Embedded Security by ETAS will be exhibiting at the CAR Symposium, Stall 44.



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Hotspot for IT Security

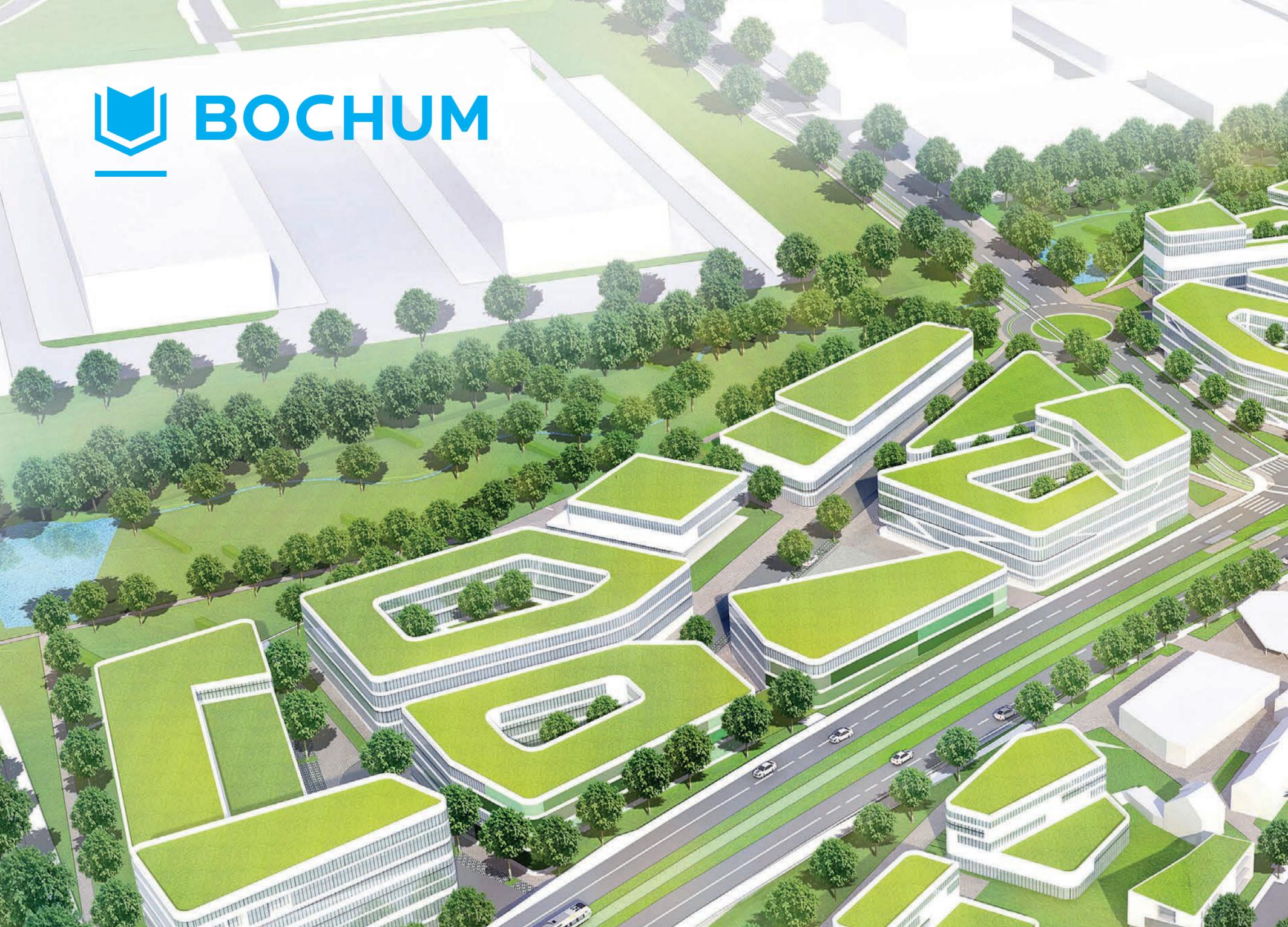
In recent years, North Rhine-Westphalia has evolved into a hotspot for IT security. With four degree courses and 800 students enrolled, the **Horst Görtz Institute for IT Security (HGI)** at the Ruhr University of Bochum offers the largest range of training opportunities in this field. It is one of the leading research centres for cyber security in Europe and has already spawned 17 start-ups to date.

That is why the Horst-Görtz-Institute was selected by the Federal Ministry of Education and Research as the location for one of only three business incubators in the country. The project's purpose is to provide entrepreneurial support and mentoring to spin-off companies in the fields of research and IT security.



The HORST-GÖRTZ-INSTITUT at the Ruhr University of Bochum

www.hgi.rub.de



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