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DRIVE THE FUTURE TODAY

Presskit

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Changes in the course of further development

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STOP DREAMING **THIS IS REAL**

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1 Premiere production vehicle

NOVUS, the Mobility StartUp from Braunschweig celebrated the milestone to series production in Berlin on September 23. In front of a selected audience, the German Tech-Mobility StartUp presented the production version of their revolutionary light vehicle.

Just one year ago, CEO René Renger and lead hardware developer Marcus Weidig were at Höhle der Löwen with a first prototype. Although there was no deal for the two that evening, that couldn't slow down the innovative StartUp.

On Friday 23.09.2022, not one, but three production-ready vehicles were then on stage.

NOVUS GmbH was founded in 2019 by René Renger. The former car designer develops since then together with his team in Braunschweig light motorcycles that want to stand out from everything that is known so far.

Here you can watch the presentation:

<https://www.youtube.com/watch?v=8UZW59vXr34>

2 The brand NOVUS

NOVUS is Latin and stands for novel. This has been our motivation from the very first day. Our deepest conviction is to want to take a step towards the future with what we do. We believe that contemporary products are needed that have the power to transform the motorcycle industry with their novel desirability.

NOVUS is clearly positioning itself as a premium lifestyle mobility brand.

Our focus is on design, lightweight construction, exclusivity and performance.

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The automotive industry is currently undergoing an unstoppable shift towards more sustainable vehicles. One reason for this is that individual manufacturers have understood that it will take a reinterpretation of vehicle values to initiate this change. The motorcycle industry, on the other hand, is not yet on that path.

We believe that new desirable products are needed for this change. We also believe that with NOVUS products we can drive exactly this necessary change in the motorcycle world.

That is our goal.

"We want to change the perception of light-duty mobility."

3 Founding story

My name is René Renger, I am the founder and CEO of NOVUS GmbH.

The story of NOVUS starts in 2010, when I studied design at the Burg Giebichenstein University of Art in Halle. At that time, I met Marcus at the university, who is now the lead hardware developer at NOVUS.

That was exactly the time when the first eBikes were just coming onto the market, at that time so-called pedelecs. At the same time, there were the first concepts for electrified motorcycles. However, both were anything but cool in our eyes at the time and thus uninspiring for two young design students.

As part of a joint bachelor's thesis, we then set ourselves the task of designing something completely new together. At that time, we didn't want to develop a business idea, but simply create the coolest electric light motorcycle we could imagine.

Without conventions and restrictions, we set out to create a design that would combine the advantages of agile eBikes with the performance of

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light motorcycles. And with a design and drive that finally promised a future.

In the following years, Marcus and I worked full-time as car designers. In our spare time, however, we could not let go of our vision of a new kind of light bike, as we called it, for many years.

Over a long period of time, we tried to create a first vision prototype with modest means but all the more passion. We made the first parts in Marcus' basement or my workshop, which was to displace the bedroom in my apartment for 8 years. Everything went wrong, was way too complex or far beyond our capabilities. But giving up was never an option.

Then, nine years after the first drawing to the NOVUS, we unveiled our first design prototype at CES 2019 in Las Vegas. It was to take nine years until the idea from our studies, which could not let go of us, became visible to outsiders.

"The only time you give up on dreams is when you dare to dream even bigger ones." - René Renger

At the end of 2019, I quit my dream job as a car designer and founded NOVUS GmbH.

Since that day, we have been working here at our headquarters in Braunschweig to bring our vision to the road. The NOVUS team includes 15 passionate team members with Marcus as the lead hardware developer. The team is continuously growing and each of us has a strong connection to mobility or vehicle engineering. What distinguishes the team is the determination with which we drive developments forward.

One thing in particular unites us as a team: the love for what we do and the belief in creating something outstanding with NOVUS, which can serve as an inspiration for change in the motorcycle industry.

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4 Key figures

L3e_AI class light electric motorcycle for urban areas

ONE vehicle for one person up to 125 kg

Monocoque carbon frame

Full carbon construction for fork, swingarm and rim

900 mm seat height

130 km/h top speed

135 km max. range in city traffic (incl. max. recuperation)

1.9 sec. 0-50 km/h (performance version)

25 kw brushless wheel hub motor

400 Nm torque (performance version without traction control)

6 kw/h (net capacity) Battery

104 Volt nominal voltage

73 kg excluding battery

108 kg including fixed battery

100 mm front wheel travel

110 mm rear wheel travel

1280 mm wheelbase

90 mm caster

68.5 degree fork angle

Front wheel 90/90/17 2,15"

Rear wheel 120/70/17 2.75"

Front brake 280mm x 4,5mm, 4-piston caliper with ABS,
Manufacturer Beringer

Rear brake 220mm x 4,5mm, 2-piston caliper with ABS,
Manufacturer Beringer

Brakefitting Manufacturer Beringer

5 Details and special features

At NOVUS, the first thing you buy is the feeling of driving the future.

Everything we do is designed to contribute to that. The whole is the sum of its parts, which we explain in more detail below.

5.1 Basic concept

Our concept from the beginning was to combine the advantages of the bicycle world with those of the motorcycle world. The lightness and agility of an eBike combined with the performance and sovereignty of a motorcycle, combined with an electric drive and a design that finally feels like the future.

Here we saw a gap that we wanted to close with NOVUS.

In addition, we asked ourselves from the beginning why motorcycles and especially electric motorcycles are all very similar in their basic layout. Why not take advantage of the possibilities offered by electric mobility and create a completely new look that also communicates this unmistakably?

NOVUS One is perhaps the most consistent design approach for a light bike that exists to date. Not an electrified vehicle. A product rethought from the ground up and in all facets and details as a symbiotic combination of aesthetics, technology and material. An expressive yet iconically designed symbol of modern and sustainable lightweight mobility. The emotional power of two-wheelers reimaged as sculpture rather than complex machinery. This essence in design focus was the basis to develop a product that unmistakably and unmistakably communicates its purpose to the viewer. An affordance to use instead of to control. Contemporary reduced, instead of abundant, but without having to practice renunciation.

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We believe that the time has come for new lifestyle products.

Time for new status symbols that are more contemporary, adapt to the current mobility change and even intentionally accelerate it.

5.2 Design

"At NOVUS, we are all designers in a way."

For us, design is the sum of all creative activities which, in their consistency, lead to a new product. Construction, design, material and manufacturing processes must go hand in hand to lead in a harmonious unison to an extraordinary result.

NOVUS One is equally inspired by the simplicity of bicycle frames, as well as the timeless and user-oriented product design aesthetic.

NOVUS One is designed according to the heuristic principle of parsimony, or economy principle.

Of several sufficient possible design approaches for one and the same circumstance, the simplest design is always preferable to all others. This design canon runs through NOVUS from the brake adapter mount to the frame component. Only in this way can the overall design come to the fore. No chain, no transmission or gearshift. No urge to show off the individual elements, no jagged component landscape.

Each technical element steps back in the sense of simplicity and integrates itself into the overall impression of the form - a modern sculpture on wheels.

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"Unlike conventional two-wheelers, a NOVUS One is still unmistakably recognizable for what it is from 200m away, in low sun, 3 diopters of poor vision and cataracts. You won't find this consistency anywhere else". – René Renger, CEO & Founder

To meet this demand, we have questioned and reinterpreted a variety of traditional approaches.

Our specially developed fiber composite frame is unique in the motorcycle world. It is similar to a nutshell, simultaneously the load-bearing and protective structure and the design-giving outer skin in one.

No other two-wheeler has such a minimalist design.

This sculptural design approach also functions as an extreme lightweight construction approach. The use of fiber composite technology combined with the elimination of all fairing components makes a NOVUS lighter than any other road vehicle with comparable performance.

The main frame, inspired by lightweight bicycles, deliberately dispenses with the central volume that has always been occupied by the combustion engine in conventional vehicles. The result is an inherently rigid and closed structure, which at the same time unmistakably communicates the departure from the combustion engine. The extremely lightweight, one-piece frame of a NOVUS is both a load-bearing and design element. It accommodates the battery as the electric heart deep in the frame in a form-fitting manner in order to enable the lowest possible center of gravity in combination with the direct drive in the rear wheel hub and thus agile and safe handling.

Almost all elementary components were rethought for the NOVUS One. Whether chassis, handlebars, motor, battery, electronics or software. All components were specially developed with the aim of achieving the highest possible functional integration and the highest standards of design, quality and performance.

This is a key difference to other electrified two-wheelers.

We went to great lengths to rethink the NOVUS One from the ground up.

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The graphic design of the NOVUS is based on a strongly forward-inclined main axis. This is found again in the areas of the seat, the lower frame and the upper frame section leading to the handlebars.

The recurring alignment suggests an unmistakable forward thrust.

The main axis is contrasted by two secondary axes that also run parallel to each other. Secondary axis one is formed by the front fork, as well as by the directional alignment of the vertical frame area above the battery towards the seat. Second secondary axis is formed by the lower beam from the battery to the head tube, which run parallel to the frame lines in the area of the leg system.

The harmonious interplay of main and secondary axes, combined with the holistic design approach of all technical components according to the principle of economy, results in a vehicle design unlike any other in this consistency.

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"For us, design is not detached from technology or construction.

For us, design is rather the sum of all creative activities which, in their consistency, lead to a new product. Construction, design, material and manufacturing processes must go hand in hand to lead in a harmonious unison to an extraordinary result".

5.3 Fiber composite components and vehicle weight

We apply this approach particularly intensively to our fiber composite components. Prepreg carbon monocoque technology enables us to implement a sculpturally integrative design that has yet to be seen in any other vehicle. In contrast to already known carbon components, ours are not only the shaping outer skin, but also the load-bearing structure and protective cell for all technical elements. The NOVUS thus consists of only 4 main components - frame, fork, swingarm, front rim and rear rim.

The effort to produce such components in hours of manual work over many process steps is enormous. However, the result of these efforts is then an absolutely unique, completely unmistakable shape that would be almost impossible to produce using conventional methods.

NOVUS is the first brand to design two-wheelers so consistently in light-weight construction.

NOVUS is not only a design object, but also a high-tech product. By using prepreg carbon in a material-appropriate manner, we have succeeded in making all components extremely light, yet sufficiently rigid and resistant to operation. The entire main frame weighs a mere 5.8 kg. With a total weight of 103 kg (including battery!), the NOVUS bike is unique. The low mass in combination with the up to 25 kw (short-term peak power) high performance ensures an extraordinarily sovereign driving performance in this class. The fiber composite components are developed in Braunschweig.

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With the aid of complex computer-aided simulation software, these components are optimized over many design loops. In this way, a compromise can be found between safety, lightweight construction and design. Real component tests then confirm the digital simulations.

The carbon fiber reinforced plastic components are manufactured in a so-called autoclave. This is a large pressure chamber in which all parts are cured under heat and pressure and given their final material properties. Beforehand, hundreds of specially cut carbon fiber mats are placed in a mold by hand for each component. The intelligent overlap, alignment and number of mats, along with other factors, then produce the structural properties of a finished carbon component.

The rims, fork and swingarm are also manufactured using a very special process. Unlike conventional prepreg components, the internal pressure for compacting the individual blanks is not generated via a core or a vacuum bag. We use a special foam expansion technology here. This innovation results in significantly less scrap, lower material consumption and the components are even stiffer than hollow assemblies.

The symbolic Y on a NOVUS One is painted entirely to customer specifications. This area is on the one hand a recognizable design feature and at the same time a protection against possible damage. In the event of a crash or accidental tip-over, the area can be replaced as a spot repair.

The NOVUS motorcycle is significantly lighter than comparable vehicles with the same performance, or significantly more performant than comparable vehicles of the same weight.

5.4 Battery

In addition to the wheel hub motor, our permanently installed, redundantly protected battery is an essential element in our motorcycle. The BMS (Battery Management System) monitored lithium-ion battery has a nominal voltage of 100 V and an energy quantity of 5.4 kw/h gross capacity (6.4 kw/h net).

The battery is a custom-designed system for the One that forms a functional unit with the aluminum chassis. The battery-chassis unit is then tightly bolted to the vehicle frame.

We use the latest 21700 lithium ion round cells to generate a perfect fit, which are installed in the lower area of the monocoque in the most space-saving way possible and protected from the carbon cell. With 6.4 kw/h, we have been able to achieve a comparatively high power density. We deliberately decided against a battery that could be replaced by the customer.

Due to the high voltage level of the powerful lithium-ion battery and its own weight of approx. 30 kg, manual removal is no longer suitable. The fixed installation of the battery saves significant installation space and weight.

With an external charger, the battery system can be charged to 80% within 90 min.

5.5 Motor

The motor of the NOVUS One was developed together with the company GKN Powder Metallurgy. Specifically, it is a wheel hub motor based on the transverse flux principle. This principle has been known for some time,

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but due to the complex geometry it has not yet been applied to any production two-wheeler.

In recent years, GKN Powder Metallurgy has developed a process to produce the stator components of the electric machine from metal powder with a precise fit and without material losses.

According to GKN Powder Metallurgy, "We are combining our world-class powder metallurgy technology and soft magnetic composite (SMC) materials to create a unique new electric motor technology. Based on fully isotropic material properties, high purity iron powder particles with an electrically insulating coating, we take advantage of a true 3D magnetic flux design. Combined with a significantly increased number of magnetic poles, the GKN TFM topology results in unmatched torque density with minimal weight and space requirements for the highest performance and most efficient direct drive wheel hub applications."

The increased efficiency of the electric motor and high torque density over a wide speed range predestine our TFM design for direct drive wheel hub applications. In a direct comparison, the NOVUS wheel hub motor is 20% lighter than comparable conventional drives with a simultaneous 20% increase in torque."

The result of this development is impressive. With traction control switched off, the system can achieve a torque of 400 Nm, which can be driven from driver's license class B196 (extension of car driver's license B). Far more than most conventional two-wheelers and unrivaled within the 125cc class. The transverse flux motor, in combination with the low vehicle weight (ready-to-run state including battery 103kg), ensures acceleration to 50 km/h in under 2 seconds. The system is designed for acceleration and not for top speed, which is why this is limited to 125 km/h in the first step.

On the handlebars of the NOVUS One, the driver has the option of setting three different driving and recuperation modes. To ensure that this power is also brought safely to the road, a traction control system controls the lift-off of the front wheel.

5.6 Chassis

The chassis is designed in line with our general design approach. Here, too, we strive for maximum design and functional integration.

For the front wheel, we developed a mono fork with 100 mm travel. This is completely CNC manufactured, adjustable in rebound and compression and fully integrated into the steering tube. This approach, which is very unorthodox for a motorcycle, is also inspired by the world of bicycles and can only be implemented because we focus so consistently on light-weight construction.

NOVUS is the motorcycle with a mono fork front suspension.

At the rear wheel we install a deflected suspension and a strut with 110 mm travel. What is unusual about the rear suspension is that everything is installed invisibly. There is no deflection or traction strut visible. We achieved this by creating the space for all components between the swingarm and the frame and by mounting the swingarm from the inside. This very elaborate approach is a consequence of our clear design strategy. We want the customer to be able to concentrate completely on riding and the overall impression and not get the feeling that he has to operate a complicated machine.

5.7 Display, App and Handlebar design

Positive control crosses replace conventional instrumentation. The handlebar unit also includes an integrated LED display for showing relevant riding information, the main headlight, and turn signals are in the

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handlebar ends. With the help of the "SP Connect System", we make it possible to mount a smartphone centrally on the handlebars.

The "My NOVUS" app serves as a digital interface to the vehicle. It acts as a digital key, enables navigation, provides access to various vehicle settings and can call up vehicle data at any time. In the future, updates can be installed, and features added via the app. Of course, all driving data is determined and summarized in statistics.

A physical key is no longer necessary.

If the rider's smartphone is empty, the bike can be unlocked using an NFC card. After unlocking, the rider can start the bike using the start/stop button, which is located directly behind the handlebars. An LED ring shows the charge level before the start of the ride and displays the current riding mode via color coding.

Our focus was to make the control area as clear and unambiguous as possible. With or without a smartphone, operation is intuitive. Climb on. Drive.

5.8 Vehicle intelligence

A NOVUS One sets new standards for light motorcycles and has the connectivity of a modern car. The "NOVUS-OMNI-System" integrates seamlessly into your digital life.

A central intelligence coordinates and controls the interconnected control systems. Via integrated WLAN, as well as over-the-air updates (OTA), it is also possible to keep the vehicle always up to date.

In addition, the NOVUS One communicates with the "My NOVUS" app. This is the interface to the vehicle. It serves as a digital key and displays the status of the vehicle at all times.

In addition, numerous settings can be made and new functions added. For example, a customer who has ordered a performance-reduced

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vehicle can subsequently increase the performance. (Function not yet available from the start of production)

6 Where to move the NOVUS One?

The NOVUS One is aimed not only at motorcyclists, but also at those who have not previously found access to motorcycles because they often come across as "machines that are difficult to control".

Anyone who rides a NOVUS, on the other hand, should get the feeling that they have bought the future. A vehicle like something out of a Hollywood movie that inspires dreaming and attracts all eyes.

A NOVUS One is clearly designed for the urban environment. An agile and super stylish vehicle for routes that you want to experience consciously and mindfully.

Where a car, or a heavy motorcycle would be an obstacle and an eBike seems inappropriate. There where you are seen and yet can drive forward unnoticed by the silent drive.

A surreal appearance in the real world.

NOVUS is a lifestyle product for people who want to stand out.

People with an affinity for design and high-tech, who nevertheless want to be sustainably mobile and communicate this confidently.

7 Vehicle category

The NOVUS One Light Bike is a light motorcycle (class L3e_A1) combining the advantages of a bicycle and a motorcycle. In urban areas, the NOVUS can best exploit the weight advantage.

We are also interested in offering people who insist on private mobility an incentive to leave their cars behind. With its high power-to-weight ratio and potent acceleration, it is also quiet but extremely agile in urban areas.

NOVUS is not a commuter or touring vehicle, however, the top speed of up to 125 km/h and range of up to 150 km in city traffic still offers the option to enjoy shorter country roads or highway sections.

In this context, the NOVUS One will not compare with much more powerful motorcycles, nor with comfortable scooters, because it is neither one, nor the other.

8 NOVUS vision

With NOVUS, we want to change the perception of modern lightweight mobility.

We believe that sustainability has many facets and does not necessarily work by doing without.

NOVUS is meant to be an example and inspiration that a modern design and lifestyle product doesn't have to be a two-ton vehicle and that the shift towards sustainable forms of mobility can create incredibly attractive and desirable products.

We believe it is time for new, contemporary status symbols.

With NOVUS, we are building a modern and innovative brand that will be the future manufacturer of high-tech design products in two-wheeled mobility and beyond.

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In a few years, the market for electric mobility in the two-wheeler sector will exceed the critical size to soon completely replace combustion engines and secure the path towards a future that is as emission-free as possible.

Overcrowded inner cities and more and more passenger cars with high space requirements are forcing customers to turn more to new forms of mobility or alternative products. But these are now no longer just a means to an end, but, like our NOVUS, offer significant added value thanks to modern technologies.

With NOVUS, we are becoming a pioneer in sustainable, private mobility and positively shaping the perception of electric two-wheeled mobility.

NOVUS One is the first product of the NOVUS brand.

The NOVUS Two is scheduled for market launch in 2024.

With the NOVUS Two, we are gradually moving toward larger volumes and are slowly positioning ourselves as the new premium supplier for electric light mobility. In subsequent years, the portfolio will then be expanded upwards and downwards.

From 2024, we plan to enter the market in the USA and China.

With our products, we want to change the perception of lightweight mobility in the long term and in the long term, and thus accelerate the shift toward low-emission vehicles.

9 Price & Production

The NOVUS One is now available for pre-order in two different editions.

The start of production is planned for early summer 2023.

Customers can currently choose between the FOUNDERS Edition, limited to 500 units, and the AHEAD Edition, limited to just 30 vehicles. The AHEAD Edition is a package deal, with predefined equipment. The first few

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customers of the AHEAD Edition not only acquire a very special vehicle with numerous details and its own color, they can also enjoy a 10% discount.

The Founders Edition offers all configuration options up to custom paint colors. On request, the equipment can also be customized beyond the scope of the configurator.

FOUNDERS EDITION

Base	Super	God
22.134,00 €	25.239,90 €	29.155,00 €
18.600,00 € netto	21.210,00 € netto	24.500,00 € netto
45 km/h	115 km/h	130 km/h
7 kW peak	17 kW peak	25 kW peak
150 km range	140 km range	135 km range

Prices always exclude VAT and transfer costs.

10 Equipment, accessories and customization

Frame Colors optional	Crystal White Horizon Silver Magma Red Sunpowder Gold Royal Blue Special painting on request
Wheel Colors optional	Black lacquered Visible carbon
Charger	One charger included (80% in 120 min) Quick charger (80% in 90 min) Mobile charging bag
Extras	BACKSTER Frame bag with 6l packing volume and separate iPad slipcase STRAPER Luggage net for the frame Design stand Protective cover Lock Wireless charging module iPhone13 SP connect phone case Carbon care Stone chip film Internet connection Alarm system Carpet

11 Driving license

The NOVUS One is available in three performance classes:

Base	Super	God
4 kW Version	17 kW peak	25 kW peak
45 km/h	115 km/h	130 km/h
driving license class B, A1	driving license class B196, A1, A2, A	driving license class B196, A1, A2, A

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NOVUS is more than an electric motorcycle.

NOVUS is a statement and the conviction that you can do anything
if you keep going where others quickly give up.

NOVUS is the promise, of being able to ride the future today.

BE AHEAD