



The way we think.

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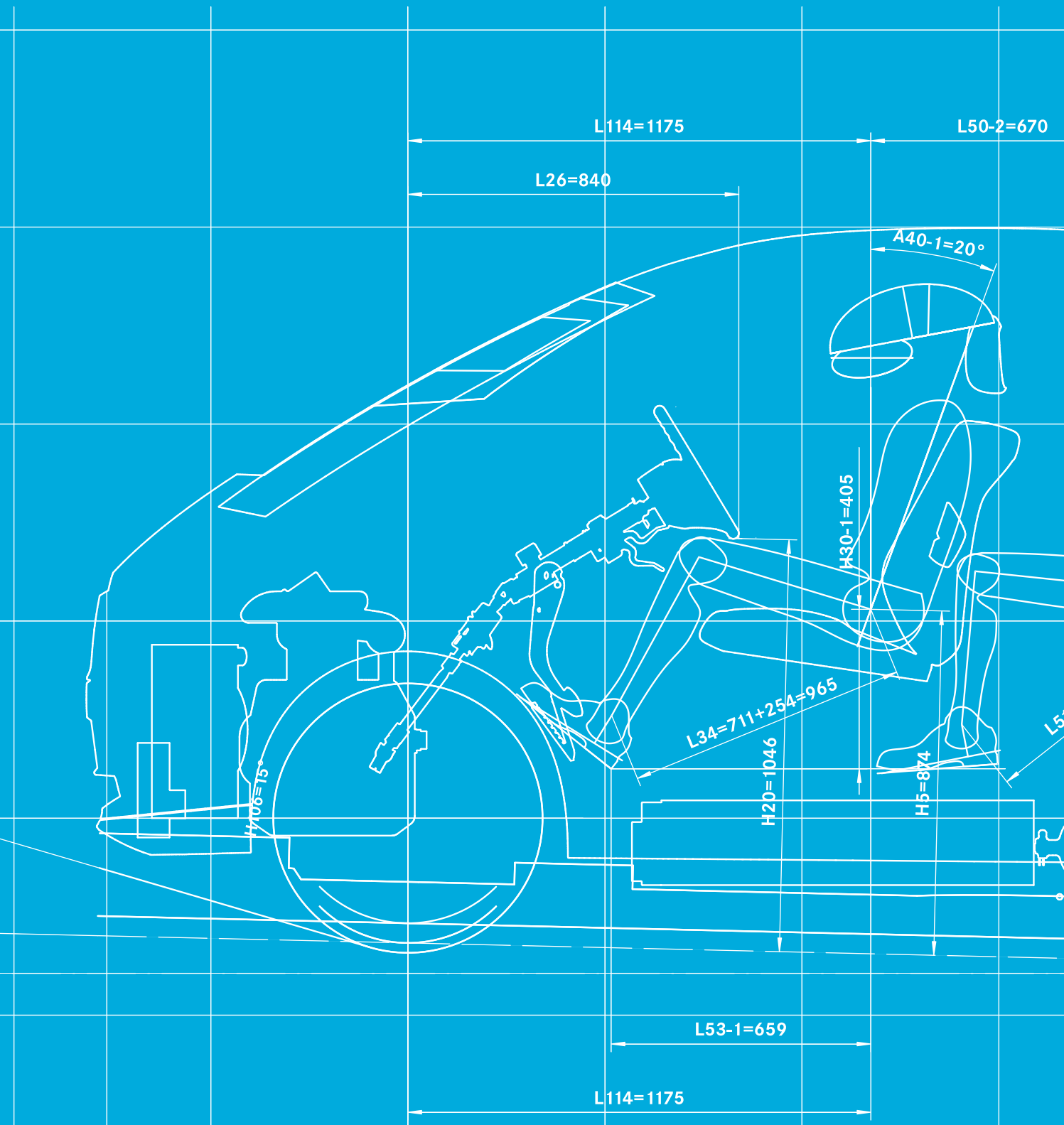
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Dear Reader:



For over 15 years, MBtech has been successfully established on the market as a customer-oriented engineering and consulting company. Ever since, MBtech has consistently further developed its automotive expertise and the products it offers in its four segments: vehicle engineering, powertrain solutions, electronics solutions, and consulting. We have also focused on our skill and expertise in working with full vehicles – meaning our ability to work together with our customers across the various segments involved.



As a service provider, we are always looking for ways to illustrate our service portfolio in tangible form. With that in mind, we are pleased to present an exciting project: the MBtech REPORTER – our own vehicle concept study, which provides ample evidence of the skills and abilities of the MBtech team.



We are always striving to achieve further development, meeting our customers' tightening requirements and rising expectations. To accomplish that it requires not only a well-developed internal network, but also intensive cooperation with our customers and partners. We are also happy to speak with you about the concepts behind the REPORTER – and would especially welcome your interest in taking an active role in shaping the further course of the MBtech REPORTER's development.

We hope you will see this magazine as an invitation to join us as we trace the path that led to the REPORTER, and as a special opportunity to get to know us along the way. Read on, and experience the way we think.

The MBtech executive management:

Werner Kropsbauer

Christoph Schmidt-Arnold

Hartmut Tresp

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INTRODUCTION

“The concept is innovative and feasible at the same time”

David Sobéus, project manager (center, with Andreas Kurbos and Jörn Hüggeleier)



Project manager David Sobéus and the team had a little more than six months to develop and implement the concept study REPORTER in time for the IAA. We talked with Mr. Sobéus about the birth of the REPORTER, vision, passion – and when inspiration strikes in the bathtub at 9:30 at night.

David Sobéus, MBtech enjoys an excellent reputation as a service provider – now you are launching the first vehicle of your own on the market.

D.S.: (Lifts hands in defense.) That's not true.

It's not?

D.S.: No. We're not trying to present the REPORTER as a vehicle of our own.

What is it, then?

D.S.: A concept study. Our aim during this first stage isn't to develop a drivable prototype. Our goal was to pool as many of our skills and abilities as possible and communicate them to others.

But you could already have done that.

D.S.: As said by you, we are a service provider. Most of our customers place a premium on confidentiality. With the REPORTER we have developed a concept study that we use now to communicate: Look at this – here's who we are and what we can do at MBtech.

Why is that so important to you?

D.S.: Because we have a lot to offer. With the REPORTER, we are presenting an interesting concept study in which we have

deliberately focused on specific areas, including design, the drive, and full vehicle conceptualization and design. As a result, the REPORTER showcases a selection of our development abilities. What we want to do now is actively invite partners and customers to participate in the second phase. And we are also offering our services for new projects involving full vehicles.

How much time did you have for the first stage of the REPORTER as it is now?

D.S.: We started in February with a couple of ideas and a blank sheet of paper.

You're joking.

D.S.: (Laughs.) No. It certainly was a challenge.

And how did you manage to pull it off?

D.S.: With experience, expertise – and most especially, a lot of passion. We couldn't have done any of it without the constructive interdisciplinary cooperation that exists between the individual departments. And one other thing was hugely important: We had the full support of the top management.

The result is a highly innovative concept study. But in all honesty, now, it must be barely feasible.

D.S.: The concept is innovative and feasible at the same time. It would be remiss of us to get our audience emotionally interested in something that was just a pipe dream. The REPORTER is a carefully conceived, credible project that stands up to any technical discussion.

What was the biggest problem you faced?

D.S.: The time pressure was a major challenge. Besides that, many of our tasks

were new. After all, MBtech normally works on behalf of customers who have their own expectations, often very specific and detailed ones. So then, when you are suddenly given the freedom to design and conceptualize something yourself, there are a few skills that need to be developed first. It would never have been possible without outstanding hard work and dedication.

Can you give us a concrete example?

D.S.: Our designer had an important idea over the weekend. He drafted a new variant right away, on Sunday. And I got the idea for how to solve a problem at 9:30 one night, when I was taking a bath.

Where does this dedication come from?

D.S.: We bring passion to our jobs – and passion doesn't simply turn off when the clock strikes six in the evening. Plus, in this case, after the first virtual 3D presentation, another major jolt went through the whole team. The REPORTER had been born, so to speak.

So that means you can sit back and relax now.

D.S.: (Laughs.) Hardly. We have a number of highly interesting customer projects in the pipeline, plus there are plans for a second and third stage of the REPORTER.

What will the emphasis be?

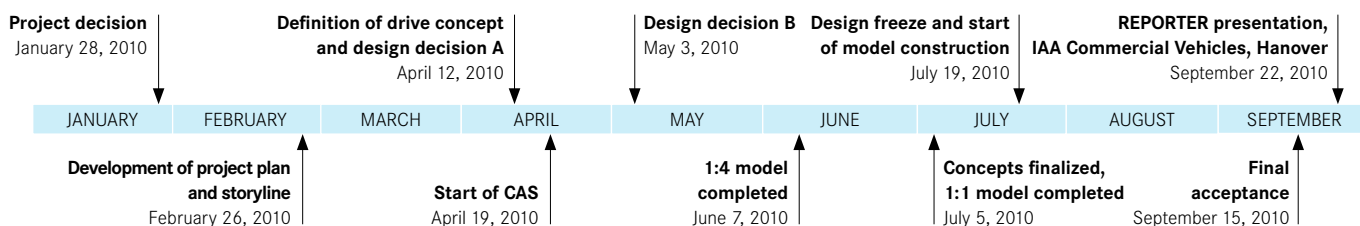
D.S.: The motto of the first phase was "Look." The next one will be "Feel." At that point, we hope to make the REPORTER even more of an experience, demonstrating more technology and perhaps also something of the interior.

So the REPORTER is supposed to undergo continuous further development?

D.S.: That's our goal.

Phase I Roadmap

Milestones through September 2010



COMMUNICATION

“The REPORTER gives MBtech a face of its own”

Jörn Hüggeleier, Head of Product Marketing (right, with Lars Radmacher and Cigdem Kurar)



Jörn Hüggeleier is the Head of Product Marketing at MBtech. He and his team are among the people who are happiest about the REPORTER. After all, they are finally able to do something that is frequently off-limits to them due to confidentiality agreements with customers: present all of MBtech's abilities openly.

Jörn Hüggeleier on ...

... the message of MBtech

J.H.: Our brand promise is “we keep you ahead.” We accomplish that with the skill, expertise, experience, and passion our employees bring to their work. In short, with the way we think. Our aim with the REPORTER is to showcase this so others can experience it.

... the challenges of day-to-day communications

J.H.: As a service provider, we depend on our customers' trust and confidence. That also includes strict compliance with confidentiality agreements. As a result, of course, we seldom have the opportunity to actively market our services.

... the company's external communication goals with the REPORTER

J.H.: For the first time ever, we are able to present our cross-segment services openly, and communicate about them the same way. We hope that the REPORTER will be a kind of flagship demonstrating our abilities. We are giving the MBtech brand a face of its own and a vivid new dimension. Once the project is complete, after three phases, we will have accomplished what we call the “proof of concept.”

REPORTER Project

“The way we think”



MBtech REPORTER

REPORT|01

REPORT|02

REPORT|03

MBtech REPORTS

MBtech Group

“we keep you ahead”



MBtech REPORT

... the internal impact of the REPORTER project

J.H.: One of our interim goals was to enhance employee identification with MBtech. All of our departments worked together closely on a shared project. Everyone involved was called on to live up to our corporate values of passion, innovation, discipline, and trust. It was a great experience, and one that taught us a lot. And the most important thing about it was that everyone was fully on board, with high enthusiasm and dedication.

... the development phase

J.H.: For one thing, we performed a market analysis so that we could understand the market. But then we also conducted an internal survey, asking employees how they imagined the REPORTER. The most frequent things mentioned were that it should be emotionally appealing, desirable, innovative, and groundbreaking. We were guided by all of these factors during the process.

... flexibility

J.H.: We view the REPORTER as a platform we can use for all of our communication channels. One factor that was very impor-

tant during development was ensuring that the concept would be solid and accommodate further development over various stages. It has exactly the kind of flexibility that is also needed in our day-to-day work. Those involved in the fields of engineering and consulting have to be able to adjust to the requirements set by the market and by customers.

... the naming process

J.H.: The fact that the REPORTER name stands out from the traditional kinds of names used for mass-produced vehicles is intentional. One particular message is very important to us: We are a development service provider, not a manufacturer. That's why we stayed away from a traditional model logo, instead simply sinking the REPORTER name into the surface.

... the report

J.H.: What could be more fitting than to accompany the REPORTER with just the right medium – this report? By doing so, we aim to invite the observer to get an idea of our expertise – and the people behind it. After all, they are the driving force behind the innovative spirit and passion that set us apart and define us as MBtech.

IDEA COMPETITION

“Knowledge and passion are our most valuable capital”

Innovation Manager Mario Rombach (right, with Dr. Peter Klose, Principal Technology & Innovation)



Special projects call for special measures. The REPORTER is something special – so MBtech relied on unusual methods and took a new approach, including when it came to internal communication. In the initial stages of the project, the entire staff was involved. “We wanted to ensure that our colleagues were involved as much as possible,” says Mario Rombach. “After all, their knowledge and passion are MBtech’s most valuable capital.” With that in mind, a platform was developed to welcome contributions from all employees: the REPORTER Project Forum. Rombach was responsible for the forum, with support from Dr. Peter Klose, a principal in Consulting. “The platform is based on three main aspects,” Klose explains: “information, discussion, and ideas.” The information section keeps staff members informed of the status of development. “There is also a forum for discussions having to do with this topic,” Klose says. He adds, “The most important tool was the idea competition, though.” Every employee was welcome to submit his or her own suggestions.

Now, there are companies where idea competitions or suggestion programs can become a truly dismal matter because the employees are simply not interested. But if you’re looking for an example of the opposite phenomenon, you’re in the right place. At MBtech, 51 eligible suggestions were submitted. Klose and Rombach rated the suggestions based on four criteria: power to innovate, marketing potential, feasibility, and the effort and expense involved. “There were some really great ideas submitted,” Rombach reports. Most of the suggestions concerned electrical and electronic features, but many employees also came up with ideas for the areas of the body-in-white and vehicle exteriors as well as the electric drive – putting them fully in step with developments in the industry. “Many of the ideas are in line with current trends, like CO₂ reduction, increasing technical complexity, or the growing demand for networking and simplification,” says Klose. And Rombach feels that his intuition has been confirmed. As he says with a smile, “MBtech’s employees just know what’s good.”



we keep you ahead



Global expertise in automotive solutions.

Those who think holistically get where they're headed faster. Therefore, MBtech's service portfolio is an exact portrayal of a full vehicle expertise. As a global engineering and consulting company, we're your partner for consulting and training as well as developing and testing. You benefit from our proficiency along the entire product creation process and product lifecycle. Whether it's systems, modules, or components, sub-processes or complete projects: regardless of what we do or which tasks we assume for you, we always focus on the overall results that correspond to your objectives. And we have vast experience producing such results for automakers and automotive suppliers alike. MBtech – interdisciplinary thinkers, flexible doers.

-  *vehicle engineering*
-  *powertrain solutions*
-  *electronics solutions*
-  *consulting*

DESIGN

*“The design is daring,
almost radical”*

Andreas Kurbos, Head of Design Creation



Andreas Kurbos, Head of Design Creation at MBtech, and his team have several turbulent months behind them. “I almost can’t find the words to express what we accomplished here,” says project manager David Sobéus. That means it was high time to pause for a moment and look back on a project that was the first of its kind in the history of MBtech.

Andreas Kurbos, we need you to tell us a secret.

A.K.: I’ll see what I can do.

How do you actually develop the design for a pickup on a very tight timeline if you know nothing about it except that it is supposed to have four seats?

A.K.: (Laughs.) It isn’t easy – but it certainly is exciting, because we were able to live it up once in a while.

You just started sketching away?

A.K.: Actually, it wasn’t exactly that uncoordinated. It was clear that we wanted to arrive at a daring, unmistakable, futuristic, and innovative design, but that it also had to fit MBtech.

How did you know what would fit?

A.K.: In fact, it wasn’t easy. Vehicle brands have their own style that is reflected in every series. Our challenge was that we didn’t have a vehicle design that we could use for reference. So we asked ourselves, what exactly does MBtech stand for? At first, it might not sound like it would be difficult to come up with an answer.

But?

A.K.: As a service provider whose top priority is to turn customer requests into reality, we follow our customers’ design specifications. We don’t have an automotive product identity in the traditional sense.

So you weren’t able to answer the question after all?

A.K.: We did, but in a somewhat more abstract context. MBtech is made up of its

employees’ hard work, their skill and expertise, their experience. When a customer comes to MBtech, that customer can rely on four core aspects: passion, innovation, discipline, and trust. These characteristics are also reflected in the REPORTER. Our goal was to highlight the idea behind the vehicle concept through its design.

What does that mean in concrete terms?

A.K.: Can I answer with a question of my own?

Why not?

A.K.: What do you see when you look at the REPORTER?

A clear, modern silhouette with few lines.

A.K.: Exactly. We wanted the REPORTER to have a clear character right at first glance. But the more closely you consider it, the more you see its technical depth. If I may leave modesty aside for a moment, achieving depth of this kind in such a short time is probably quite a rare accomplishment.

The entire development of the concept study took just a little more than half a year. How much did you feel the time pressure?

A.K.: Internally or externally?

Was there a difference?

A.K.: Internally, it was definitely something we talked about, of course. But externally, it wasn’t an issue at all. Ultimately, the observer doesn’t look at the REPORTER, ask how much time we had to complete it, and then form an opinion. He either says, “wow, cool,” or “that doesn’t work at all.” It makes no difference to him whether or not the project had to be finished fast.

Still, you had a – shall we say – very ambitious timeframe.

A.K.: Which we were able to meet, because we have a sensational team here at MBtech. An accomplishment like this is only possible if you have enthusiastic and experienced team members.

The REPORTER was a very emotional project for you?

CREATION



Sketches

CAS



3D modeling

VISUALIZATION



Renderings

MODELING



Model construction

A.K.: Definitely. It's the first time that we at MBtech can stand here completely openly and say: Hey, look over here – we did it! Otherwise, we are often subject to confidentiality requirements, which we also take very seriously.

So how important is it for a designer to have passion?

A.K.: The job would be unthinkable to me without passion. For me, every project is a very personal and emotional thing. The moment when you first hold a 1:4 model of your own design in your hands – it's a bit like the birth of a baby.

Are you still able to tune that out in your private life?

A.K.: The question is more whether I want to. I love my job. Take the REPORTER. Do you know when I got the idea for the rough shape of the top?

No idea.

A.K.: One Saturday, when I stopped at a junction in Munich. The next day, Sunday, I sat on the patio for hours, making initial sketches.



People mover variant

How do you know, actually, what kinds of design will appeal to people a couple years down the line?

A.K.: We can't know for sure, we can only feel it. Over time, though, you do develop a sense of trends. With the REPORTER, however, that wasn't the main factor. What we are showing with the REPORTER is MBtech in 2010 – and not MBtech as it will be in 2018.

To what end?

A.K.: We want to inspire the viewer. We want to pique audiences' curiosity and invite them to take a closer look at the REPORTER. And we want to show what we can do. That's why we decided in favor of a daring, almost radical, design.

And yet you don't see a big MBtech logo.

A.K.: No, and that's deliberate. We definitely don't want to give the impression that we want to launch a vehicle of our own on the market. We are not a car brand, and we don't want to become one, either. The REPORTER is a medium that is intended to show the full spectrum of what we offer and our know-how. Those are things you can see when you look at it.

The design of the REPORTER seems very futuristic – and it's probably very difficult to implement.

A.K.: No, not at all. It is both functional and feasible; those were two of the most important criteria. Flexibility was also a high priority for us. That means that the REPORTER can be further developed and we can envision a whole range of different possible variants – depending on what the customer wants, and in line with the requirements.

What aspects of the topic of full vehicles does a designer find appealing?

A.K.: It's the major league in terms of design, because it involves the utmost in complexity. The design for a complete vehicle ties all of the different areas of design together. You have to be a master of simply everything: product design, graphic elements, color, surfaces, and on and on.

And do you play in the major leagues?

A.K.: You'll have to ask our customers. But it is a fact that they play in the major leagues – and that is the level that they also expect of us as a service provider.

How do you measure that? Taste is well known to be arguable. Isn't design the same way?

A.K.: Yes and no.

Yes and no?

A.K.: Of course some aspects of it are subjective. But there are also details that give you an idea of whether a vehicle was designed cleanly, such as the surface quality. There are big differences there.

Is a designer actually an artist or a craftsman?

A.K.: Ideally, both. After all, the idea isn't to satisfy your own ego, but rather to arrive at the best possible product. And even the greatest artist should know that the most beautiful design is useless if it cannot be implemented or doesn't do what the customer wants.

So how much compromise went into the REPORTER?

A.K.: There's a lot of exchange with the specialists behind it. But with the REPORTER, we have definitely been able to give optimum form to our design ideas.



Pickup variant



Delivery van variant

DESIGN | CREATION

“The design process was a challenging, exciting time”

Benjamin Nawka, Designer (left, with the team Creation)



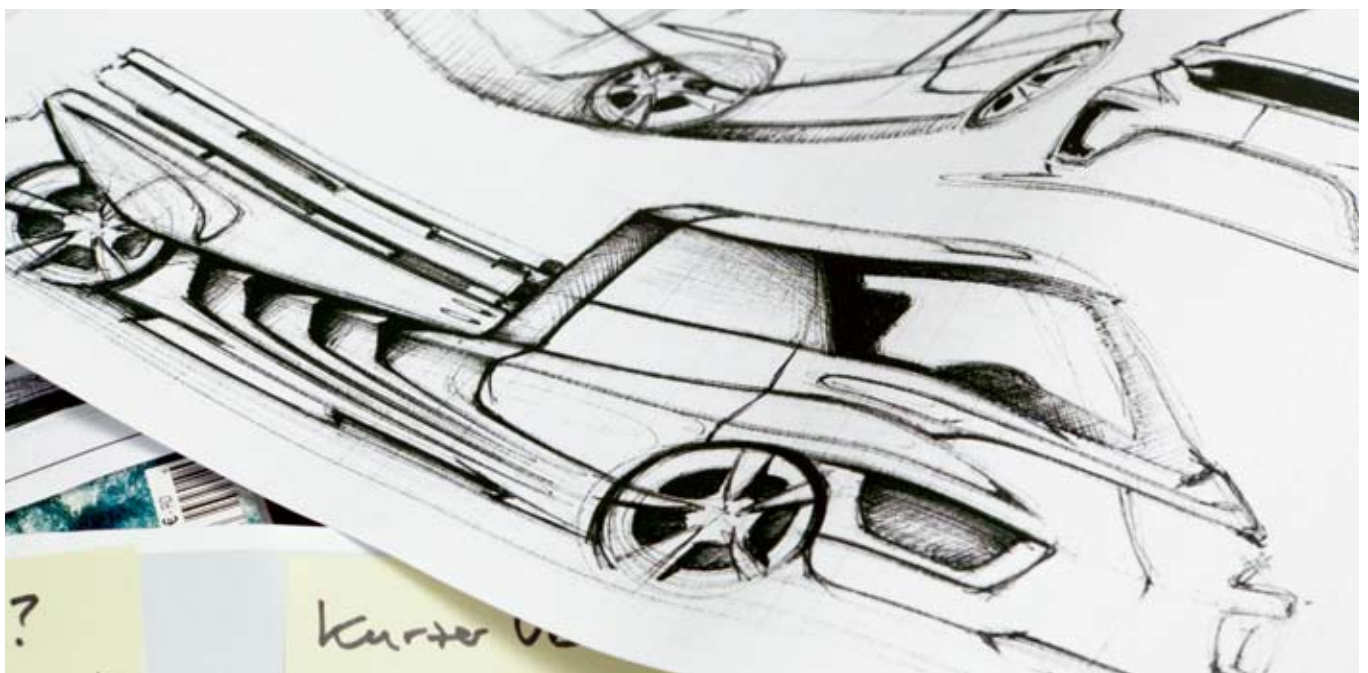
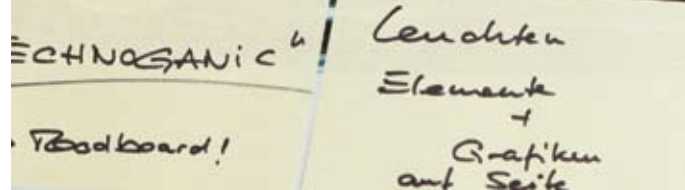
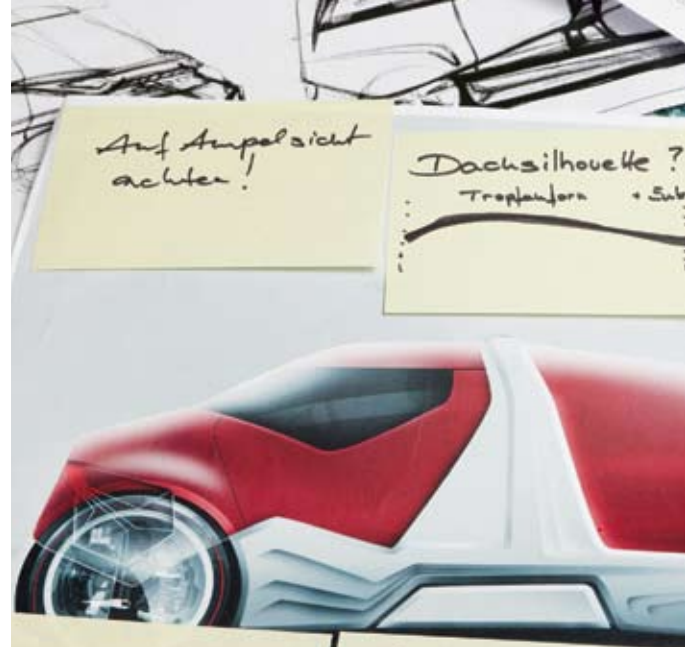
Together with Andreas Kurbos, Benjamin Nawka was responsible for creating the design of the REPORTER. To tackle the job, the two of them started out by relying on one thing above all: their hands. They worked in a classical style, with pen and paper. But they did so under tough conditions. “We didn’t have the budget to have 1:4 models made from various drafts,” Kurbos explains. That meant that the team had to offer various sketches to serve as the basis for fundamental design decisions.

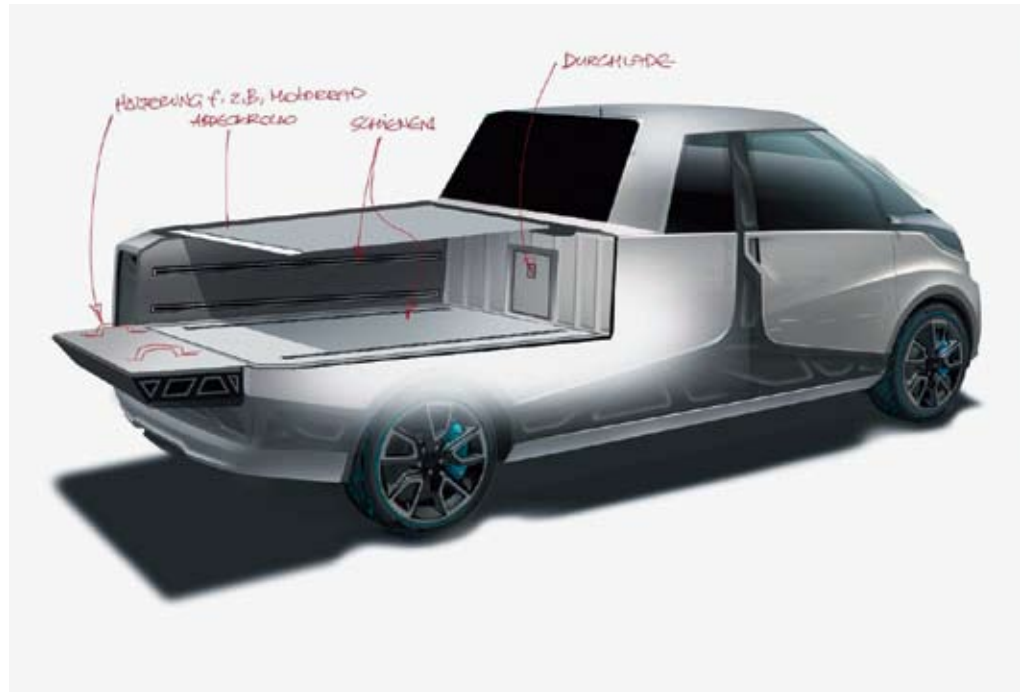
The sketching phase was the most creative stage of the process, and also one of the most crucial. “Our job was to develop and pinpoint the vehicle’s character,” Nawka explains. “It was a long development process, with a lot of shared creative sessions and brainstorming.” But even in the midst of all that creativity, the team had to keep the objective and overall technical data in mind. “We don’t just design at random,” Nawka says.

"We always pay attention to make sure that the volume and wheelbase fit the specifications, and that there's enough space for four people plus the engine."

It is true that the creation phase marks the beginning of the design process – but it doesn't end until the vehicle is finished. "We follow our design to the end," Nawka explains. "After all, we are the ones who are also responsible for how the vehicle looks in the end." And since it is supposed to not just look good, but also be technologically perfect, the designers have to co-operate with the other departments involved. "With the REPORTER, though, we had an unusual amount of leeway," Nawka says. "That's why the design process was so much fun." He pauses, then adds: "The entire design process was an exciting time, but also a challenging one."



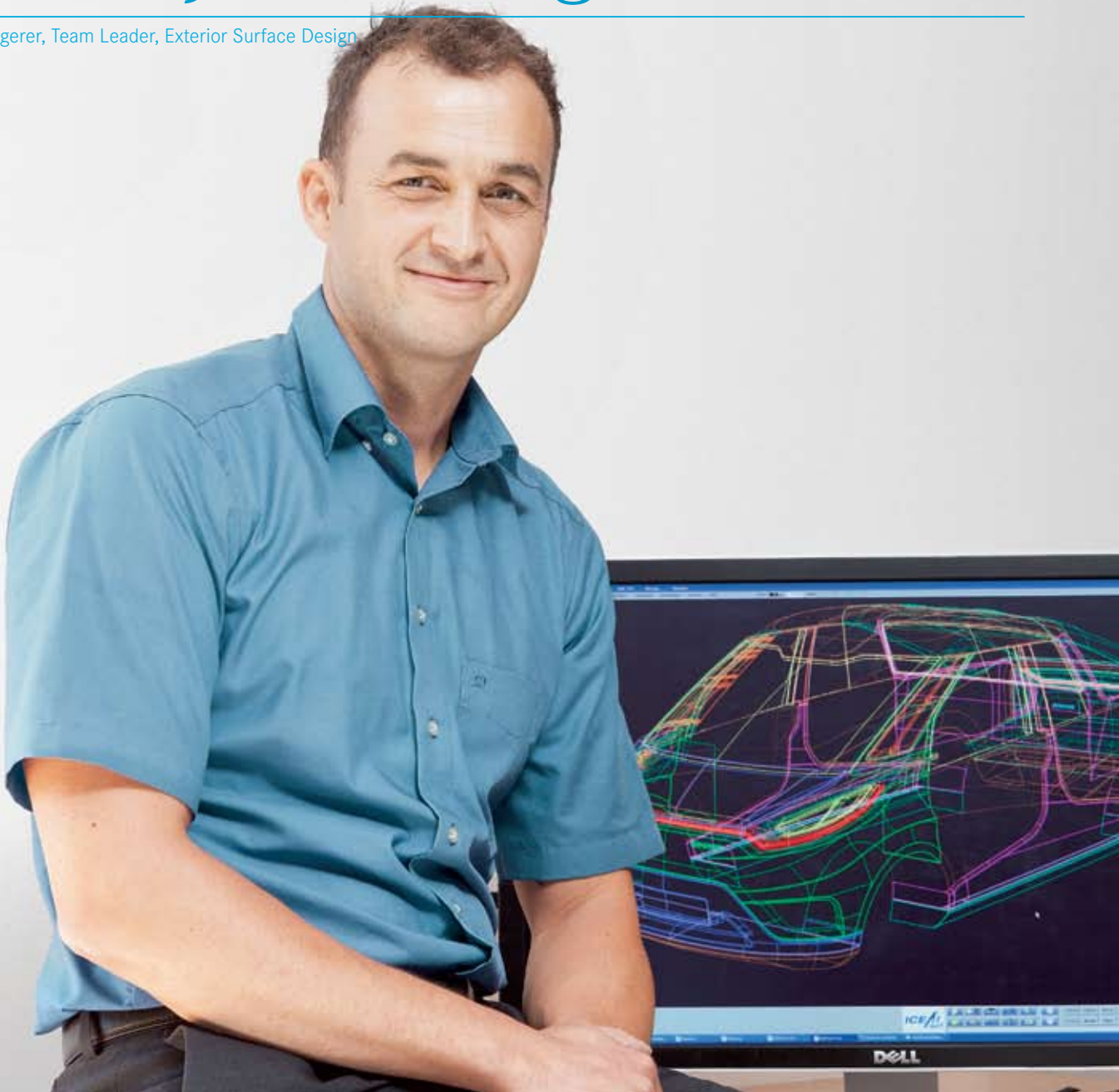




DESIGN | SURFACES

“It’s not about my preferences. I view myself as a tool of the designer”

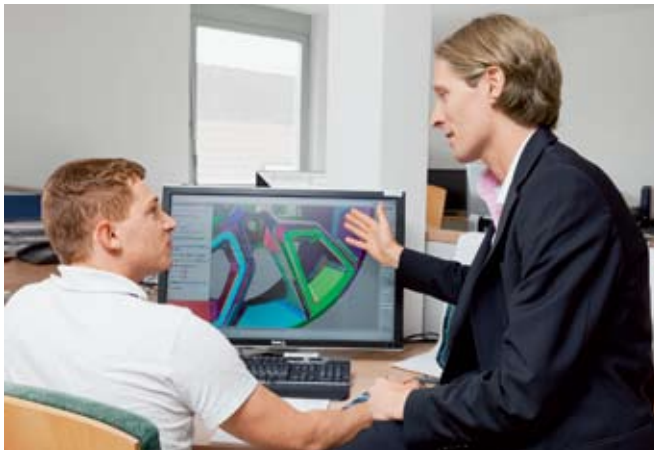
Markus Ungerer, Team Leader, Exterior Surface Design



Markus Ungerer is not one of those people who always have to be the center of attention, lending weight to their arguments through sheer volume. He sits quietly, explaining in a soft voice what he considers his job to be. "I see myself primarily as a tool of the designer," says the MBtech specialist in surface design (computer-aided styling, or CAS). This is what modesty sounds like. And as for what appreciation sounds like: "A CAS specialist has to have a precise understanding of the designer, his ideas, and his sketches in order to turn them into reality," says Andreas Kurbos, Head of Design Creation. "Markus Ungerer and his team know how to do that. They are vitally important to me."

Ungerer is a bridge-builder. Between design and engineering, between the idea and the actuality. To boil it down to one sentence, his job is to transform the ideas of the creative department into digital 3D models. There's simply no room for an outsized ego.

"It's about the product, not about pushing my own ideas or expectations," Ungerer says. But that doesn't mean he shows anything less than the utmost motivation and dedication to his tasks: "I always give a hundred percent. I try to bring the design requests into line with the technical and legal requirements."



Coordination of CAS rim development



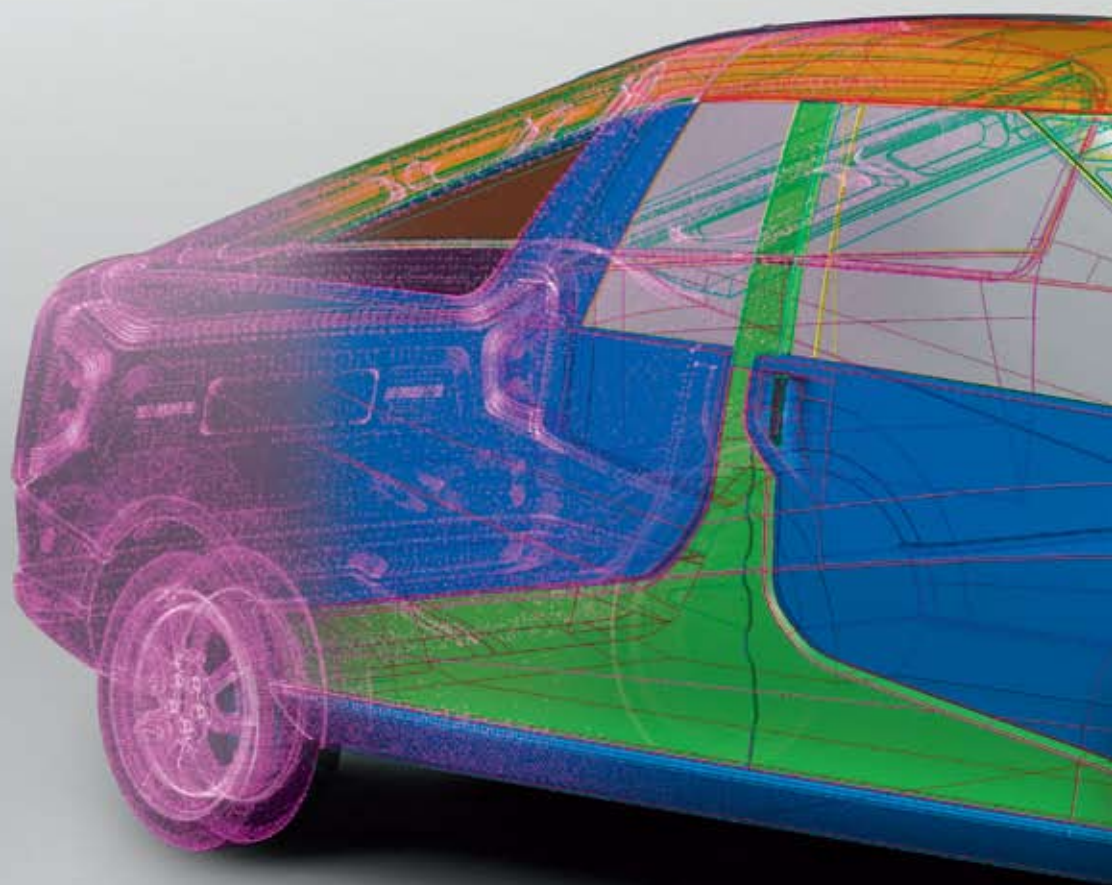
CAS – detailed view of headlights

And that is often no easy task. Once, he was given the sketch for a sports car – only to find out, after the digitalization was complete, that the roof would have to be chopped off to accommodate people more than 1.5 meters tall. What does he do in those cases? "Work together to find a solution that comes as close as possible to the ideal." Ungerer is a highly tenacious person.

With the REPORTER, though, he had somewhat more freedom. "While it is a realistic, serious concept," Ungerer says, "the design was the main focus. We were encouraged to be daring." That had a lot of appeal, but it also meant that the project didn't run along by itself.

At the beginning, Ungerer had exactly three sketches. One of the front, one of the rear, and one of the side. "It was especially challenging to have nothing to go on but the drawings," Ungerer explains. Nonetheless, the design team wanted the digital 3D model to be faithful to the lines of the drawing and the feeling conveyed in the sketches. But of course, Ungerer also could not allow himself to lose sight of the most important technical hard points: Do elements like the engine and tires fit in their allotted space? How large can the radiator surfaces be, and how large do they have to be?

"We all worked closely together and took a very goal-oriented approach," Ungerer says. "As a result, the concept developed further on an ongoing basis." And once the concept had largely reached maturity, it was milled in the form of a 1:4 model. It was a special moment: For the first time ever, viewers could get a good look at the REPORTER – and more: they could touch it. Even the most refined digital technology is no substitute for a moment like that. Although the model replicates the exact dimensions of the digital design used to make it, it can have a whole different effect on the viewer. That's why this stage is followed by fine-tuning – right up to the moment that the designer gives the project the final nod. And that is also the moment when Ungerer is finally satisfied.





DESIGN | MODELING

“The greatest thing is when the observer forgets that he’s looking at a model”

Matthias Berner, Managing Director, proceda Modellbau



The district of Flacht, in the small town of Weissach, is tucked away in an idyllic corner of the German landscape. It is located on the edge of the fertile farmland and gentle hills of the Strohgäu region, just 40 kilometers away from Stuttgart. The quiet town boasts a tidy main street, and just outside it, a small industrial area. In short: just the right place for companies that want to focus on essentials. Companies like proceda.

It isn't hard to find the company's headquarters here; it stands out architecturally from its surroundings. The building is modern and elegant, with spacious glassed-in surfaces. The offices on the first floor have a fantastic view of the natural surroundings. This is one center of modeling activities. The other is located a couple of kilometers away, in a building so unobtrusive it is barely noticeable. If you didn't already know that it was the workshop of one of the most sought-after vehicle modeling companies in the entire country, you wouldn't believe it. The shop doesn't even have a real doorbell.

The precautions are intentional. Confidentiality is one of the top priorities at proceda. Any attempt to approach the inner sanctum is doomed to fail. Everything is kept under tight security. "Our customers," says Managing Director Matthias Berner, "know that they can trust us."

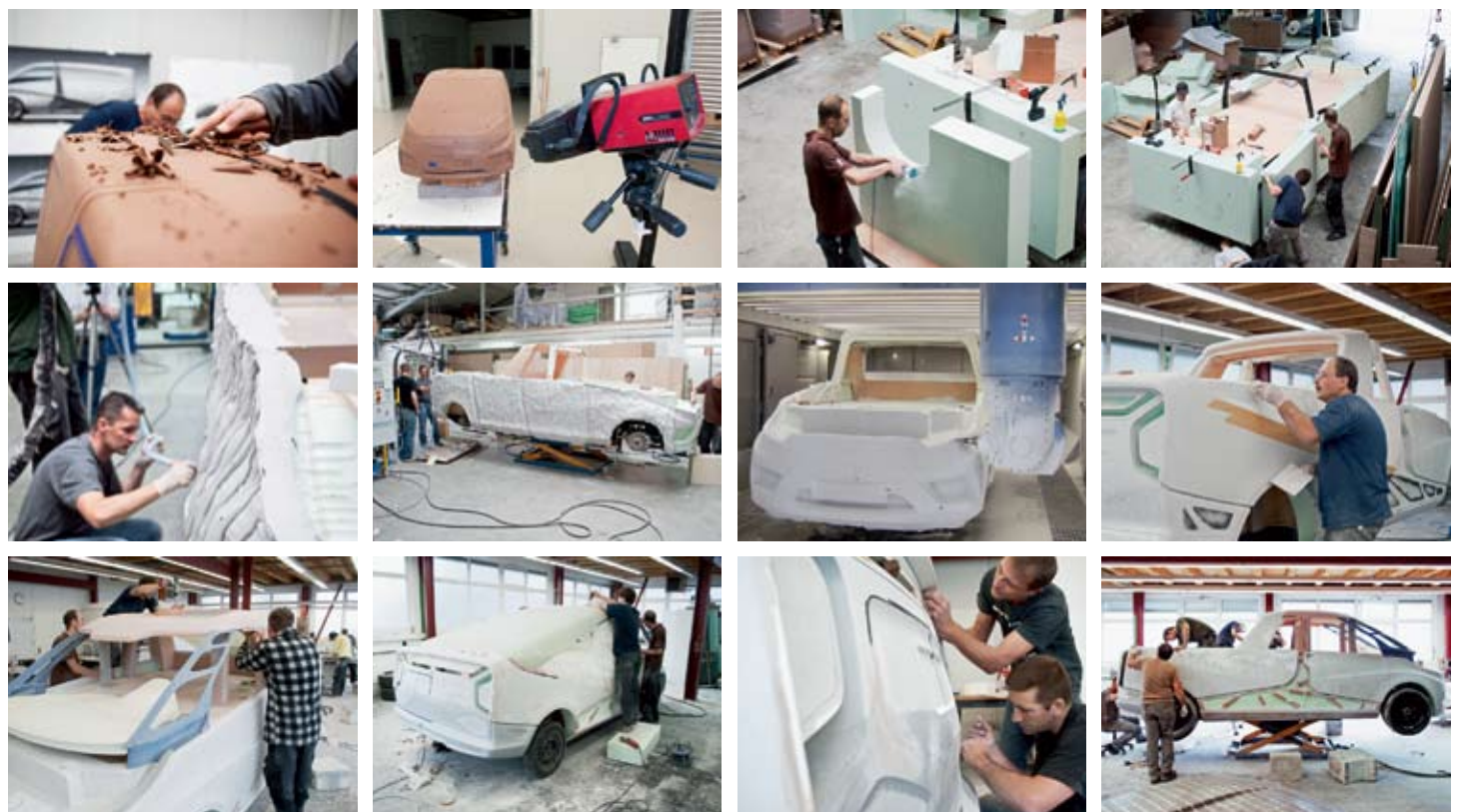
After all, deep in the belly of the hall is where state-of-the-art technology is used to produce the latest models. Berner was the first model constructor with his own metallizing system, and his milling and measurement equipment meets the highest standards. "But anyone can buy the machines," Berner says, "just not know-how, passion, and experience."

And those are exactly the strengths of Berner and his 70 employees. Anyone who joins Berner knows what to expect: a high-performance team that considers punch cards a rather superfluous invention. If need be, the team even works through the weekend. The notion that a deadline might be missed is something Berner has heard of only distantly. That is a characteristic MBtech values about its cooperation partner as well – and one that was put to a tough test with the REPORTER. Berner and his team had just six weeks. From just a single 1:4 scale model to the final 1:1 model, every stroke had to be perfect.

A challenging project and a tight timeline? Those are things that don't frighten Berner. To him, every challenge is an opportunity for further development. "We always want to offer a little extra something, that slight touch more than what the customer expects," he says. "To us, the greatest thing is when the observer says, at the end, 'wow' – and completely forgets that all he has in front of him is a model."

That's why Berner trusts in attention to detail – and a great deal of autonomy and initiative. Here, everything is done in-house, from the production of laminates to painting and finishing. Everything is made by proceda. "It might sometimes be a bit more labor-intensive or more costly," Berner says, "but it's worth it. This way, at least I know that every step in the work meets our quality standards." And they are high standards indeed – including those that come from proceda's customers. Many of those customers operate in the premium segment. And that's no coincidence.













FULL VEHICLE CONCEPT

“Vehicle handling can be simulated, teamwork can’t”

Dr. Thomas Weidner, Head of Full Vehicle Design and Calculation (left, with Till Römhild, Expert alternative drive systems)



Matthias Repsch and his colleagues spend most of their working time some distance away from reality. During working hours, their world is a virtual one. And yet, it is perhaps not so far away from the real world as it might appear. The colorful vehicle on the simulation monitors, at any rate, rolls smoothly along the digital autobahn. It might look like a cartoon, but the background is completely serious. This simulation of how the vehicle handles will help designers analyze and evaluate changes in the vehicle concept and the impact of these changes.

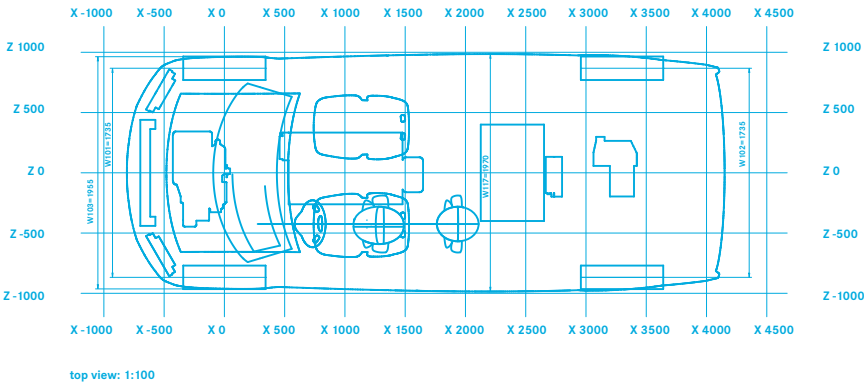
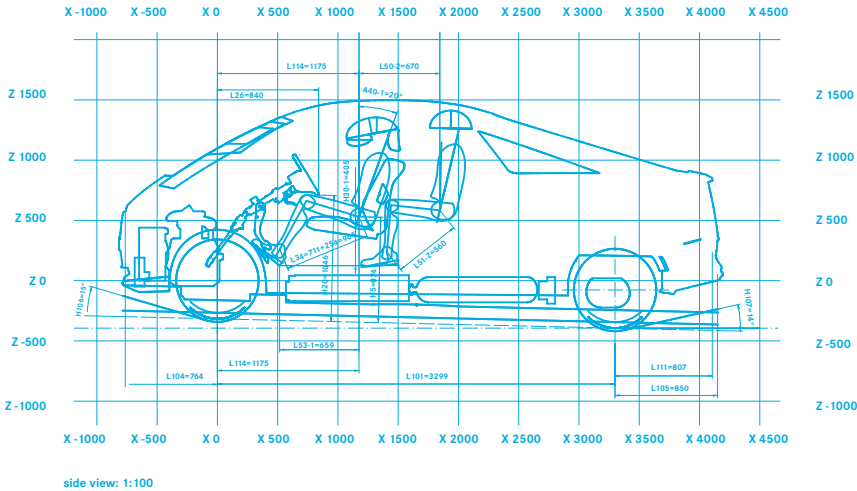
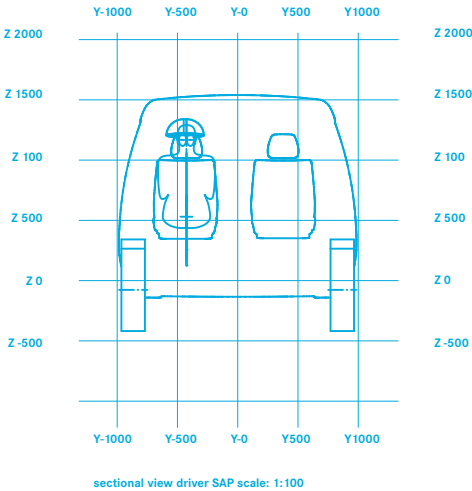
Repsch and his colleagues are the digital master builders, so to speak, behind the REPORTER. They look at the design model (computer-aided design, CAD) and, thanks to the results of the simulation, they can pinpoint those areas where the vehicle still needs improvement or has potential for further development very early on. The job of the Full Vehicle Design and Calculation (digital prototyping) department is to find the ideal packaging: to digitally combine the various structural elements and components of the REPORTER into a complete, functional vehicle and to put that vehicle to the test. Flow analysis, multi-body and rigidity simulations – the list of the tests a vehicle is required to undergo is a long one.

Facts and Figures

Comparison: the REPORTER

	Length	Wheelbase	Width	Height
REPORTER	4,995 mm	3,300 mm	1,955 mm	1,890 mm
Renault Trafic	4,782 mm	3,098 mm	1,904 mm	1,978 mm
VW T5 (Facelift)	5,290 mm	3,400 mm	1,904 mm	1,945 mm
Mercedes-Benz Vito	4,748 mm	3,200 mm	1,901 mm	1,875 mm

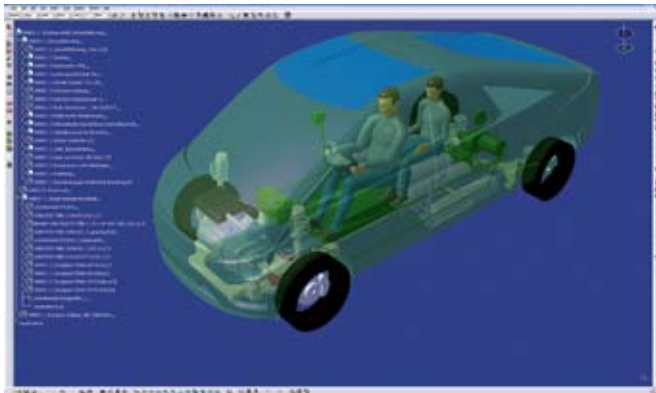
“Digital prototypes and CAD are essential features of our work nowadays,” explains Dr. Thomas Weidner, head of the department where Repsch works. “Using them saves us a huge amount of time and money, because they help us eliminate a number of loops later on in the area of prototype production.” That’s why his division includes several experts in data procurement, data management, CAD, and multi-body, rigidity, and other simulations. “Our goal is to continuously improve the digital prototype and to apply latest methods and tools,” Weidner says, “and we pursue this consistently.”



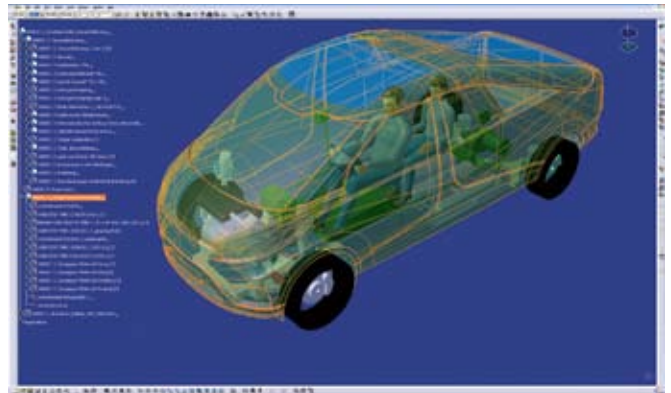
The REPORTER project was still a step into uncharted territory for Weidner's team, however. Tight limits on time and budgets made one thing absolutely essential: controlling the development processes' dynamics. "Our department was the place where a lot of things came together, both technically and in our internal communications. That made it especially important for us to coordinate with others," Weidner says. After all, the REPORTER was supposed to feature as much of MBtech as possible. "It worked very well," Weidner says with certainty. "We created a concept study that reflects all of our departments."

In addition to high technology, the project sometimes also called for completely ordinary, everyday things. A trusty old ruler turned out to be nearly as important as the CAD system, for example. Till Römheld, another employee of the Full Vehicle department, keeps one tucked away in his desk drawer at all times – and has done so since the REPORTER project, at least. That was when

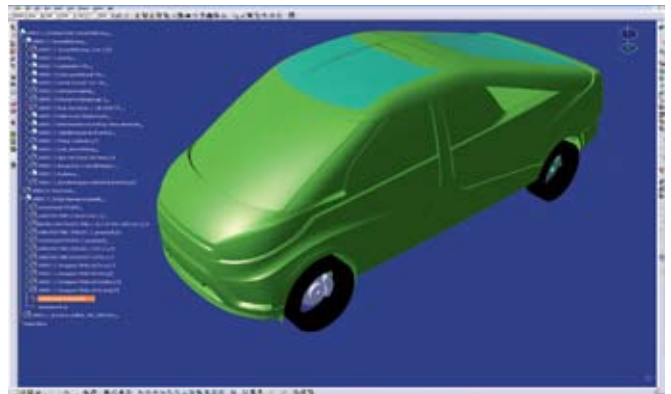
a simple ruler became his secret weapon, for instance when it came to determining the radiator surface area. "The design department wanted the air intakes to be as small as possible," Römheld explains, "so I got down to work with my ruler and measured the radiator surfaces of a huge number of different vehicles to get a basis for comparison fast, in just one day." If not all of the basic conditions are set, you sometimes have to take an unconventional tack. A digital-only approach doesn't work, after all. "Even with the best simulations, you can't rely solely on the PC. That's when it also depends on the know-how and experience of both the employees and the test departments," Weidner explains, adding: "by the time you get to the crash tests, at the latest, you need real-world tests." For the REPORTER, though, that has not yet been necessary. But Weidner's department is ready and equipped to handle a live full vehicle concept – and not just with CAD and ruler standing by.



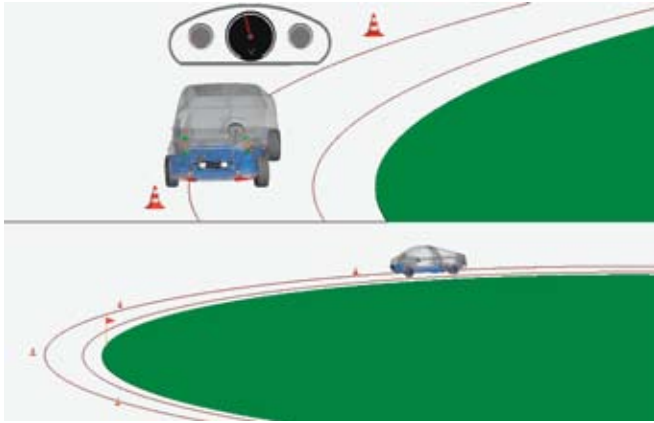
Transparent CAD model



Wireframe CAD model



CAD shading model



Screenshot of multi-body simulation

Dr. Thomas Weidner is head of the Full Vehicle Design and Calculation (digital prototyping) department at MBtech. Many different aspects of the project met in his offices and those of his employees. We spoke with him about the interpersonal component of working on the REPORTER.

Dr. Thomas Weidner, as head of the full vehicle department, you held a particularly prominent position throughout the REPORTER project.

T.W.: Well, our team was where a lot of aspects came together, at least. The project was a challenge from the technical standpoint, but we also learned some new things, including in our internal communications.

In what regard?

T.W.: At MBtech, we do generally work in interdisciplinary teams on other projects as well, but in smaller teams. And above all, we always have a clear assignment from a customer. The REPORTER project marks the first time that all of the departments have worked together, and there is a huge

range of different skills and personalities involved. We were given very few specifications, which gave us a lot of room to design.

That's certainly nice.

T.W.: Definitely. But it was also unusual, and something we had never tried before. Everyone demonstrated especially high ambition during the project. Ultimately, the MBtech REPORTER is finally letting us showcase all of our abilities completely straight forward.

You have to keep your projects confidential, otherwise.

T.W.: In most cases, yes. So everyone was even more excited about turning their own ideas into reality and pushing them through with this project. (Laughs.) Our department really felt like "ground zero" sometimes. There was always some big explosion going on – but always in the project's interests.

That certainly also shows how passionate the employees felt about it.

T.W.: Exactly. And the discussions were also very helpful. As the REPORTER came

closer and closer to its definite shape, you could see more and more that these controversies were part of a necessary process of growth and maturation. They helped us arrive at a solution that reflects everyone who participated, and one that everyone can share in supporting. (Smiles.) Vehicle handling can be simulated, teamwork can't.

What do you take with you from your time spent working on the project?

T.W.: We have developed further, both technically and in terms of methodology. We have gained new process knowledge and learned some things in terms of our internal communications as well. Many of us now have a better sense of our colleagues and their skills and expertise, and our trust and confidence in the teams working in other areas has grown.

The first phase of the REPORTER project has been concluded. Does that mean your work is done?

T.W.: (Laughs.) I hope not! The whole thing is much too exciting for it to be over. We are already looking forward to the second phase.

BODY-IN-WHITE

“The challenge is finding the right combination of technology and materials”

Claus Hüttinger, Team Leader, Body-in-White



A-PILLAR

ALUMINUM CASTING

- offers potential for savings on weight and expenses, since many connections and functions can be integrated into a single structural element
- one longitudinal support used in the REPORTER replaces 37 individual parts.

B-PILLAR

CRP

- Carbon-Reinforced Plastic, often simply called “carbon,” is highly rigid and stable and enables consistent lightweight construction. CRP is the technology of the future, since weight reduction is becoming a more and more important issue in light of the debate surrounding CO₂ emissions.

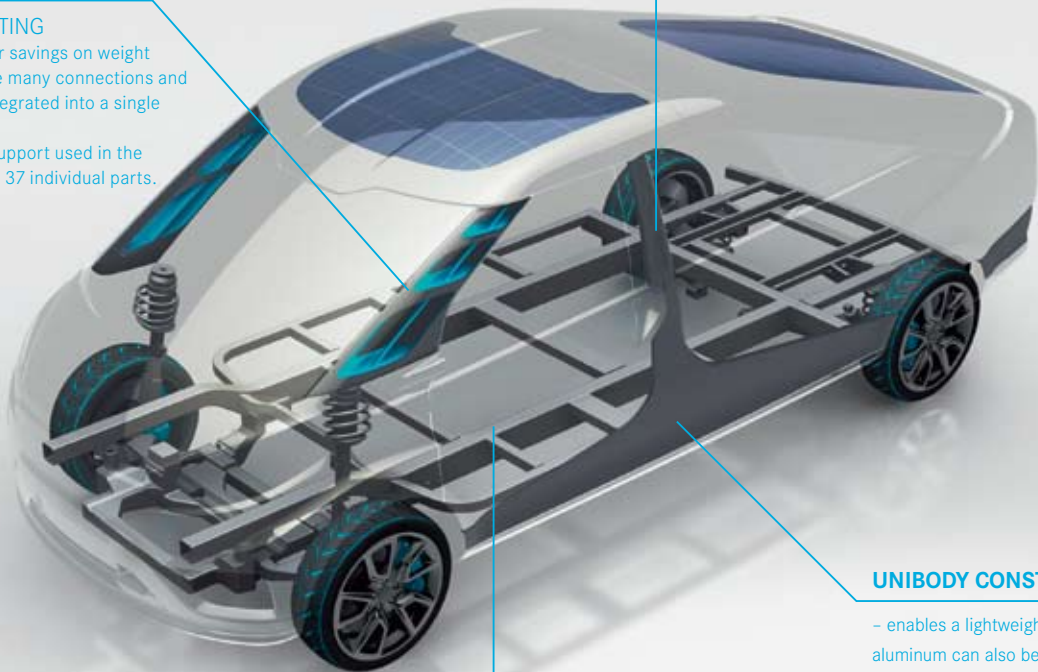
UNIBODY CONSTRUCTION

- enables a lightweight design, since aluminum can also be used for the shell. Unibody construction is the most widespread technology used for self-supporting vehicle bodies. It is especially suitable for production of large unit volumes and offers considerable potential for savings.

PLATFORM

EXTRUDED ALUMINUM PROFILES

- are lightweight and highly flexible in terms of length and width, making them the right technology for small series and the integration of modular drive systems.



As the team leader of the Body-in-White department, Claus Hüttinger knows what is important in his field: “The challenge is finding the right combination of technology and materials. In the REPORTER, we show that we have development expertise for all of the important technologies.” To achieve this, Hüttinger and his team worked closely together, sometimes in tandem and sometimes in parallel, with the Full Vehicle Design department, in an approach dubbed “simultaneous engineering.” “In terms of

both hierarchy and physical proximity, we keep in close contact with each other. The fact that we have a shared database lets us access the most current data from individual departments,” Hüttinger says. The job assigned to him and his team: “To design a lightweight, modular structure, and really show what we can do.” The result: a concept that showcases the full breadth of the available production methods – from aluminum casting to unibody construction and carbon technology.

DUALX E-DRIVE

“Yes to alternative drives – individualized and still economically efficient”

Dr. Bernd Blankenbach, Senior Expert E-Drive Systems (right, with Martin Ott, Head of E-Drive Systems)



Adaptive

The REPORTER is ...

INDIVIDUAL

– since the driver has a choice between three driving modes: zero emissions in eco mode, optimized fuel economy in 4range mode, and full power in 4dynamic mode

MODULAR

– since the platform and full vehicle concept can accommodate all of the typical drive variants, from a gasoline engine to a natural gas drive and even a purely electric drive.

VERSATILE

– since the operating status adjusts to the driving situation. If more power is needed, for instance, the extender automatically turns on – and then turns back off when it is no longer needed.

CUSTOMER-ORIENTED

– since electric and zero-emissions driving is possible in the city, while still providing unimpeded mobility – and doing so at an optimum cost-benefit ratio.

Dr. Bernd Blankenbach is one of MBtech's experts in the development of electric and hybrid drives – and is thus responsible for a key component of the REPORTER: the DualX E-Drive drive concept.

Dr. Bernd Blankenbach, you were one of the driving forces behind the development of the REPORTER's drive concept. What were the specifications you were given?

B.B.: What made working on the REPORTER especially exciting was that we had the rare opportunity to start with a clean slate. We were free to decide how to proceed. We had only a loose set of specifications stating that it should be an electric drive, but even that wasn't set in stone.

How did you approach the task?

B.B.: We started out with four main considerations. First: What does the customer want? Second: What fits the vehicle? Third: What are our options in terms of using an innovative drive? And fourth: Is the drive supposed to achieve zero emissions? We used a simulation tool we developed ourselves to determine the required driving performance, along with the energy content, weight, and cost of the batteries, for two established driving cycles: the New European Driving Cycle (NEDC) and the Artemis cycle.

What reason might there have been not to design the drive for zero emissions?

B.B.: Driving with zero emissions is the ideal, there's no question about it. But it was extremely important to us to make sure

that the REPORTER would be an economically feasible concept that could theoretically go straight to the road as it was.

Is zero emissions that unrealistic?

B.B.: No, it's possible to drive with zero emissions – the REPORTER can do that, too. But only in the city. At higher speeds and longer ranges, the weight, size, and cost of the batteries needed to achieve zero emissions would be disproportionately high. In our view, a vehicle with a purely electric drive does not yet offer a real balance between cost and benefit when used outside the city.

So you decided in favor of low emissions instead.

B.B.: Exactly. But it was also very important to us to ensure that it was versatile and modular.

Which means?

B.B.: Our point of departure was the ideal of having a long range and high speed. Higher speed means more energy consumption, though, and thus a shorter range. We thought about three variants to deal with this issue.

What were they?

B.B.: First, a purely electric variant for urban use, with a range of about 75 kilometers and a speed of up to 60 km/h.

That's not exactly going to break any records.

B.B.: It wasn't supposed to. For the average private driver, that wouldn't be enough.

But think about a letter carrier in the city, for instance – that person doesn't drive long distances, is never allowed to drive faster than 50 km/h, and the batteries can charge overnight while the car is parked in the station's garage.

True.

B.B.: And that's not all. With carbon taxes and in locations where a special toll is required to drive in the city, an electric drive is a really great thing. Plus, it's quiet, and it doesn't emit particulate matter.

Okay, that's convincing. But you mentioned three variants. What was the second one?

B.B.: A purely electric drive for short distances – with an average range of 150 kilometers and a top speed of about 110 km/h. But unfortunately, our calculations confirmed our suspicion that an electric drive that makes it possible to achieve these values is economically out of reach. Maybe in 15 years, but not now. And we wanted a concept for 2010, not 2025.

And the third variant?

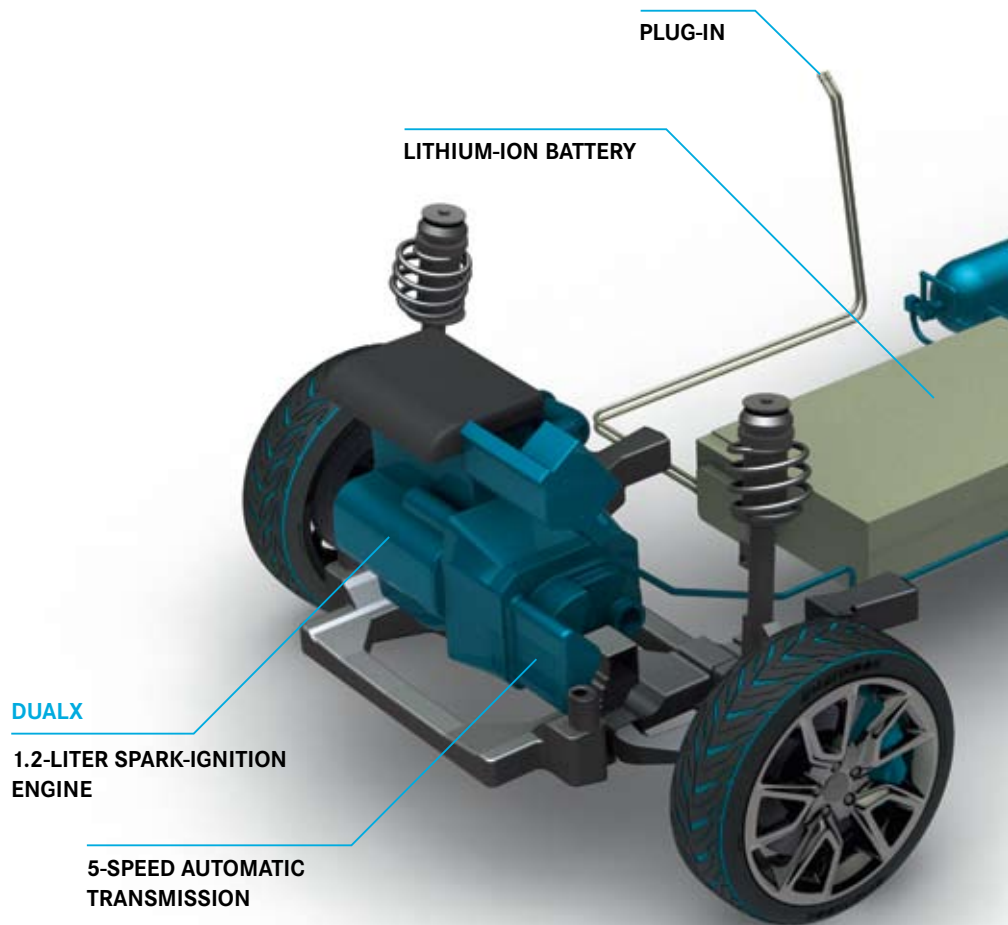
B.B.: Is a complete substitute for a conventional drive. With speeds of up to 130 km/h and a range of 300 kilometers, the customer practically doesn't have to compromise at all – and there is still a benefit to the environment.

How are these values achieved?

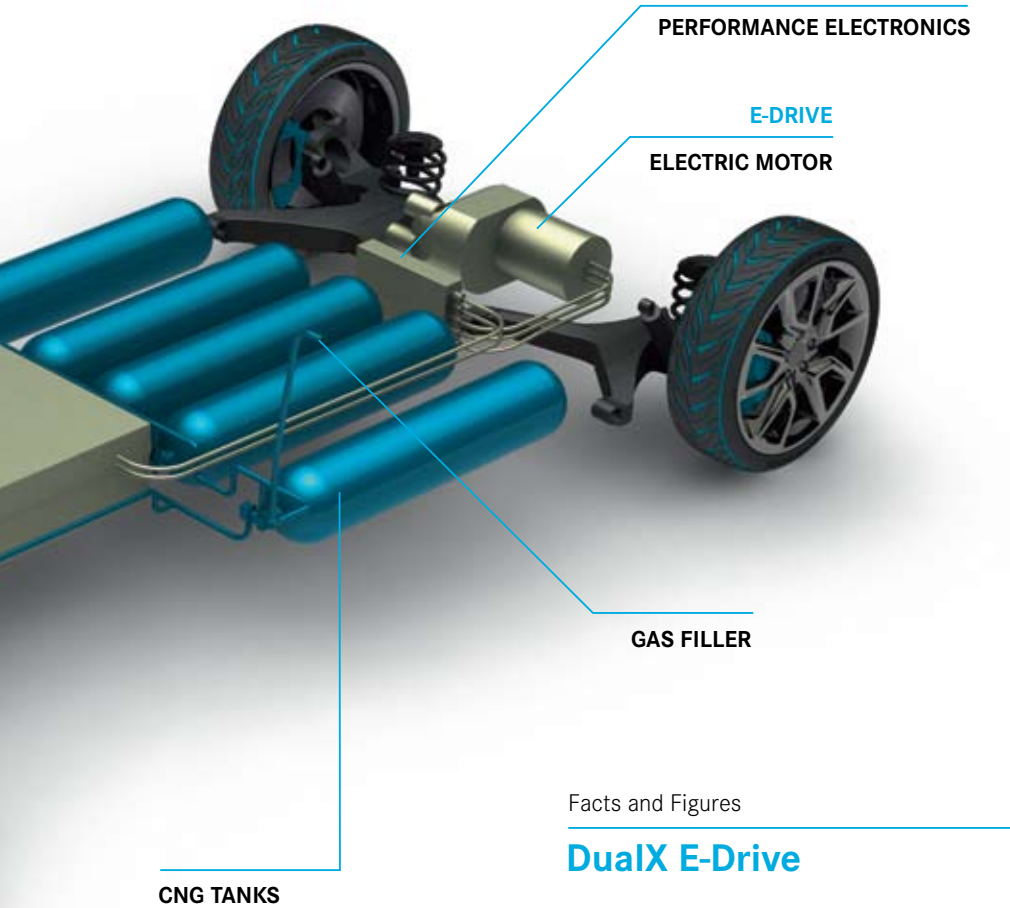
B.B.: Due to the new way we have combined an electric motor and a combustion engine. It was clear to us that we could not achieve the desired ranges, torque values, and speeds with an electric motor alone. The electric drive unit needs a range and performance extender if it is to be suitable for everyday use.

So that's where the name DualX E-Drive comes from?

B.B.: Precisely. DualX stands for the fact that the mechanical extender, which in the main REPORTER variant is a CNG spark-ignition engine, supports the electric drive – and thus increases the vehicle's range, power, and speed.



The DualX E-Drive is an intelligent, demand-driven combination of two equally important drive units.



Facts and Figures

DualX E-Drive

Maximum speed	130 km/h
Range	> 300 km combined (purely electric: approx. 55 km in the NEDC)
Electric motor	70 kW
E-Drive	2-speed transmission for optimum range
Lithium-ion battery	25 kWh
1.2-liter spark-ignition engine	75 kW
Transmission	5-speed automatic transmission
CNG tank volume	150 l/25 kg (five 30-liter bottles)

So it's a hybrid drive. That's not a revolutionary new development, either.

B.B.: Well, firstly, innovation in drive technology does also mean utilizing new technologies and components. But the crucial factor is combining and integrating the components in the optimum way, alongside intelligent energy management. That means saying yes to alternative drives – individualized and still economically efficient.

And secondly?

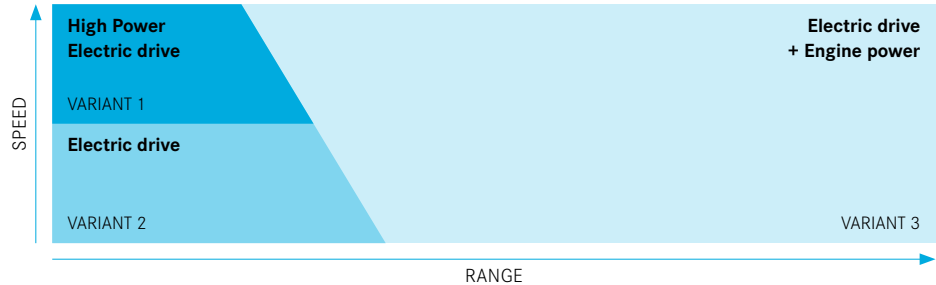
B.B.: What we have developed isn't a normal hybrid drive. The electric drive unit is at

least equivalent in relation to the combustion engine, whereas in conventional hybrids, it is generally just an add-on. In addition, both units do actually serve to drive the vehicle, instead of one simply generating electricity for the other.

So is that the optimum combination?

B.B.: Yes, and the key factor is that both motors are self-sustained. The electric motor drives the rear axle, the combustion engine the front axle – and that is true whether one of them is operating alone or both are working together as a hybrid.

Design Spectrum, E-Drive



That means that if needed, an intelligent all-wheel drive feature is available. Plus, this configuration enables better handling on curves.

So how does the vehicle decide which motor is active, and how?

B.B.: The driver decides that, with the way he drives and his operating strategy. The driver can choose from among three modes: eco, 4range, and 4dynamic.

That sounds good.

B.B.: It doesn't just sound good, it is good. The eco mode is designed for maximum CO₂ reduction, making it possible to drive in the city with zero emissions – as we wanted to achieve with the first variant. 4range enables maximum range with optimum fuel economy, and 4dynamic stands for the utmost driving enjoyment and agility.

Does that mean the last two modes you mentioned embody the third variant?

B.B.: Exactly. With the DualX E-Drive and the three operating modes, we have taken a big step toward achieving dramatic reductions in driving emissions, even as we are only asking drivers to make minor adjustments in terms of their mobility expectations. Our study showed that when it comes to range and top speed, customers are willing to compromise.

The maximum range of 300 kilometers doesn't exactly let drivers go on a world tour, though.

B.B.: (Laughs.) That wasn't our goal, either.

We wanted a vehicle for urban and regional use, not for long-distance travel. And when drivers want to drive a little farther, all they need to do is make one more stop at a service station as usual.

And pay ...

B.B.: Yes. But considerably less than they would with a conventional drive.

On the other hand, the vehicle probably costs more than one that runs on gasoline.

B.B.: I can't deny that. But in comparison to other alternative drives, the DualX E-Drive is reasonably priced. It pays off three times over: when you buy it, because of its relatively low sticker price, at the gas station, and when driving, since you don't sacrifice anything in terms of handling.

It sounds like you're fairly excited about the DualX E-Drive yourself.

B.B.: I am! It was a lot of fun to work with the other departments and fine-tune the project to find the optimum solution. In all honesty, I firmly believe that we have designed something really special here.

Your efforts can only be seen in virtual form thus far. Is that enough of a reward for the work you put into the project?

B.B.: The solution is enough of a reward in itself, actually. Of course, it would be great to be able to actually depict the drive in the model as well, but the project hasn't reached its end yet – maybe we can still make up for that.

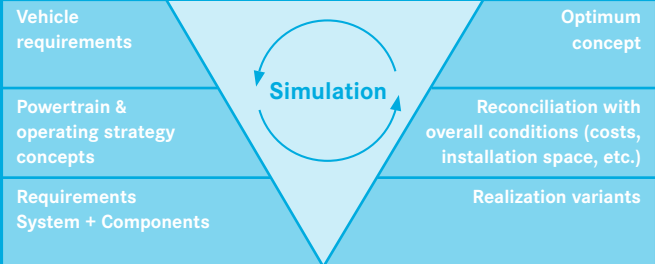


Martin Ott is the head of the E-Drive Systems department, which was also responsible for the development of the DualX E-Drive. He is proud of the results his team has achieved.

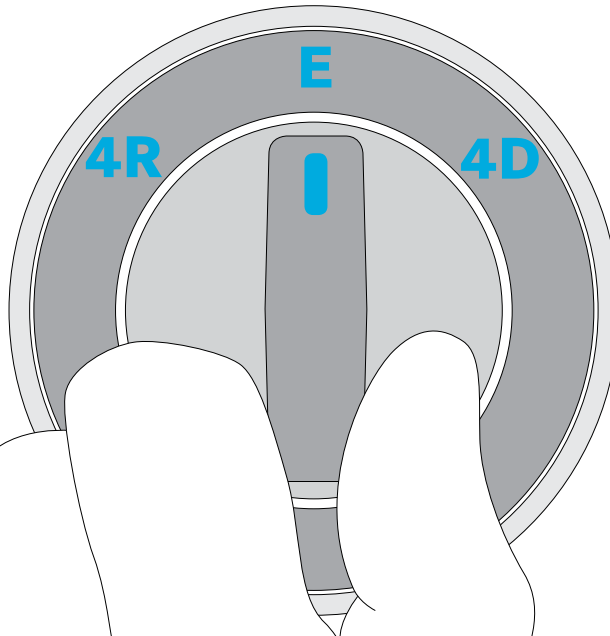
“I was very pleased to see the passion the team brought to the task of developing an intelligent and innovative drive solution. With the DualX E-Drive, we have in fact developed an optimum solution. One of the key steps in the process was the design of the powertrain, for which we were able to use simulation tools we had developed ourselves. Starting from base requirements, we can use these tools to compare different approaches and concepts for electric and hybrid vehicles and for various driving cycles. You enter the criteria for the overall vehicle and operating strategy and the program tells you the requirements for the drive system and its components. It’s a smart solution. The process also helped us expand on our abilities in another way, since the new tools let us support our customers even better over the entire automotive process chain – with our engineering and consulting capabilities.

Even though we are still in the process of further developing the REPORTER, we are well equipped for future simulations and validation processes, with a new vehicle system test stand that lets us test all drive components and combinations on a modular basis. That’s how we pinpoint the ideal powertrain configuration – long before the customer would have to test it in the vehicle, at considerable cost. That saves time – and especially money.

We are ready and willing to take new approaches – and we have the passion and skill needed to do so.”



THREE DRIVING MODES



4RANGE

stands for maximum range and optimum fuel economy when driving. 4range is the best choice for environmentally conscious, high-economy driving over longer distances. 4range is also ideal for making deliveries between nearby cities or going on vacation.

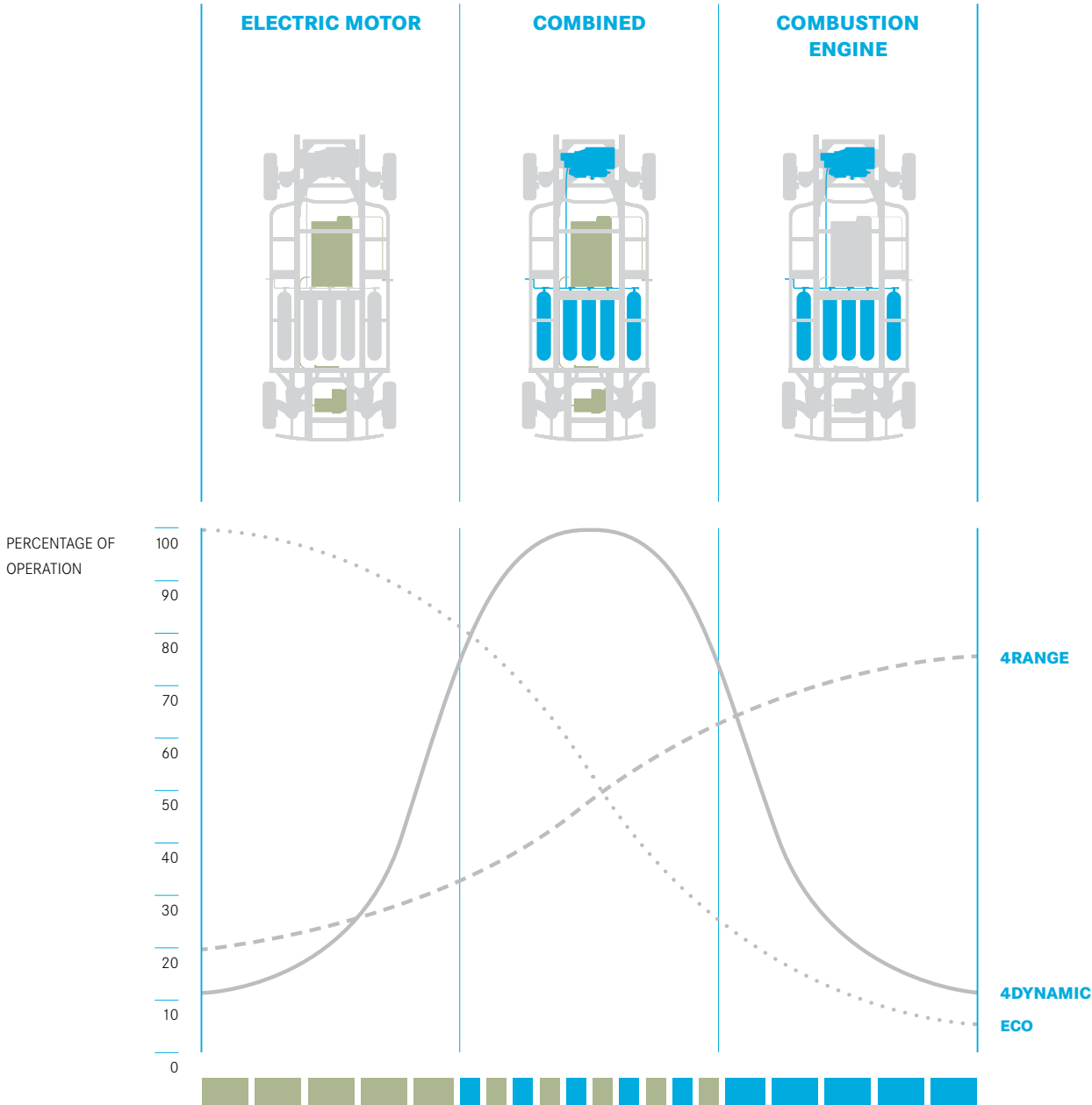
ECO

stands for maximum CO₂ reduction and zero-emissions city driving. The combustion engine is activated only in emergency situations. eco mode is optimum for couriers and others making deliveries in the city, commuters, and those who just want to go for a short shopping trip.

4DYNAMIC

stands for maximum agility and driving enjoyment. 4dynamic is designed for high drive power. The vehicle responds more immediately in this driving mode. That makes 4dynamic mode ideal when it comes to speed in any situation.

THREE OPERATING STATES



DUAL EXTENDER

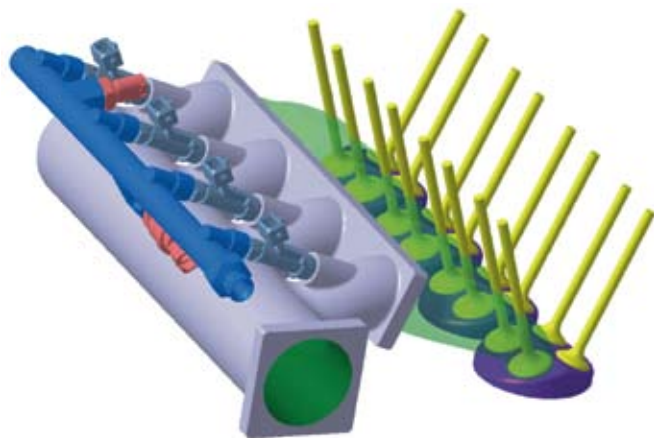
“The compact CNG motor is the optimum partner in our dual drive”

Jürgen Schäfer, Engine Development



Jürgen Schäfer and his team have tried it all, analyzing even drives used for ATVs, motorcycles and boats, along with emergency power generators, for their potential in the dual extender (DualX) feature. The objective was to create a solution that can be implemented right away, not just several years down the line. In the end, they arrived at a proven passenger car engine after all. “It was the one we were able to adapt at a reasonable cost in a short period and optimize for our application,” Schäfer says, explaining the decision.

Another factor that contributed to the selection of this drive was the ability to use alternative fuels, such as compressed natural gas (CNG). While CNG is at a disadvantage to gasoline in that its power density is lower, and use of CNG also entails necessary adjustments to the engine, “we think the benefits far outweigh the disadvantages. The compact CNG motor is the optimum partner in our dual drive,” says the MBtech powertrain expert. Treating the exhaust is easier and highly efficient, the engine is quieter, and above all, CNG produces a cleaner combustion process than diesel fuel. The team is also considering expanding the engine to accommodate biogas, which would mean practically CO₂-neutral operation. “CNG and biogas are an especially good idea for vehicles used in urban areas for commercial or distribution routes,” Schäfer explains, then adds with a wink, “As a consumer, I would take our concept right away.”



CNG-adapted injection system

But getting there was no cakewalk. “Finding the right DualX drive in the short time we had was definitely a bit of a challenge,” Schäfer recalls, “but it was also a lot of fun to work with our colleagues on a project involving everyone, and finally to arrive at a shared solution.” They had to answer three fundamental questions in the process:

1. Diesel or spark ignition?

Answer: Spark ignition.

Reasons: Easier modification for CNG or biogas, simpler exhaust treatment, low noise levels, and low engine weight were the deciding factors. The disadvantage of low torque is compensated for by the electric motor.

2. What engine class?

Answer: A turbocharged 1.2-liter four-cylinder engine.

Reason: The ratio between power and installed size is optimum for the vehicle’s intended purposes.

3. What kind of transmission?

Answer: Automatic.

Reasons: Weight and costs turned out to be optimum. Plus, the amount of coordination between the electric motor and the combustion engine would be too complex for a manual transmission.

The overall solution is therefore a turbocharged 1.2-liter four-cylinder spark-ignition engine with an automatic transmission. “In line with the modular concept behind the REPORTER, the engine can be realized in two variants, one for CNG and one for gasoline. Both options offer an optimum fit with the electric motor,” Schäfer says – and then offers a look ahead to the future: “I would be very happy to work on the further development of the drive concept during the second phase.”

SOLAR MODULE

“We are demonstrating flexibility and making solar technology mobile”

Martin Bogar, Managing Director, CSP



On the principle that there's always room for more, the REPORTER team added something else literally on top of the design – the solar module. “Our goal was not to stop at an innovative design and drive concept, but rather to think ahead another step,” says project manager David Sobéus. Something completely new was what they wanted, an environmentally friendly extra. The idea was to use free space on the roof to generate additional energy.

It didn't take long to find the right partner: CleanSolPower (CSP). “We are making solar technology mobile. The REPORTER roof gives us a chance to show the possibilities offered by solar technology in the automotive sector,” says Martin Bogar, Managing Director of CSP. Sobéus returns the compliment: “We benefit, too, since in CSP we have found the partner that offers the optimum solution for us.” After all, there are easier tasks than upgrading a vehicle to include a solar roof, especially on a tarp above the truck bed.

But for MBtech, a challenge is just the first step toward the solution. “We wanted to deliver a true additional benefit for the driver, and not just something that sounded green,” Sobéus says. The REPORTER has a considerable amount of open space on the fixed roof above the cab and on the top. But conventional solar cells are too big, too heavy, inflexible, and because of the glass involved in construction, they also pose a risk of injury. “That's why we could only create the solar roof with CSP's help,” Sobéus says, “because they are the only ones with the lightweight, flexible modules we needed.” Their name: CSP-Flex3.

Each module consists of a large number of tiny spherical solar cells pressed into place between two layers of plastic. The list of their advantages is long. “Our modules are much thinner and

lighter than conventional ones, they aren't fragile, and they are flexible,” Bogar explains. “Plus, the efficiency of the cells does not decline in very strong sunlight, which is typical of other cells.” For project manager Sobéus, there was another thing that was very important as well: “The solar elements also were unbeatable for us, because they can be fixed in place in a variety of ways. On a flexible tarp, we would not have been able to work with conventional cells.”

The solar top yields a couple hundred watts – enough to run the air conditioning system, interior lighting, or radio. “That reduces fuel consumption, or consumption of energy, which in turn increases the range,” Sobéus explains. He and Bogar agree on one thing: This is a model with a bright future. “In the van, truck, and camper segment and in the market for boats, there is a huge range of options for the use of solar modules,” Bogar says.

And to really put the finishing touch on the whole story, the solar top can also be used portably. With a handy zipper, it can be removed, packed into a special case, and tucked away in the cargo compartment or used elsewhere. “You can just spread the tarp out anywhere, plug in the charging and control unit, and use the energy it generates to run something like a laptop, for example,” Bogar explains.

All of this means that during the process of developing this feature, like many others, the REPORTER team was thinking ahead – developing add-ons and even more. As the saying goes, there's always room for more.



Integrated solar roof, mobile solar top (vehicle rear)

Facts and Figures

The Solar Module

	Cell	Integrated Solar Roof	Removable Solar Top
Weight	8.5 g (not laminated)	< 7 kg	< 4 kg
Length	154.9 mm	900 mm	1550 mm
Width	56 mm	640 mm	640 mm
Thickness	1 mm	9 mm	5 mm
Number of cells	1	136	182
Rated output P under STC	0.84 W	114 W	152 W
Efficiency	11.3 %	11.3 %	11.3 %
Maximum power (solar roof + solar top)		266 W	

Photovoltaic technology converts light directly into electrical energy. Its history begins in 1839, when French physicist Alexandre Edmond Becquerel discovers the photoelectric effect, paving the way for photovoltaics.

History of photovoltaics

1839

Photovoltaic technology converts light directly into electrical energy. Its history begins in 1839, when French physicist Alexandre Edmond Becquerel discovers the photoelectric effect, paving the way for photovoltaics.

1921

Albert Einstein develops a theory of the photoelectric effect in 1907 and is awarded the Nobel Prize in Physics in 1921 for his research in the field.

1940

Russell S. Ohl discovers by accident in 1940 that silicon generates electricity when exposed to light.

1950

About ten years later, the first crystalline silicon solar cells are developed, at Bell Laboratories in the United States. They are about 2 cm² in size and have efficiency levels of about four percent.

1959

Photovoltaics join the space race in the late 1950s. From then on, solar cells are used to run certain transmitters on satellites.



1976

Solar cells are first put to good use on earth in **1976**, to run the telecom network in the Australian outback. In the years to come, they begin replacing batteries on offshore oil rigs and in other locations.

1980

Commercial use of solar modules begins in the **1980s**.

1990

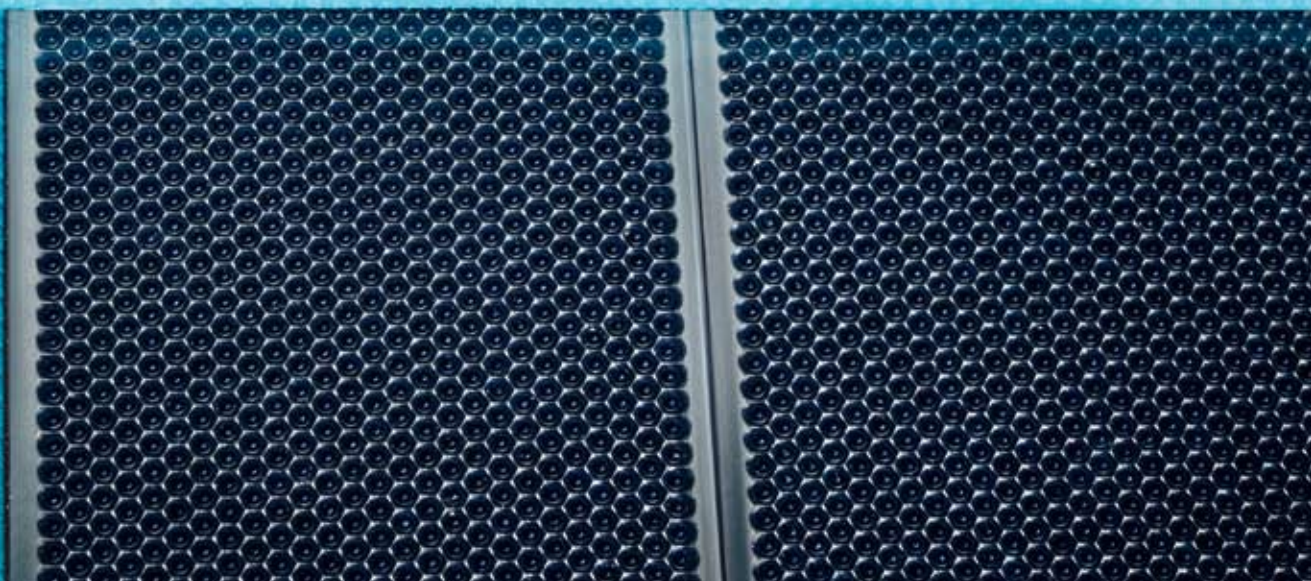
The ball-shaped solar cells used in the REPORTER are developed in the **early 1990s**. They are just over 2 mm² in size and reach efficiency levels of about 11 percent. They are also far less expensive than their predecessors.

1991

Various programs have been initiated since **1991** to support feeding of solar energy into the German grid and the installation of solar panels on the roofs of homes and other buildings.

2010

In **2010**, MBtech and CSP integrate solar modules on the roof space of the REPORTER to generate additional energy in an ecofriendly way.



STUDY

“It is an advantage that engineering and consulting work so closely together”

Martin Schwarz, Senior Consultant



Martin Schwarz is one of the experts who look ahead into the future for MBtech. One of the jobs of the Consulting segment is to get an idea of future customer requests and market trends early on. And in this segment, it is almost a given that product and market analyses often form the basis for a project. That was certainly the case with the REPORTER, which, like other projects, was preceded by a study: the Trend Monitor 2010, which focused on the light commercial vehicle market – and thus supplied important input for the REPORTER.

These kinds of studies are only one of the many responsibilities of the Consulting segment, however. From formulating and achieving strategic goals and planning production lines right up through the product design and creation process, Schwarz and his colleagues provide the engineers with important advice on a wide range of issues, supplying information and providing support. As Schwarz says from experience, “it is highly advantageous in the service sector that consulting and engineering work so closely together.”

In the REPORTER project, as with many others, teamwork between the departments played a major role. During the Trend Monitor 2010 project, the consulting team was tasked with pinpointing the driving factors behind the light commercial vehicle segment so that the engineers could take the needs of the market and consumers into account when designing the REPORTER. “We focused on the issue of total cost of ownership, or TCO, in terms of new drive trains,” Schwarz explains. “People often underestimate those costs, but it’s not unusual for the costs of maintenance to far exceed the purchase price.”

Because the clientele in this segment is highly heterogeneous, Schwarz and his colleagues looked first at how important TCO is within the purchasing decisions made by various customer segments and among body manufacturers. In addition to safety, which is an obvious prerequisite, and environmental compatibility, the cargo capacity also plays a very important role in purchasing decisions in this sector. Based on their research in these areas, the team ran a calculation of the TCO for commercial vehicles already available on the market, based on real-world figures. This analysis was used as the basis for evaluating innovative drive concepts, which were likewise subject to a TCO evaluation. The results, of course, were considered in the process of designing and creating the REPORTER. Ultimately, keeping an eye on the future is never a mistake.

Facts and Figures

User groups surveyed:

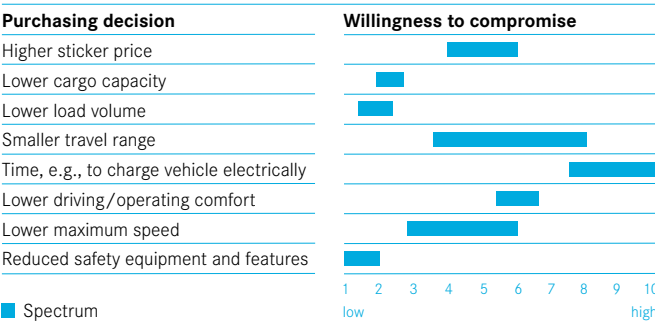
- Public services
- Logistics providers
- Manufacturers and industrial users

Respondents’ opinions of future technologies

Type of drive	rating
Hybrid	++
Battery-powered electric vehicle	+
Fuel cell vehicle	+
Biodiesel	--
Gas (LPG, CNG)	-
Vehicles aimed at specific driver types (e.g., specific urban vehicles)	+

- ++ very important
- not important
- + important
- not very important

Respondents’ willingness to compromise on factors with definite impact on purchasing decisions







EXTERNAL PERSPECTIVE

“The REPORTER is impressive evidence of what MBtech can do”

Georg Weiberg, Head of Truck Product Engineering, Daimler AG

Dear Reader:

When MBtech asked me for a guest commentary, my answer was immediate. With a partnership as trusting and valuable as the one I enjoy with MBtech, it seemed to me to be a matter of course.

And of course, I followed the REPORTER project with a great deal of interest. The idea of turning this concept study into a reality as a pickup has definite appeal. I found the whole project exciting, because it meant that MBtech was addressing a specific niche within the market. But there is one thing I find even more noteworthy: The product can also move back out of that niche with ease if necessary.

That's because aside from its daring design and truly innovative drive concept, the REPORTER is especially impressive for its versatility. It is easy to imagine how the concept could be modified, yielding additional vehicle variants such as a delivery van or a minibus. That in itself is very clever and foresighted.

Plus, I will freely admit that when I heard how quickly the REPORTER was created, I was simply amazed. Bringing off a project like this in just seven months – now that is indeed a challenge and worthy of our respect.

It does, however, show quite clearly and impressively how MBtech has developed over the past 15 years. The company has consistently expanded on its competencies. And with the REPORTER, the MBtech team delivers impressive proof that they have now arrived in the top league in the engineering sector: with a concept for a full vehicle.

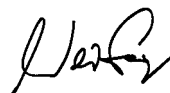
The staff of MBtech has cutting-edge technological skills. They are highly versatile and motivated, and the company maintains close internal connections among its individual departments. That means that they do not have to engage in lengthy decision-making loops – a process that would have made a project with a timeline as ambitious as the REPORTER's impossible.

Completely independent of this current project, interdisciplinary cooperation among the individual spheres of competence is becoming more and more important. In light of the increasingly complex requirements in the industry, that is something that automotive manufacturers and suppliers increasingly require of their partners.

That is also why I think it is important, and the right step, for MBtech to invest in the future as it has done here, mustering the courage to initiate an internal project like this and see it through. These efforts will pay off in the long run, since this power to innovate makes MBtech highly attractive to potential customers. At any rate, I feel that my assessment has been confirmed: MBtech is on the right track.

We will continue to watch the path of MBtech's future development with interest and in a spirit of partnership.

Sincerely,



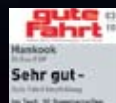
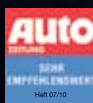
Georg Weiberg



Tame the Road



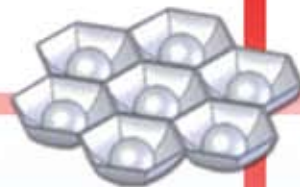
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CleanSolPower UG

(haftungsbeschränkt)

The **CleanSolPower** markets a spherical solar cell, because of their ease and flexibility of only 2 mm thick laminate construction among others, has excellent advantages in the vehicle industry.

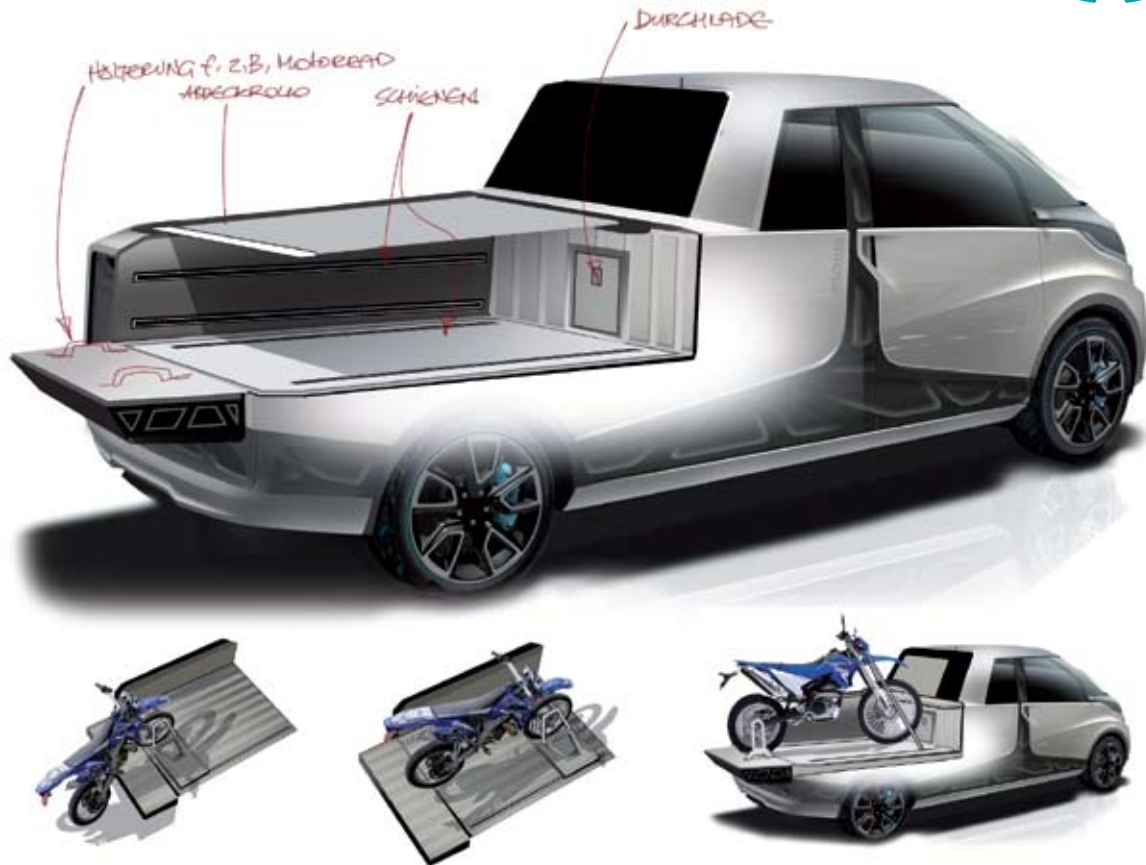
*Spheric solar cells
for a smarter planet!*



- Lamination and quality assurance made just-in-time in Germany.
- Complex and difficult roof structures avoided due to the low weight.
- The weight is max. 2.9 kg/m², the technology is patented, tested and weather resistant (-45 to +108 °C).
- This technology reduces fuel consumption and supports the electrical supplies of hybrid vehicles.
- Refrigerated vehicles can economically operate.
- Trucks and cars can already be pre-cooled.

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Focused on customer –
driven by innovations



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1910
100 YEARS OF INNOVATION
2010

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CSP (solar technology)

Hankook (tire development)

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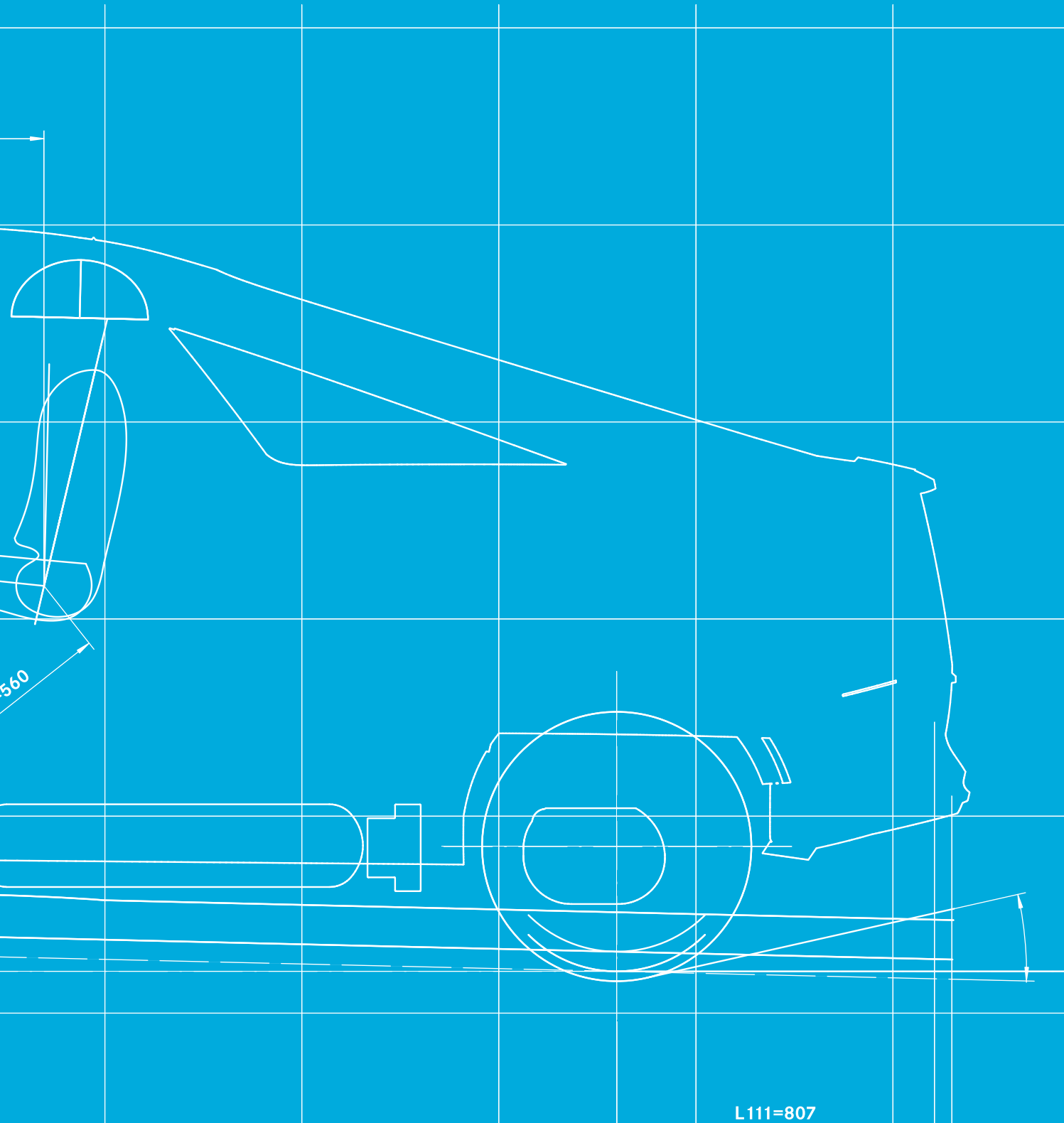
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REPORT|01

The way we think.

Reporter [correspondent, communicator, announcer]

Reportage [compile, bring together, deliver]

Report [communiqué, chronicle, information]

