

Rinspeed presents innovative “Dock+Go” mobility system at the Geneva Motor Show:

## Backpacks on Wheels for Electric Vehicles

“You’re not going to take your steamer trunk as if you were going on a lengthy vacation if all you want to do is a little shopping at your local supermarket!” - No, Swiss automotive visionary Frank M. Rinderknecht isn’t hiring out as an experienced travel consultant these days who has seen much of the world. Rather the man from Zumikon near Zurich is simply pointing out that usually all of us automatically do the right thing when we move around: we lug around as little ballast and unnecessary items as possible. And it is precisely this from an economic and ecological standpoint sensible behavior that Rinderknecht echoes with his new concept car “Dock+Go” on two and sometimes three axles. The concept will be on display for hands-on inspection at the Geneva Motor Show, March 8 through 18, 2012.

It is specifically this third on-demand axle that is the crucial point of the innovative modular mobility system the Rinspeed boss has devised. “Dock+Go” was built - in the traditional sense - by Peter Kägi and his company 4erC. The concept draws its irresistible charm from easy-to-dock single-axle “backpacks on wheels.” These so-called “packs” carry out their assigned tasks depending on current need. But the best thing is: they cleverly solve the much-debated operating range problem that electric vehicles suffer from. Neither unnecessary space nor superfluous weight is being transported. This truly creates “mobility à la carte.”

Any electrified city speedster could serve as the basis for “Dock+Go.” For demonstration purposes Rinderknecht selected a two-seat smart car as the basis. Different “packs” can turn the electric flea into the dream car of every pizza delivery driver - complete with a built-in isothermal box. Or they allow winter sports enthusiasts to comfortably stow their gear. In Geneva Rinspeed will furthermore show off a rolling “sound pack” which multimedia and infotainment specialist Harman has filled with the latest high-end sound solutions in order to guarantee a first class acoustical experience.

Yes, this car truly always saves the best for last: and in this case it is a generous helping of operating range if the 100 kilometers that are usually on tap in electric vehicles simply are not enough. An “energy pack,” fitted with a range extender or additional batteries, powered by a fuel cell or equipped with a combustion engine, provides the crucial extra kilometers to reach more distant destinations. The simple and equally clever trick of the latter is: the docked third axle drives the rotating second axle and in doing so also recharges the on-board batteries of the city speedster. The world’s first Variohybrid - as Frank M. Rinderknecht calls his range donor - is born. And to top it all off: when the pack with auxiliary batteries is docked and the vehicle is not in use, the pack will even provide electricity to the owner’s private residence or serve as a buffer for the public energy grid, in effect turning it into a “smart grid.”

Rinspeed’s automotive visions live not only on the quality of the ideas behind it, but also and in particular on their sharp implementation. That’s because one key element of Frank M. Rinderknecht’s credo is that a car must provoke emotions and visions, especially if it is to serve as a vehicle for communicating new technologies and innovative materials. And there is a lot to see on the “Dock+Go” in that respect, contributed by large corporations and small but brilliant specialists alike in order to effectively showcase “Dock+Go,” which is currently going through the Swiss patenting process.

An immediate eye-catcher is the silver outer skin from AkzoNobel with a finish that resembles sparkling ice crystals. It ties in with the Goodyear low-rolling-resistance tires in size 205/40-17 mounted on 7.5-inch AEZ rims, whose decorative silver covers are attached to red fasteners with rubber bands. At night the chrome-blue accent striping on either side stands out immediately, developed by Lumitec based on an electroluminescent 3D-flexible film. Anyone with a message for their environment can broadcast it using the innovative “Identiface” feature. This display-based

surface, developed by MBtech, replaces the front grille, which on an electric vehicle serves virtually no purpose. Thanks to internet connectivity "Identiface" can display the owner's Facebook pages, news from around the world, the manufacturer's badge or even the offer of a ride from point A to point B.

The interior is dominated by black and red. The high-tech Schoeller yarns have strong natural thermoregulation, good insulation and a high capacity for absorbing moisture. They keep comfortably warm in winter and remain pleasantly cool in summer. Premium automotive textile manufacturer Gaenslen&Völter spun them into soft, supple upholstery that provides that special feel-good factor. And wherever plastics are used, it is in the form of high-grade man-made materials, such as the creatively and stylishly embossed synthetic leather that is supplied by Hornschuch, a specialist in this field. The transparent roof and its distinctive grass inlays - as well as a number of other interior materials - were contributed by Studer. The view ahead is dominated by a 12.1-inch monitor. It belongs to the multimedia equipment and is part of the intelligent infotainment system developed from Harman. The platform features the latest integration technologies for smart phones, adaptive navigation and the cloud-based Aha-platform with a flexible Human Machine Interface (HMI) and gesture control in order to bring digital contents intuitively, easy and safely into the car. This gesture-controlled system makes operation of the contents child's play and the four cameras integrated into the vehicle body make dents from parking maneuvers things of the past.

The instruments were again supplied by - who else? - VDO. Also brand-new is the steering wheel from the German-Japanese Takata Corporation with integrated "parking space" for a smartphone, which serves as a second monitor when docked. This is made possible these days by a driver airbag that thanks to vacuum technology requires reduced installation space.

But "Dock+Go" offers more than just style; it also serves up a high level of technical sophistication. The recently newly developed high-strength, lightweight door frames come from Austrian steel manufacturer Voestalpine. Weber Fibertech built the extremely lightweight liftgate insert with function integration, the high voltage electric heater including the futuristic air vents were supplied by German specialist Eberspächer. No compromises can be made when it comes to handling huge amounts of energy safely, a fact accounted for by the extremely robust electric plug connectors from TE Electronics. Apropos plug connectors: recharging the car no longer requires it to be plugged in. Instead the vehicle simply rolls onto an induction field from SEW Eurodrive for non-contact charging.

"Dock+Go" is a clever mobility concept, implemented rich with emotions, enhanced with technical delicacies and intriguing enough for Swiss insurance giant Zürich Versicherung to commit to the cause. Who wouldn't think of a series production in this context? No wonder that dynamic Frank M. Rinderknecht, one of the flagships for Swiss watch manufacturer C.F. Bucherer, is toying with this possibility. Rinderknecht on this issue: "Yes, we have been in productive talks with potential manufacturers for some time now." Düsseldorf-based consulting company A.T. Kearney at any rate has already devised a manufacturing and marketing concept for the series production.

Even visions must be presented at the Geneva Motor Show at the highest level of quality. This is made possible by HD monitors and Blu-ray players from Sharp and advertising support from German ad agency Vollmond.

**The partners have a word:**

**4erC GmbH - creative - clean - car - concepts, the company of Peter Kaegi**

Take-1, take -2, take -3, take- 4 or tell me what you need, that`s the statement of this concept vehicle.

For 13 years, Peter Kägi is project manager of the Rinspeed motor show projects, Frank M.

Rinderknecht and him connect many creative moments.

More and more manufacturers come up with electric vehicles on the market. All have the problem of the operating range and the associated high battery costs. Special the small urban vehicles have only very limited space, if they have electric propulsion and transport also a range extender, they gets problems with the security.

The project "Dock+Go" is different.

The size of the battery and therefore the costs are depend on several factors, drive with high power, or operating range, and the Battery charging strategies. This vehicle concept has a small Battery, with a battery-saving charging strategies, and just 25kW of power. Enough to cover all the daily trips to the office and to the shopping.

Should more be required, an additional Pack can be fastened. You don't must have it by yourself, there could be hired if necessary.

For 26 Years, the owner of 4erC works with electric vehicles, the range goes up to several hundred kilowatts from a power of a few kilowatts.

The consulting and development company 4erC works on vehicle projects for OEM and industry. Focus on: Project management, package, lightweight construction and fiber composite.

### **AEZ Wheels: Take six!**

Three instead of two axles means six instead of four wheels, too - the optional „packs“ not included. So if the Rinspeed “Dock+Go“ model finds enough followers it would probably mean good business for the alloy wheel manufacturer AEZ. However, the company has an entirely different motivation to participate in this ambitious concept study based upon the Smart Fortwo.

As Rinspeed's long-standing concept partner the AEZ team is used to tackle things differently or think differently or to accept facts like that a car doesn't necessarily have to have four wheels. The choice of rims then doesn't only have consequences in terms of design but also in terms of technology. Originally, alloy wheels are motorsport wheels. They serve to reduce the weight of the vehicle and to have a positive influence upon the so-called unsprung masses. However, not only racing cars have profited from that concept, but also economical cars with alternative engines. After all, it is often an e-car's range that still forms a handicap. But the lighter a car is, the longer the electricity in the battery will last. And since a car should still be fun to drive, such a “lightness of being” is certainly on everyone's agenda at any rate. So the mass of the battery has somehow to be equalised. And in this study, no fewer than six wheels have to be set in motion, which should, after all, not put the car at a disadvantage. So the AEZ engineers' technical goal was to make the rims as light as possible. This is an approach that sets important standards for the efficiency and performance of alternative vehicles.

While the “Dock+Go's“ body is rather plain and the extra modules to be docked on replicate the Smart's rear end's design, the wheels are supposed to be a visual object of projection for the propulsion technology. So the silver-painted aluminium wheels' visual effect is technical by design. The total of five triangularly notched spokes form a rotor, a component that, in various forms, is found in electric motors, wind turbines and generators of all kinds. The space between the spokes in the flange part are characterised by black contrasting trapezoid structures. Again, this is modelled upon electric engine components. If individual motor car traffic is indeed becoming ever more electrified, some of the style elements shown here may well also once be found in and on mass-production cars.

## **Sikkens Creating Together with Rinspeed**

Perhaps you might not have realized it before, but AkzoNobel Automotive & Aerospace Coatings (A&AC) have almost certainly touched your life. A&AC is a business unit of the largest coatings company in the world, AkzoNobel. Amongst others A&AC is one of the world's leading producers of automotive refinishes, with Sikkens as their premium brand.

A&AC's Sikkens brand has a proud history since 1792, long experience in the automotive market and a worldwide reputation for top-quality, innovation and sustainability.

We have specialists around the world who understand local markets and can serve local needs. We provide state-of-the-art color technology, high performance coatings, and industry-leading customer services, as well as technical and logistical support and training to customers and skilled professionals in the automotive and aerospace sectors.

Today the Sikkens product range meets the highest quality standards for repairs, with durable colors designed for the professional body shop. With its broad range of products, Sikkens can handle any car repair. Since A&AC began working with Rinspeed, it has been providing Rinspeed with specially developed custom colors based on its Sikkens brand of automotive coatings.

Partnership and creating together is one of the most important elements of A&AC's – and Sikkens – business approach. A&AC recognizes that its long-term success is dependent on the success of its customers. Therefore they have always worked very closely with our customers to provide not just the products that they need, but the training, support and equipment to guarantee outstanding color performance as well.

In the partnership however it is about selecting the right color to get along with the concept. Sometimes that means more extravert colors, but sometimes exactly the opposite like this time.

"We understand that color plays a major role in the look and feel of a car." says Remco Maassen van den Brink, A&AC Marketing Director for the EMEA region. "So we are developing colors, effects and bespoke paint systems to fit the specific needs of the Rinspeed concept."

### **A.T. Kearney develops series production-ready vehicle concept and appropriate business models for Rinspeed's 'Dock+Go' concept study**

Adaptable vehicle size, improved range and flexible business models

Management consulting firm A.T. Kearney and Frank M. Rinderknecht, founder and head of the Swiss company Rinspeed, have reviewed the 'Dock+Go' study for series readiness and developed sustainable business models. The new 'Pack' system, which is strapped like a backpack on existing vehicles, e.g. a Smart, is unique the world over. The technical solution for the functioning of interfaces accounts not only for coupling the e-vehicle's mechanical and electrical equipment by means of energy, space and accessory 'Packs', but also connecting to existing infrastructure. In addition, a number of innovative business models have been developed for 'Dock+Go'; these range from vehicle and 'Pack' purchase through to pay-per-use for individual 'Packs'.

"The 'Dock+Go' concept has the potential to significantly reduce existing e-vehicle drawbacks in terms of range and space. It is clear that the flexible product line also requires dynamic business models. "This is the precept that we chose as a guiding principle in our solutions," says Steffen Gänzle, automotive expert at A.T. Kearney.

Use of existing product lines

Rinspeed's 'Dock+Go' approach relies on an existing product line – like the Smart – and establishes the best conditions for profitable production in the shortest possible time. The necessary economies of scale will be achieved in just 2 years on the basis of an existing product line as well as via parallel development and simultaneous product start-up of the versions of a line. While the vehicle is always equipped with an electric drive, the drive mix can be offered from combustion engine through to fuel-cell in the form of 'Pack' versions and a cost-efficient modular design of the 'Dock+Go' body concept.

#### Technically sophisticated interfaces

From a technical perspective, the 'Packs' are coupled using a U-shaped frame, which also takes on the functions of a roll bar and central crash box. Sensors are fitted which, communicate the current docking state to the driver. At the same time, the third axle is latched with its subframe to the cradle of the e-vehicle and operating readiness is displayed in the cockpit.

Optionally, the additional electric drive concepts can be charged using induction or at the power outlet. Here, a stationary charge can be implemented as part of a 'Smart Home'/'Smart Grid' at home or in metropolitan centers at 'Car Ports' and 'Car Parks', which will be situated in many mega cities around the world by 2015.

#### Fully flexible business models

A variety of partner and operating models are conceivable for the development, production and sales and distribution of 'Dock+Go'. These range from an integrated OEM through to an amalgamation of manufacturers, engineering service providers and trailer producers. Intelligent vehicle 'Pack' and 'Battery' leasing schemes as well as pay-per-use payment options will be offered for the end customer. Due to the high level of complexity and additional costs vis-à-vis the drive mix as well as possible private and commercial use, offers must be tailored quite specifically to the needs of the individual customer.

#### **Creative, passionate and forward-looking - Carl F. Bucherer sponsors modular mobility system from Rinspeed.**

Carl F. Bucherer is sponsoring another project from Swiss company Rinspeed AG. The smart "Dock+Go" mobility system is unusual, intelligent and incredibly flexible.

Over 30 years ago, Frank M. Rinderknecht set about making a boyhood dream come true by creating cars that would satisfy his vision of the ultimate vehicle. Ever since, Rinspeed has established a high-profile reputation for itself as a manufacturer of concept cars and limited series. With his latest brainchild, Rinderknecht has succeeded in capturing an individual attitude to life and transforming it into an all-round concept. The "Dock+Go" mobility system is based on a four-wheel vehicle a little like the Smart but can be supplied with six wheels on request. This would be necessary if the owner wished to transport camping, golf or skiing equipment, or needed space for a large toolbox. A pack can be rented or purchased for this purpose. When required, the pack docks with the back of the car like a rucksack and provides enough space to meet the owner's needs.

#### Sophisticated energy concept.

But Rinspeed would not be Rinspeed if sustainability and energy efficiency weren't also important factors in the equation. An energy pack with a combustion engine or range-extender, packed with batteries or powered by a fuel cell, ensures the vehicle has the power it needs to take it to more distant destinations. Apart from this, when the third axle (the one belonging to the pack) docks with

the vehicle, it also drives the second axle and recharges the urban vehicle's on-board battery, which keeps it moving entirely CO<sub>2</sub>-free. It also means that no unnecessary seating is used or superfluous weight carried around when the pack is not in use. The latest creation of the Swiss mobility guru will be unveiled at this year's Geneva car show from 8 to 18 March 2012.

A common philosophy.

The concept cars developed by Frank M. Rinderknecht redefine mobility. They are the work of a man who continues to go his own way undeterred. As did Carl F. Bucherer, the founder of the Lucerne watch brand of the same name,

Carl F. Bucherer.

Once again, this unique mobility concept stands for having the courage to be creative, to be passionate and to think outside the box, just like the timepieces manufactured by Carl F. Bucherer. Even more decisive, however, is the philosophy common to both, whereby state-of-the-art technology, first-class materials and unconventional forms are combined to create new and conceptually compelling final products

About Carl F. Bucherer.

Carl F. Bucherer operates under the name Bucherer Montres S.A. and is an independent company with over 90 years' experience in the manufacture of high-quality timepieces. A brand that designs and produces its own movements in-house (a *manufacture*), it stands for aesthetic products made with uncompromising quality and self-assured design. It brings together watchmaking craftsmanship at its finest and outstanding expertise in the art of jewelry making. Its name is a tribute to the pioneering achievements of its eponymous founder, Carl Friedrich Bucherer.

The Carl F. Bucherer brand was launched to lend more strategic weight to the manufacturing expertise adeptly demonstrated by the company since 1919. As the only brand of *manufacture* status in Lucerne, Carl F. Bucherer produces and distributes exclusive ladies' and men's watches, and represents a second pillar in the Bucherer Group construct.

The Bucherer Group is owned and managed by the third generation of the family in the person of Jörg G. Bucherer, who is also Chairman of the Board of Directors. The Carl F. Bucherer team, under the supervision of CEO Sascha Moeri, strengthens the brand's position as a recognized manufacturer of watches for the premium segment with its own workshops in Ste-Croix specializing in the research, development and production of watch movements.

### **Eberspaecher catem turns up the heat for "Dock+Go" from Rinspeed**

Technical innovation coupled with unique visual appearance – that's what distinguishes the concept study "Dock+Go" from Rinspeed. The electric vehicle, with a choice of two or three axles, highlights new perspectives in the drive-train and combines high efficiency with successful design in the heating system. In addition to a PTC heater from Eberspaecher catem, a specially developed air outlet is used in the compact two-seater.

A PTC heater from Eberspaecher catem ensures temperatures in the "Dock+Go" stay comfortable. With an output of up to 5.5 kilowatts it rapidly heats up the interior – with an efficiency factor of more than 99 per cent. The PTC heater can also be positioned virtually wherever you want in the vehicle. As the electronics and control unit are now completely integrated into the electrical heating element, Eberspaecher catem's experts have been able to improve the installation options still further. Output is infinitely variable thanks to the LIN (alternatively CAN) bus systems or, as an

option, also a PWM control.

The PTC heater was developed for voltage ranges of up to 500 volts and, with its completely insulated construction, satisfies the highest safety requirements. It is therefore not only perfectly designed for use in electric vehicles but is also suitable as a heater for fuel cell or hybrid vehicles. The outstanding design element in the instrument panel is the air outlet specially designed for the “Dock+Go”. The force of the air stream can be metered exactly via precise control steps.

Highlight of the “Dock+Go” is the optional third axle. If required, the coupleable “packs” offer additional loading space – or extend the range of the electric vehicle as you wish: there are so-called “energy packs” with a combustion engine or range extender, containing rechargeable batteries or a fuel cell.

For electric vehicles, Eberspaecher catem has developed a 12-volt coolant heater for battery conditioning. The heating element heats up the vehicle battery in a short time and therefore receives its full capacity even at low temperatures.

Eberspaecher is one of the leading system developers and suppliers of exhaust technology, vehicle heaters and bus air-conditioning systems worldwide and is also involved in automotive electronics and automotive bus systems for electronic networking in the vehicles. Their customers include almost all European and North American, and increasingly more Asian manufacturers of passenger cars and commercial vehicles. In 2010, the internationally positioned group of companies, with approximately 5,600 employees, posted sales of over 1.9 billion Euros.

### **Swiss made - Esoro**

Frank M. Rinderknecht used highly advanced technology and a Swiss-based network of top automotive specialists for his project.

Over a decade the Swiss cleantech engineering company Esoro has been development partner for the Rinspeed concepts. This time Esoro focused on the implementation of new technologies from other project partners.

Esoro has now over 20 years of experience as engineering partner for concept vehicles, components and products with main focus on lightweight construction, alternative drivetrains and mobility. During this time Esoro has gained a well-deserved reputation for excellent efficiency and innovative solutions, which is demonstrated by numerous prototypes and serial products.

Since 1990 Esoro has been working intensively in the field of conception, implementation and tests of clean car concepts and drive systems. Esoro is thus one of the few companies in the world with well-founded experience in development and operation of electric, plug-in-hybrid and fuel cell drives. These activities are our core competence. Esoro therefore realizes EV projects for OEM's starting with the initial conception and the prototype up to the serial project phase.

Esoro is also developing fiber reinforced components from initial conception up to pre-production samples. In-house specialists optimize the component properties and characteristics throughout the entire development process. Important steps are non-linear, orthotropic Finite Element Analysis and crash simulation.

Another recent development from Esoro is the new E-LFT production technology developed for Weber Automotive. E-LFT makes large scale production of high-strength and lightweight composite parts affordable. E-LFT composite parts weigh more than 30 percent less than comparable steel parts. For the development of the smart fortwo tailgate, which now has been produced over 500'000

times with the E-LFT process, Esoro received the highly recognized JEC Innovation Automotive Award 2008.

### **Harman breaks new ground in personalized infotainment with its visionary networked infotainment concept in the Rinspeed Dock+Go**

Imagine a car that automatically adjusts to every driver's tastes and preferences, harnesses a universe of personalized entertainment and information from the web, and makes your drive time easier, safer, and more productive by learning your driving routes and habits. This vision of a personalized, context-aware driving experience is brought to life by Harman through revolutionary customizable infotainment technologies.

Harman delivers a personalized interface between the driver, the car, and the connected and digital world around it. It has created a new "context-aware" infotainment system concept that creates a virtual personalized dashboard for the driver. The system combines advanced smartphone integration technologies, cloud-based Aha platform, learning navigation, and flexible human-machine interface (HMI) design including gesture recognition, to deliver media-rich digital content into the car in an intuitive, easy-to-use manner, without compromising safety.

The car's infotainment system connects with the driver's smartphone and uses NFC (Near Field Communication) to recognize his saved preferences such as: seat positions, favorite music and settings for the Harman HALOsonic Electronic Sound Synthesis system, the preferred HMI visualizations, emails, contacts and calendar entries as well as Facebook and Twitter accounts via the Aha platform.

The navigation system "learns" by monitoring the driver, his operation characteristics, his preferred routes and his interactions with the system. It also detects driver alertness monitoring the driver's steering wheel movements, voice timbre, and braking and accelerating behavior, to intelligently propose less risky routes or suggest stopping for a rest. The situational HMI combines location, telemetry, and personalized user data to offer the driver with optimal route-relevant information. A range management system works hand-in-hand with the navigation system and location-based services to optimize the distance and route taken by the vehicle.

Harman's feature-rich infotainment concept is also designed to ensure that safety remains a top priority. It incorporates a number of HMI options, including gesture control and voice control, allowing drivers to access specific services such as read-aloud function for emails or - via Aha - social media feeds on Facebook and Twitter. The integrated office solution allows standard documents and emails to be viewed and managed. Harman's Aha platform delivers access to multimedia content including audio books, radio, music services, podcasts, location based services, and more, supplied by an extensive roster of partners. Drivers can choose from an array of themes and filter content to match their preferences to create their own presets.

### **Hornschuch**

As the world market leader for surfaces, the Hornschuch Group is a highly proficient partner for foils and high-tech synthetics. The premium brand skai<sup>®</sup> stands for innovation and design, being used for car interiors and upholstery covers, amongst other things. The solutions developed in a dialogue with customers set the trends throughout the industry. The Hornschuch Design Center underlines the high standards with its own Design Guide.

With Dock+Go Hornschuch is on board a Rinspeed Concept Car for the third time. After sQuba and Bamboo, the tried and tested collaboration offers the surface specialist a further opportunity to specify its vision for the design of interiors, but this time on a new basis: the Design Guide unveiled in



January outlines three megatrends which Hornschuch sees for the next three years: Origin, In Transition, Innovation. The Design Center thereby defines the maxims of its work irrespective of the applications: what represents a tool for the creative is a guideline for the customer. The Design Guide makes design development come alive and comprehensible, and shows that design at Hornschuch is sustainable.

The materials used by Hornschuch define the interior of the Dock+Go, while giving it a distinctive flair on the outside. Inside it is the door panels, the dashboard, panels in the lower field of vision and the sides and backs of the seats which are fitted with Hornschuch surfaces. On the outside it is the cover of the Space Pack, which is reminiscent of a tonneau cover. The Design Guide played an important role in the selection of the colors and structures, as well as the materials. The interior is dominated by a combination of velvet red and slate black, forming a bridge between the megatrends Origin and Innovation. A biosynthetic material is used, more than 80 per cent of which is based on natural and renewable resources. The quilting seams criss-crossing the plissé surfaces which adorn the cockpit stem from the Origin world based on craftsmanship. Finally, nano-coated outdoor synthetics are used for the covering of the Space Pack cargo space. None of the materials has ever been used before in this way in the automotive environment. They show the range of possibilities that the surface specialist – which works very successfully for many high-volume manufacturers in the automotive sector – is able to offer. Rinspeed's concept car Dock+Go again visualizes the future of the automobile. A future in which Hornschuch will be at the cutting edge.

## **Lumitec**

In 2005 as the Rinspeed Senso was making such an impression on the experts in Geneva, Lumitec was also on board. In a project where we collaborated with Bayer we saw our unique lighting technology put to use in the cockpit of the SENSO. The side panels were equipped with an EL (electroluminescent) lighting system capable of emitting three different colours. The intention here was to provide support for the driver using the right ambient light.

Lumitec AG is the technology leader in thick-film electroluminescence. EL lighting systems are constructed like plate capacitors, and make it possible to produce completely homogeneous light on an unlimited number of different surfaces. Over the past 10 years we have worked intensively on the development of three-dimensional lighting systems. It is now possible to build these lighting systems without any carrier film, and they can be combined with wood, textiles, and metal, etc. With thicknesses under 0.2 mm, it is possible to make homogeneous light surfaces with the most limited of proportions.

In the 'Dock+Go' project we can be found in three places. Of particular interest are the mouldings on the door. During the day they look like standard chrome mouldings. At dusk or during the night, however, they turn into illuminated decorative parts. And if they are combined with background writing or logos, they can even be used as night-time advertising.

In the Takata-Petri steering wheel our technology can be found as backlighting in the airbag area. This provides homogenous light in a place with very little space, and where no metal parts can be used.

Another extremely interesting item is the number plate on the newest RINSPEED project. In appearance it seems to be constructed like a completely normal number plate. It essentially consists of an aluminium plate with embossed characters and a reflective front surface. Only, this number plate has an additional EL lighting system between the reflective film and the aluminium carrier. It is so thin and flexible that the owner's number can be embossed by cold forming, just as it is on a conventional plate. Lumitec and Autoschilder Sievers in Hannover have worked closely together to be the first to develop the lighted number plate to be ready for series production. This particular

application makes the highest demands on the elasticity of the lighting system, because it must not allow crack formation where the characters are embossed, and it needs to have high weather resistance for long periods of time.

### **Unique from the front to tail -The MBtech Group continues developing the "Identiface" front display and the "Dock + Go" idea.**

The engineering and consulting company, MBtech Group is renowned for courage and the passion for new ideas instead of conventional prefabricated concepts. Which is why this year MBtech is once again contributing innovations and know-how from the electronics solutions and design sectors to the development partnership with Rinspeed. In return, MBtech utilizes the inspiration provided by the collaboration to continue developing its "Reporter" pickup study.

The unique combination of engineering and consulting competencies has enabled the MBtech Group to establish itself as one of the leading international service providers for the vehicle industry. Every day approximately 3,000 employees worldwide work to make the future of mobility for their customers into a reality today. This includes the "Identiface", a high-resolution LED display harmoniously integrated into the front of the vehicle.

It enables drivers to give their vehicles their own unique, customizable character (identity). For example, it can also be used to display useful warning messages for other road users (utility). Furthermore, the system can also create an emotional aspect by displaying personal messages from virtual networks such as Facebook or Twitter (social media) or simple fun applications (fun). The LED identity concept originates from the MBtech Group's "Reporter" pickup study and last year it was realized as a multi-functional design for Rinspeed's "BamBoo" e-vehicle study as "Identiface". The enhanced module has now been adopted in the "Dock + Go" concept as well. This enables data and information exchanged between the vehicle and the "dock" to be displayed.

MBtech continues to envision further options for the front display by integrating new experience gained from networking between the virtual and the real world in the vehicle. For example, MBtech is currently developing a new technology platform as part of the "Wireless Gateway" innovation project. It creates vehicle connectivity across wireless, GPRS, UMTS, Bluetooth and other standards in order to consistently meet the needs of the smartphone generation.

The collaboration with Rinspeed has also inspired the MBtech Group's designers and model makers to go back to the drawing board or return to their clay models for the "Reporter": The basis idea consisted of creating an initial design when easily transforms from a pickup into a delivery van or a people mover. Motivated by fresh ideas, the design and model construction team is now developing new vehicle variant possibilities for the "Reporter".

### **Sustainability + Innovation = Sustainnovation**

Schoeller Group, which has its headquarter in the Austrian city of Bregenz, is one of the leading worsted yarn manufacturers in the world. With its 500 staff, the Schoeller Group produces 4000 tons of yarn a year at various locations across Europe. One-and-a-half centuries of experience and an innovative research and development department furthermore ensure that the Group is constantly increasing its technological lead. However, all of the Group's actions and decisions are informed by one guiding principle: sustainability. Hence, Schoeller has now not only become the first worsted yarn spinning company in the world to have been bluesign-certified (a comprehensive standard certifying compliance with a range of environmental and organic production requirements), but has also received the coveted bluesign Award. However, Schoeller is also actively involved in the IVN (International Association Natural Textile Industry) and GOTS (Global Organic Textile Standard). An important part of the Schoeller customer portfolio is the 'Traveltex' segment, i.e. yarns used in

cars, busses, trains and planes – several of the yarns and fibres are even used in space travel, making them some of the most widely travelled threads around. This segment comprises innovative yarns developed by Schoeller in collaboration with its industrial partners that, amongst others, are enabling these companies to develop new kinds of seat covers, door linings, composite materials and car roof liners.

Schoeller and his project partner Prevent Gaenslen & Völter have demonstrated their strengths in sustainable development and production with the implementation of Rinspeed's new 'Dock+Go' concept. Wool – a natural fibre – was applied in the project, intelligently combined with high-tech, innovative fibres such as Vectran® and Nomex® to make up a large proportion of the seats. 'Schoeller Power-Wool®', a natural thermoregulator, is used where moisture absorption and passenger comfort are the priority. And in seats that are also intended to store body warmth, Thermo<sup>2</sup> is employed – an innovative wool-polyester blend that reflects heat and infrared rays. This ecological and economical product is both lightweight and reduces the need for electric heating – a major benefit for electric vehicles.

The textile double-face roof of 'Dock+Go' is made up of a Vectran® blend. Vectran is the most cut-resistant fibre on the market. It is also five times more tear-proof than steel, offering optimum yet unobtrusive resistance against wear-and-tear and vandalism. Glossy, dyed Nomex yarn is used in the seat stitches and the side netting. Highly resistant to wear-and-tear and available in a choice of colours, it emphasizes the functionality and high-quality design of 'Dock+Go' in important, highly visible places. All yarns are certified to the "bluesign" standard, delivering innovative functionality while ensuring compliance with strict environmental standards – and underlining the pioneering nature of the 'Dock+Go' concept.

### **Brose-SEW: electric drives and charging technology from a single source**

Wireless charging technology for electric and hybrid vehicles

Early in 2011, two strong partners pooled their expertise for electric mobility: Brose Fahrzeugteile GmbH & Co. KG, market leader in mechatronic systems and electric motors for the vehicle body and interior, and SEW-Eurodrive, one of the leading suppliers for electric motors and control systems for industrial applications, founded Brose-SEW Elektromobilitäts GmbH & Co. KG. The goal of this joint venture is to develop, produce and sell drive and charging technology for electric and hybrid vehicles. Since the joint venture can tap the know-how of the two parent companies Brose and SEW-Eurodrive and access their production facilities, it can achieve additional economies of scale and cost benefits. Apart from developing customer-specific vehicle drives ranging from 0.25 to 150 kilowatts, the joint venture will also be seeking to find intelligent and economical ways of implementing individual electric mobility. This is where Brose-SEW has a viable, forward-looking solution to offer: wireless charging technology facilitates accessing power supplies at home and while on the move; moreover, it is more convenient than a plug-supported solution.

"Filling up" with electricity without cables

Intelligent and user-friendly charging technology is an essential prerequisite if electric vehicles are to be established in the mass market. The components required for wireless power transmission consist of the power supply element and the pad on the ground which act as the "energy source" and a module on the underbody of the car which assumes the role of the receiver. Power is transmitted inductively, i.e. non-contact power transfer up to a distance of 20 centimeters between the ground and the vehicle via a magnetic field. An electromagnetic shield in the coils ensures the passenger compartment is protected from the magnetic field. This way of charging the car is convenient, safe, clean and independent of weather conditions. Moreover, regular top-ups are kinder to the battery.

Power is transmitted in line with the resonant transformer principle: alternating current produces a magnetic field in the primary coil which induces alternating current again in the secondary coil. The primary coil is installed, for example, in the ground of the parking lot and supplied from a power-feeding device. When an electric vehicle arrives, it activates this power-feeding device via near field communication, switching from standby to operating mode. Once the electric vehicle's battery is charged, the power-feeding device returns to standby.

In March 2011, the VDE/DKE approved an application guide (VDE-AR-E 2122-4-2), thus establishing a basis for standardization in order to prepare this highly innovative and convenient charging technology for mainstream use. BROSE-SEW has developed its system in full compliance with the standard and can thus already offer it to its customers for installation in vehicles.

Inductive charging technology as a prerequisite for widespread electric mobility

Wireless charging technology enables vehicles to be automatically recharged at every short stop, e.g. at traffic lights and railway crossings or in multi-level car parks or parking spaces. This is not only kinder to the power storage unit, but also ensures that the vehicle has enough power for its maximum range. Subsequently, the size of expensive batteries can be reduced bringing about significant savings in costs and weight.

### **Sharp -Rinspeed's official multimedia partner**

The renowned Swiss car and concept designer Rinspeed is cooperating with Sharp, one of the world's largest technology corporations, with regard to its new concept car „Dock+Go“ for the eighth time. An extraordinary concept deserves an extraordinary presentation. And as always, Sharp guarantees this with a range of state-of-the-art LCD TVs boasting innovative technologies that give the viewer an even better understanding of the ideas and characteristics behind this new concept car, pin sharp and with unprecedented colour brilliance. Thanks to their advanced technologies, the newest Sharp TVs are especially power efficient, which is completely in keeping with Rinspeed's philosophy.

Quattron stirs up colour television

In the spring of 2010, LCD pioneer Sharp revolutionized the flat TV market with its Quattron technology. Today, the unique four colour technology forms the basis of the future generations of Aquos LCD TVs. The electronics corporation is gradually expanding its LCD TV line-up and supplementing its series with 3D technology and a direct internet connection. SHARP continues to focus on the best image, innovative designs, the best environmental performance in the market and large screen sizes.

The Quattron technology adds a fourth colour yellow (Y) to the three basic colours red, green and blue (RGB). The thus expanded colour scale allows for the lifelike colour reproduction of almost all colours that the human eye can see without an aid. In particular golden yellow. The highly efficient Quattron panel in connection with the power efficient LED background lighting produce not only impressive images, but power consumption is also reduced to an absolute minimum.

Sharp /This is Why - Sharp has been an inventor for society for almost a hundred years.

We don't invent for the sake of it, we believe our products should solve real human problems to benefit our culture and wellbeing.

We always look for opportunities to improve our lives; for the home and business, for the environment and society, and we provide solutions with the user in mind, with simple human

benefits.

As part of our continued commitment to future innovation, we employ 8,000 researchers in facilities around the world and invest over 6.5% of our net sales in R&D.

We'll always strive to make products that our competitors want to imitate.

We'll always look for the next opportunity to invent for our society, and then we'll tell you why we've innovated.

Sharp /This is Why - Did you know?

Our founder, Tokuji Hayakawa, invented the first mechanical pencil, the Ever-Sharp /This is Why we are called Sharp.

Sharp believe, as we make products that rely on energy, we should create energy too /This is Why we have been developing solar technology for over fifty years and continue to be industry leaders.

Sharp are leaders in LCD technology. We were the first to introduce this technology to calculators and invented the first LCD TV in 1988 /This is Why we continue to lead the way. Today we produce the largest LCD TV at 108-inches.

Sharp understand the demand for healthy food with the modern day lifestyle and diets /This is Why we invented a convenient microwave that's also a healthy, easy-to-use steam oven, for meals with more taste and nutrients.

### **Studer exclusive surfaces - Exclusive Interior Design Materials**

Rinspeed's brand new concept car Dock+Go takes off

Studer Handels AG distributes a wide range of top-quality and also innovative materials for interior design. Two of these materials are now fitted into a motor vehicle for the very first time.

Frank M. Rinderknecht chose Invision for the roof of Rinspeed's Dock+ Go concept car, an eye-catching transparent glass made by Designpanel. Invision is in fact PET glass with inlays made of organic materials.

Exciting innovations

The car's ecological appeal is accentuated by its natural environment-friendly roof with its embedded green blades of grass. Invision panels are normally used for room design, in the private as well as public domain. The inclusion of nature brings a feel good atmosphere into the living ambience. This is stunningly demonstrated by the bar top, the table surfaces and the special bar stools on the Rinspeed exhibition stand at the Geneva motor show.

Organic materials, cool metals or delicate textiles embedded in transparent plastic. The prerequisite for these innovative surface compounds is a specially developed technique. The panels in the nature series are made of materials of organic origin. Their transient beauty is captured in a long-lasting synthetic material. Individual inlays can be fabricated upon request.

In the interior of the car another Studer Handels AG high tech product finds a striking implementation.

Stone-like Staron® by Samsung.

Placed in the center of the dashboard it serves as a support for the latest computer developed by

Harman. The black solid surface material has metal inclusions, is compact and homogeneous and can be worked like solid wood. Unlike stone it feels warm to the touch and is appealing. STARON can be thermoformed with heat and seamlessly glued. Individual parts can therefore be assembled without expensive moulding. The ventilation nozzles on the dashboard by Eberspächer are a very good example.

Staron® is a moulded, non porous solid surface material, consisting basically of a high-quality natural mineral. Available in panels it is made of one third acrylic and two thirds bauxite, the raw material used for the manufacture of aluminum. Unlike wood or stone, Staron® by Samsung is very shock-resistant, robust, non porous and therefore extremely hygienic.

Studer Handels AG is your competent partner for solid surfaces and exclusive materials for interior fittings.

### **Takata-Petri**

With so many people involved in the development of a whole range of sustainable transportation concepts, approaches to the problem are bound to be varied. Rinspeed's Dock+Go concept is an example of the successful implementation of one of these ideas. This impressive concept fuses two components, or technologies, into one innovative system.

A unique smartphone docking station is integrated into the steering wheel. This goes way beyond the standard charging cradle, transforming the steering wheel into an on-board communication center which is clearly visible to the driver at all times. It takes the driving experience to a whole new level, where functionality, infotainment and entertainment are all part of the same integrated concept.

Specifically designed for the Dock+Go, a number of innovative ideas have been incorporated into the airbag steering wheel. By vacuum packing the driver's airbag so that it is ultra-compact, enough space has been created for the docking station. The Vacuum Folding Technology (VFT) used in the airbag concept, which received a 2011 Automotive News PACE Award, has taken design in a whole new direction. The layout of the steering wheel plus the use of optical effects and high-grade materials and surfaces combine to create a complete visual and tactile experience.

Vehicle design is an expression of style and lifestyle. And yet many interior components are often very similar and unremarkable. The patterned safety belt breaks with convention and adds a dash of chic to the interior. At the same time, the different design on the underside is an added safety feature, immediately indicating when the belt is twisted.

Airbags and safety belts are the cornerstones of modern passenger protection. As well as being safety features, they have become part of the interior design concept in modern-day vehicles, adding to the character and identity of a car. A striking design should be an eye-catcher – and a head-turner!

Driven by prevalent issues such as safety, the environment, information and affordable transportation, the automotive industry is currently going through a period of far-reaching change. As one of the leading global developers and suppliers of automotive safety systems (safety belts, airbags, steering wheels, child car seats, electronics and sensor systems), Takata is strongly placed to help actively shape the future of the industry in partnership with automobile manufacturers.

Takata has 49 plants in 18 countries and employs over 34,500 people, every one of whom is committed to turning innovative ideas into reality. Their common goal is to reduce the number of fatalities in road traffic accidents to zero.

## **TE Connectivity**

Converting the potential into the inevitable

This is truly an exciting time. Hybrid and electric mobility is the most significant change to the automobile industry in over 100 years. Everything is being re-imagined. And with more than 50 years of experience in automotive connectivity systems, high-voltage electricity, and pushing innovation from one industry to the next, from the charging socket, to the battery, to the motor-and everywhere in between- TE Connectivity is safely and reliably connecting and protecting the flow of power and data.

Vehicles represent one of the most challenging engineering environments in the world. Exposed to regular temperature fluctuations, continuous vibration and frequent neglect, they're still expected to operate flawlessly for years. Hybrid and electric vehicles take the requirements to an even higher level: They need to reduce mass to improve the power-to-weight ratio. The high-voltage electricity must be shielded to protect the function of in-vehicle electronics. The safety of consumers, technicians and emergency first responders cannot be compromised. That's why OEMs rely on the safety and reliability of TE's contactors, sensors, cable assemblies and AMP+ connectors and terminals.

TE has nearly every component it takes to create your EV charging solution. From cables to contactors, meters to card readers, screens to sockets, we've already solved how it all goes together. Level 1 and 2 Charging Coupler Cable Assemblies, Contactors/Relays, and Inlets safely deliver electricity to the vehicle to charge the battery.

Major OEMs around the globe rely on TE technologies as the one of the largest suppliers of automotive connections in the world. TE is more than your source for world-class technology. We team with you in innovation. We work side-by-side with engineers in virtually every industry to create smarter, faster, better answers to the challenges of tomorrow. No matter what your business is bringing to Hybrid and Electric Mobility Solutions, you can depend on TE to help complete the connection.

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### **voestalpine is setting new standards in lightweight automotive**

A New Dimension in Lightweight Construction

Maximum strength and corrosion resistance: pbs-ultraform® is an innovation from voestalpine combining the benefits of press-hardened components with the tried-and-proven corrosion resistance of galvanized steel strip. pbs-ultraform® opens the door to a new dimension of lightweight construction with regard to freedom of design, dimensional accuracy and process security. It is the futuristic solution in particular for safety-relevant components that are subject to heavy corrosion. pbs-ultraform® thus makes a decisive contribution to the issue of lightweight construction and is

therefore highly relevant for electrical mobility applications.

phs-ultraform® is remarkable for the numerous impressive benefits it offers such as extreme strength of up to 1,800 MPa, cathodic corrosion protection, complex components and the possibility of processing blanks made from a wide variety of materials and in various thickness combinations (tailored welded blanks).

For the first time, press-hardened components made of phs-ultraform® can be reliably manufactured using either the direct or the indirect process.

In the direct hot forming process, steel blanks are heated to a temperature of approximately 900 °C and then shaped into their final geometry and hardened in a cooled mold. voestalpine is the first steelmaker to be able to produce hot-dip galvanized material for components with cathodic corrosion protection manufactured using the indirect process.

This is where voestalpine benefits from its many years of series production experience with the indirect process. In the indirect process, blanks made from phs-ultraform® – including those that are laser-welded – are formed and cut to the final geometries using conventional cold-forming technology. The component geometry is merely hardened and finalized in a heated state. Moreover, voestalpine, as an innovation leader, is able to manufacture clock-cycle-neutral components with "tailor-made" properties (tailored property parts).

phs-ultraform® components are the futuristic solution for safety-relevant components that are subject to heavy corrosion, such as those used for longitudinal members, A and B pillars, side panels, sills, tunnels and bulkheads. Besides these classic applications, phs-ultraform® is increasingly being employed for doors and hatches. phs-ultraform® is thus setting new standards in automotive construction.

phs-ultraform® technology makes an important contribution to reducing fuel consumption and at the same time is significantly enhancing occupant protection. Steel as a material is thus successfully and futuristically facing up to the challenge posed by alternative materials such as aluminum and CFRP (carbon fiber-reinforced polymers).

voestalpine is your partner from development to the finished product, providing software simulation of the entire process chain through to the properties of the final component. Stay that decisive step ahead in the lightweight construction of the future with voestalpine.

The voestalpine Group

voestalpine is a globally operating group with a large number of specialized and flexible companies that produce, process and enhance high-quality steel products. With 360 production and sales companies, the group is present in over 60 countries on all five continents.

With its top-quality flat steel products, voestalpine is one of Europe's leading partners in the automotive, household appliance and energy industries. The voestalpine Group is also the world market leader in turnout technology, in tool steel and special profiles and is number one in Europe for rail production.

### **Vollmond Advertising Agency: Full service, Creativity and Economic Efficiency**

As a full-service partner, the Vollmond Advertising Agency has been developing promotional communication solutions in the print and non-print area since 2004. We are proud of supporting Rinspeed in the areas of brand communication as well as print and online media.



Opinions are changing, designs are varying. Only one thing remains the same – advertising!

Vollmond inspires and unites people with companies. We are convinced that success is measurable and we want to thank all our customers for being able to prove this every day.

Vollmond provides safe and honest advice, planning and implementation. Thanks to national and international experience, we demonstrate our ability in the areas of advertising, marketing, design, search engine optimization and programming over and over again by acting in a loyal and reliable manner.

Among our customers are renowned representatives of various economic sectors. We do not distinguish by the amount of the budget, but we are happy about every new challenge, about our customers' success and the good feeling of having achieved something.

In dealing with our customers, we rely on the human touch, trust and reliability. This ensures a smooth process flow and provides optimal results. In other words: each of us spares no effort to perform more than you expect – day after day. Take us at our word!

### **Weber Fibertech**

Weber Fibertech GmbH, together with Weber Automotive GmbH and Weber Motor GmbH constitutes the Weber consortium. Weber is a supplier to the automotive industry for more than 35 years with worldwide business contacts. Production facilities are located in Europe and North America. In 1998 Weber entered into the industry of fiber reinforced plastics.

The product range of the Weber consortium reaches from core parts of the ICE like engine blocks, cylinder heads, crankshafts and con rods, to a range of ICE's developed in house and to fiber reinforced plastic parts. Engineering services associated to the aforementioned products are also supplied by Weber.

At Weber Fibertech reinforced plastic parts are produced with the help of the patented E-LFT process. This process is characterized by a maximal flexibility in part design, a great potential for lightweight construction and unbeatable efficiency. Series production of E-LFT parts at Weber Fibertech in Markdorf / Germany started in late 2006. The first series production part is the tailgate structure and lid of the Smart fortwo. Until today more than half a million components have been delivered to Smart. Weber Fibertech gained the JEC Innovation Award in 2008 category Automotive & vehicles for this application.

Current and also forward looking projects are, among others, structures for complete passenger cars and battery housings for hybrid- and electric cars.

Further target parts for the E-LFT process are primarily areal structural parts like:

- Tailgates, door modules, sliding doors
- Seat Modules and seat structures
- Frontends, under ride guards, cross car beams etc.

### **Zurich Insurance**

At Zurich, we do a lot more than just sell traditional insurance. We are constantly looking at how customer needs and preferences are changing, particularly in the areas of technology and the environment. That's why we are one of the only insurers to offer an insurance product that caters to

the unique needs of electric car drivers.

We seek to work with partners that are leading the way in innovation and helping us understand future opportunities and risks. The partnership we have with Frank Rinderknecht and Rinspeed is a perfect match for us. The new Dock + Go Mobility concept highlights how people will be able to utilize mobility in the future to fit their needs as well as minimize their carbon footprint – two things we're very keen on as well.

As we continue to build insurance products and services that lead the way in mobility, we remain excited about working with Frank Rinderknecht and the entire Rinspeed organization for inspiration and collaboration.

Zurich Financial Services Group (Zurich) is a leading multi-line insurance provider with a global network of subsidiaries and offices in Europe, North America, Latin America, Asia-Pacific and the Middle East as well as other markets. It offers a wide range of general insurance and life insurance products and services for individuals, small businesses, mid-sized and large companies as well as multinational corporations. Zurich employs approximately 60,000 people serving customers in more than 170 countries. Founded in 1872, the Group is headquartered in Zurich, Switzerland. Zurich Financial Services Ltd (ZURN) is listed on the SIX Swiss Exchange and has a level I American Depositary Receipt program (ZFSVY) which is traded over-the-counter on OTCQX.