VIAVISION

VOLKSWAGEN GROUP • SHAPING THE FUTURE OF MOBILITY

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An Engine for Job Creation – The Scrapping Premium

From the Old Comes the New:
95 percent of a vehicle is recyclable.

Solar on the Roof:
Volkswagen inaugurates the largest photovoltaic plant in Northern Germany.

Dear Reader,

Christian Klingler,
Board of Management

Once again, in this, the second edition of the VIAVISION newsletter, we take the opportunity to share with you our thinking in relation to the issues facing the automotive industry today.

The car industry, a key part of the global economy, faces considerable challenges. I welcome that, during this economically crucial juncture, the political process proved its capacity to work. Finally, things are getting done in Germany. The prime example: the scrapping premium. In March, the domestic registration of new vehicles increased by 40 percent, with incoming orders improving by 75 percent. That is to say, the dominant trend towards restrained spending in the German passenger car market is being overcome in a sustainable fashion. Now, car purchases that have been long postponed are finally enjoyed.

Furthermore, the scrapping premium, in creating positive consumer sentiment, thereby generates a considerable increase in consumption. Polls among 2,500 clients in Volkswagen car dealerships have shown that one Euro's worth of state scrapping premium spending creates four to five Euros' worth of additional private consumption. All in all, 1.5bn euros in funds have already triggered an increase in consumption of well in excess of 6bn euros. This makes the scrapping premium a pragmatic, immediately effective program for securing employment. One prejudice VIAVISION would like to dispel is the view that it is primarily foreign producers who benefit from the German tax money which makes the scrapping premium possible. As you can read in detail on the following pages, in the interconnected, globalised automotive industry this claim is far from the reality.

Not only are car dealers, companies and employees among the beneficiaries but also the environment. One of the best contributions you can make towards protecting our environment is the purchase of a new car. On average, newly registered vehicles emit roughly 30 grams of carbon dioxide less than scrapped vehicles, per vehicle kilometre. For the approximately 600,000 vehicles replaced, due to the scrapping premium alone, savings amount to about 270,000 tonnes of carbon dioxide annually. As you can see, there are many good arguments in favour of this truly sensible initiative.

Cordially yours,

Christian Klingler, Member of the Board of Management with responsibility for Sales, Marketing and After Sales.

The Scrapping Premium
What it does for Germany

The scrapping or scrapping premium is easily the most popular measure in the government's second stimulus package. Since its inception, the Federal Office of Economics and Export Control (BAFA) has received nearly 1.2 million applications and reservations: and now the newly topped up premium will be enough for a further 800,000 vehicles. Nevertheless, many fallacies prevail:

- **Fallacy No. 1:**
  "The billions of Euros of German tax money spent will mostly benefit foreign producers."

This is simply incorrect. In fact, the scrapping premium helps the domestic car industry immediately, contrary to the beliefs of the naysayers. For example, already, in the first quarter of this year, the **Volkswagen Group has sold an estimated 141,000 additional cars.** Within the group, the VW brand, whose Blue Motion Technologies set new standards for environmental sustainability (see VIAVISION No.1, March 2009), is performing particularly well with a rate of 92,000 vehicles sold, closely followed by the Škoda brand with 28,000 new car sales. For other manufacturers things are looking good as well: Opel reported an increase in orders of 50 percent for the same period

This is how German car drivers support the livelihood of, in total, some 1.2 million employees who work in the automobile industry and its suppliers. Even though the front runners in sales statistics are still foreign importers, such as Daihatsu and Hyundai, the global interconnectedness of the automotive sector creates a **distribution of tax money to all locations.** Contrary to the beliefs of some sectors of popular opinion, the German economy benefits from a rise in car sales – even if a proportion of those cars are produced abroad. **The Volkswagen Polo, for instance, is built in Spain**

The Scrapping Premium's Genesis

January 14, 2009:
- The Cabinet approves the scrapping premium.
- In total 1.5bn euros is made available for the project – sufficient for 600,000 vehicle purchases.
- Entitled to the premium of 2,500 euros are applicants who buy a new vehicle and who simultaneously send their old car to be scrapped.
- Applications have to be submitted to the Federal Office of Economics and Export Control (BAFA) by May 31st at the latest.

March 25, 2009:
- The scrapping premium is increased and extended till December 31st 2009.

March 30, 2009:
- Applications have to be submitted online. ▸

Engine production in the Volkswagen plant Chemnitz.

• The scrapping premium will now also apply if the car owner inherited the vehicle, in the event of the death of a relative.

April 2, 2009:
• More than 600,000 new reservations were received.

April 6, 2009:
• The level of support is increased to a total of €5bn.
• This would allow a total of two million vehicles into the scheme.

Scrapping Goes International

Just as Great Britain's Chancellor of the Exchequer, Alistair Darling, announced the introduction of a British version of the scrapping premium, preparations for a premium modelled on the German version are already underway across the pond. Barack Obama is planning a scrapping premium in the United States of America. On the one hand, the US-President pursues his objective of supporting the badly shaken domestic automobile industry; on the other hand, he wishes to improve America's commitment to climate protection under his leadership. Therefore, the American model will link the scrapping premium to the end-of-life vehicle's fuel consumption and not to its age. Someone whose car consumes 13 litres or more per 100 kilometers is entitled to up to 4,500 dollar if they send their old car to be scrapped. However, other details have still to be determined. In Europe, government schemes incentivising the scrapping of old cars now also exist in Austria, France, Italy, Portugal, Romania, and Spain too.

and Belgium. However, roughly 60 percent of supplier and construction parts are made in Germany. Much the same applies to brands such as Škoda and Seat. Thus, the sales of cars which are produced abroad nevertheless secure jobs in Germany. The following graph (page five) shows where the different car parts come from.

• Fallacy No. 2:
"The scrapping premium is good for the automobile industry but bad for the environment."

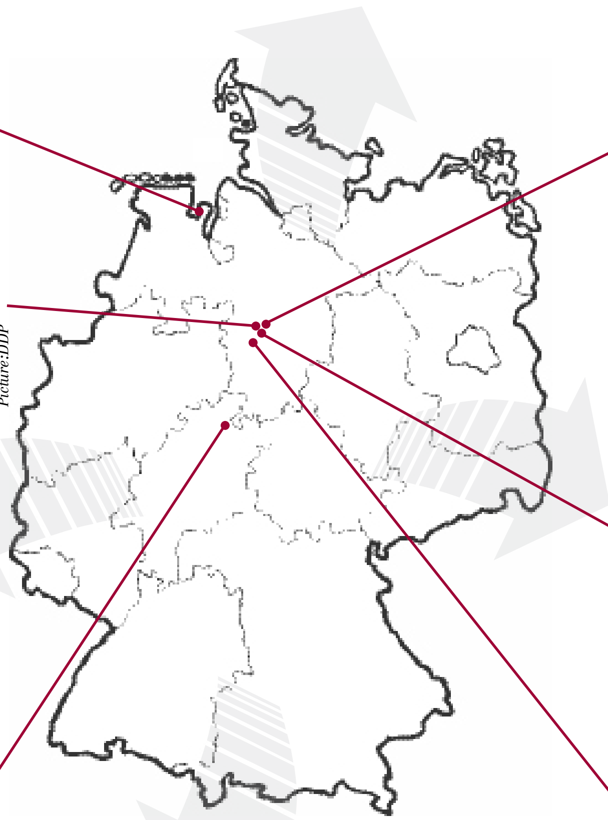
Replacing all vehicles registered in Germany that are older than nine years with a new model **would result in a reduction in emissions of 30 grams of carbon dioxide per vehicle, per kilometer.** Given the two million vehicles that qualify for the scheme, this will result in a massive saving of 900,000 tonnes of CO_2, based on an annual mileage of 15,000 kilometer per vehicle. This makes an enormous contribution towards protecting our environment. Not to mention the increase in on-road safety. **Every old car that is replaced with a new car that is fitted with state-of-the-art safety technology on board saves human lives.**

• Fallacy No. 3:
"The scrapping premium does not solve problems but merely postpones them: the rude awakening is yet to come."

It seems that the lingering spell of restrained spending which has constrained private consumption is finally broken, despite the financial and economic crisis. Consumers are taking the opportunity to snap up their dream cars, facilitated by the premium. Here, we can distinguish between two types of clients: **Half of them, actually, would have bought a car only in the consecutive year, or in two years time, but instead seize the opportunity now. The other half are new entrants, who would have never considered buying a new car, were it not for the premium.**

The effect of the scrapping premium has considerable and quantifiable advantages for the whole economy, including a boost for tax revenues. Selling a car at a **net price of 13,000 euros results in 2,500 euros returned via VAT into the national treasury.** Furthermore, a shifting in consumers' other acquisition plans is not to be noted.

Volkswagen's Production Plants



Emden:
- surface parts
- vehicle body parts

Wolfsburg:
- cockpit
- cardan drive shaft
- front ends
- injection-moulding machine

Picture:DDP

Hannover:
- cylinder heads
- inlet manifolds
- heat exchangers

Braunschweig:
- front and rear axle
- vibration damper
- struts
- steering systems
- instrument panels
- synthetic mudguards
- foot pedals

Kassel:
- manual and automatic transmissions
- exhaust systems
- vehicle body parts

Salzgitter:
- engines
- common rail system
- assembled camshafts

Up to 60 percent of the parts can be found in foreign products from the Volkswagen group, like the Škoda Roomster, are made in Germany.

From the Old Comes the New
The Volkswagen-SiCon Process

Extensive Recycling: Many parts of a car can be industrially reconditioned and reused (coloured grey in the picture). Iron and non-iron metals are returned to metal recycling, among others shredder fluffs, granulate and sand are generated from the rest.

Cracking and crunching sounds emerge from the metal funnel as a black Golf disappears into it. Effortlessly the claws of the shredder tear the steel apart and produce a mountain of countless pieces of metal, rubber, fabric, plastic and glass. A procedure which takes place many thousands of times per year in Germany; it is the end of a car's life.

For a long time a pile of scrap was the only thing that remained from an old vehicle. In many cases only the metal could have been recycled. **All the other parts of the car – some 20 percent – were deemed unusable and went straight to the landfill.** The old cars became dangerous waste. Of course, this cycle was not likely to please the experts at Volkswagen. **"We consider ourselves to be responsible for all the environmental impact of our automobiles"**, said Stephen Krinke, who is responsible for life-cycle analysis and an expert on environmental issues, based in Wolfsburg. "Therefore, we examine all stages of a car's life – from its production, to its usage and finally to its recycling – **and we are trying to make them more and more eco-friendly by optimising both our procedures and use of materials.**"

His college Dieter Schmid puts three bowls on the table. One contains fibrous material, the second granulate consisting of grey and less fibrous particles, the third a fabric of sand-like texture: shredder fluff, shredder granulate, and shredder sand. So is it possible to create new cars out of these materials?

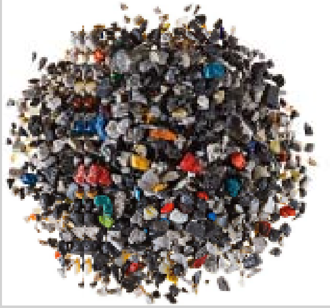
Indeed, the recycling of vehicles is not as easy as reclaiming glass from scrap glass or producing paper from waste paper. "There is almost no material that could not be reused," explains the metal-physicist, "but one has to abandon the idea of reproducing the exact same product from a material or fabric." Schmid has worked since 1999 on vehicle recycling and has been developing new recycling methods for Volkswagen since the year 2000. He, and his team, found a way out of the recycling problem by thinking outside the box. **"We started to look at the old vehicle as some sort of complex ore** – it has many useful raw materials which it is well worth the effort to recoup. The task at hand, therefore, was to ask: "How can they be extracted and who would be interested in them?"

The first steps of car-recycling are still relatively simple. After extracting the battery and wheels, all environmentally hazardous liquids are removed and the airbags deactivated. Still functional parts can either be used as spare parts or – having been professionally reprocessed – used as replacements, and are removed. The pollutant-free remains of the vehicle are then sent into the shredder. The steel generated is easy to separate and can go directly to the electric steel plants. Other metals, such as aluminium or copper, also return to the metal industry.

"There is almost no material that could not be reused."

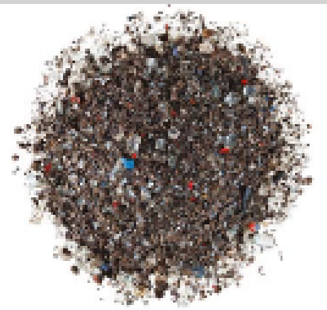
The remaining 20 percent of non-recyclable shredder residues were a huge challenge. The basic problem consists of how to isolate the materials. Together with the company SiCon, Volkswagen developed a system to separate the materials using filters, blowers and screens – all of which, albeit not new, were combined in a purposeful and innovative way.

Next the experts defined the material and physical characteristics of the different material groups and asked: 'Who needs these materials?' and 'Could those customers cope with large quantities as well?' In other words, **a recycling system can only be viable if there is demand in the market for the resulting product** – so it does not simply end up in the landfill.



Shredder granulate consists mainly of firm and hard particles, which are generated from cupholders, bumpers, instrument panels and side panels. The granulate is used, for example, by the steel producer and processor voestalpine in Linz, Austria, for the production of pig iron from iron ore in the blast furnace process. The reaction of granulate with hot air produces carbon monoxide and water – gases which are required to draw the oxygen from the iron oxide by smelt reduction and to reclaim liquid pig iron. At voestalpine, up to 220,000 tonnes of plastics can be used annually, a quantity that could not be provided by the automobile industry alone, which is why synthetics from packaging, as well as from industrial and household waste, are also used. Details on how, for example, the blast furnace process works can be accessed, in German, via **www.expeditionvoestalpine.com**

Shredder fluffs consist of soft, fibrous materials which were once seat cushions, carpets, belts or insulation mats.
The fluffs are used to drain water work sludge, for example at the Centre for Sludge Treatment of the sewage works Bottrop, a plant of the Emscher cooperative. Here 7,000 tonnes of coal, which previously had to have been imported by the plant, have now been substituted by shredder fluffs.



Shredder sand consists of glass, rust, colour particles and minuscule metal fragments which are generated during the numerous comminution processes of the VW-SiCon Process. The main objective is to reuse the shredder sand as a construction material. In order to do so many procedures have to be developed to separate sand and metal parts from each other (see Interview).

The essence of the solution is 'substitution' – the replacement of one material by another. The resulting products from the VW-SiCon-method are usable in various industrial processes, replacing materials which up until then had to be transported at considerable expense, in both money and carbon terms: thereby helping to reduce ecological damage.

Environmental expert Stephan Krinke explains this further using the example of shredder fluffs: "These can be used to drain water from water work sludge. Until recently an especially fibrous coal was imported from Venezuela, which dried out the sludge so that it could be burned." Physically shredder fluffs perform the same function but ecologically they score much better: the long, energy-intensive transportation of the coal is now rendered superfluous. Furthermore, there is less residual moisture in the water work sludge so that the sludge's incineration generates additional warmth and energy.
Now, thanks to the VW-SiCon technique, 95 percent of old vehicles can be recycled – a figure which is not required by EU law until 2015!

Text: Kay Dohnke, Image: Volkswagen Magazin

• Interview:
"Recycling 95 percent is technically and economically feasible."

Dieter Schmid, 49, holds a doctorate in metal physics at Volkswagen and has been working there on vehicle recycling since January 2000. His task is to implement the European Directive on End-of-Life Vehicles and the resulting 27 adapted national End-of-Life Acts. Together with partner company SiCon, his team developed the VW-SiCon Process thanks to which a remarkable 95 percent (instead of the previous 80 percent) of a vehicle can now be recycled.

How are the individual substances separated and sorted into fluffs, granulate and sand during the VW-SiCon Process?
The shredder parts are comminuted in multiple stages, separated according to their size and sorted based on physical parameters such as density, grain shape, magnetisability, electrical conductivity, as well as optical properties, and dismantled into single fractions.
In the first phase raw granulate, raw fluffs, raw sand, as well as iron fragments and non-iron fragments, are generated. For the parts to be used by the end buyer, they have to then pass though a separate process of refinement.

Shredder fluffs and shredder granulate have already found areas of application and buyers. Currently, shredder sand is used to fill mines. Why are you searching for further ways of using these products?
On the one hand, it is questionable whether legislators will consider the filling of mines to be recycling in the long term. On the other hand, valuable materials are lost in this practice.
The metals contained in the shredder sand have to be separated. Then they can be reused as metals and the now nearly metal-free sand can be used as a construction material. The problem is that the metals are smaller than one millimetre. At such a small size mechanical separation methods alone are powerless.

Will there be a 100 percent recyclable car in the future?
We think that 95 percent is a technically and economically feasible. That is why the industry has, in 1997, already voluntarily committed to a corresponding target; which was later adopted into German legislation.

Dr. Dieter Schmid, metal physicist

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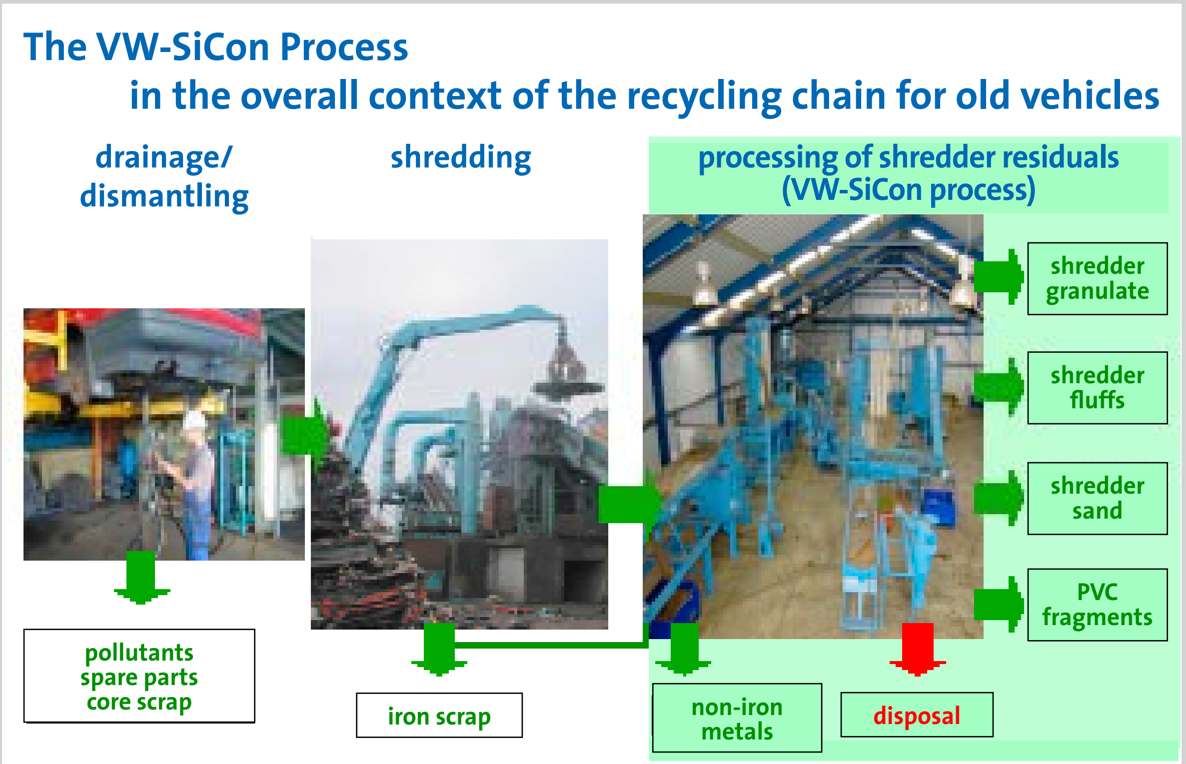


Awarded with the Environment Award of German Industry (2005/2006), the European Business Award for the Environment (2006) and the ÖkoGlobe (2007): the VW-SiCon Process.

Good Comes From Above

Wolfsburg installs a photovoltaic system

The photovoltaic plant on the roofs of the Volkswagen plant in Wolfsburg produces sufficient energy for 750 four-person households.

Energy Gained from the Sun

Two ways to generate energy from the sun have proven feasible: the photovoltaic technique deployed on the plant's roof in Wolfsburg and common solar thermal systems.
Generally, photovoltaic refers to the direct transformation of radiant energy, mainly solar energy, into electric power. The name comes from photos (the Greek word for light) and volta (for Alessandro Volta, a pioneer of electrical engineering). Photovoltaic energy is generated by solar modules which consist of single or multi-crystals.
In solar thermal systems, solar collectors transform the radiation of the sun, not into freely available energy, but into warmth.

Normally the hustle and bustle is found under the roofs of the Volkswagen plant in Wolfsburg. However, during the last six months work has been taking place on top of the roof: Freiburg based company Solarstrom AG has installed photovoltaic modules across an area of 125,000 square meters, the size of six soccer fields. A plant of this size is capable of supplying energy for 750 households, with four members each, for one year.

The benefits for the Wolfsburg plant from the power plant above their heads are twofold: utilising the power of the sun, the group wants to reduce its energy costs in the medium-term and, at the same time, make their production more eco-friendly. **The car plant is saving 1,600 tonnes of carbon dioxide per year thanks to solar power** – that is equivalent to the emissions of an airplane which flies 200 times the distance from Europe to Chile and back.
Due to the decades old roof, with low loading capacity, the plant's engineer decided to use an innovative Teflon-coated laminate, which is significantly lighter than its predecessors, along with the conventional modules made of glass plates (see box "The Power Plant on the Roof").

The main plant in Wolksburg is not the first one whose roofs received a solar upgrade. **Since 2007, the biggest photovoltaic plant of Lower**

Saxony can be found on the roofs of the Emden plant, where the Passat is produced. The energy generated here would be sufficient for 100 households with four members each. In Wolfsburg, where the new plant was officially inaugurated on April 21st, 2009, **the development of further roof surfaces is already in the pipeline.** When complete, there remains only one who has to work high up above the plant – the sun.

Against the Heat
Solar roofs prevent heat accumulation

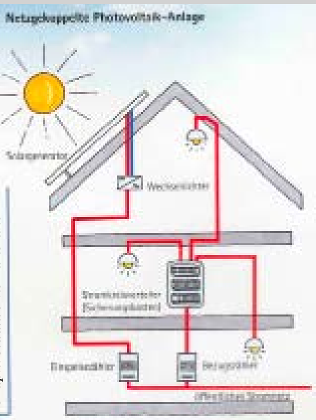
Whoever has parked his car for a long period of time at the supermarket, or during a day trip, is familiar with this problem: before hitting the road again, one has to open the doors widely and wait until the temperature inside the car has dropped again to a sufferable level. But what if a sensor had already registered during the parking period that the car's interior is getting too hot and so automatically turned down the temperature?

Modelled on photovoltaic roof plants, a special sliding roof on cars – for example in the Audi models A8, A6 and A4 – with integrated solar modules regulates the interior temperature to a constant level. As soon as the engine is turned off, **the solar generator** begins to work, registering the temperature in the cockpit and, if necessary, **offers its sun-generated energy to the air-conditioning system; all of which takes place without charging the car battery** and nearly without any loss of energy.

Even with the engine running, the solar module offers various advantages: if the vehicle is equipped with air-conditioning, the latter can cool the interior down much faster to the desired temperature, due to its lower initial temperature. That is how the system can work quieter from the start and needs less energy.

Solar cells on the sliding roof generate energy for the blower.

Furthermore, it would be technically feasible to use the energy produced by the solar cells on the roof for other purposes – such as



Graph: Stadtwerke Karlsruhe

A Power Plant on the Roof – the German Renewable Energy Act

With a photovoltaic plant on its roof, virtually every household can be transformed into its own little power station. Normally, this self-produced electricity is fed into the local distribution system. For every kilowatt hour which the plant on the roof produces, the owner is paid by the energy supplier. Generally, more money is paid for the energy fed into the system than one would have to pay obtaining the energy from the supplier. For a plant that produces 30 kilowatt hours, for instance, the owner currently receives 43.01 cents for each kilowatt hour fed into the system, whilst a kilowatt hour only costs 20 cents to purchase. With stand-alone systems which are decoupled from the local distribution system, it is possible to satisfy one's power needs oneself. This is also rewarded by energy suppliers, albeit with significantly less money. This regulation applies only to private households. The prices paid by energy suppliers to private producers are regulated by the German Renewable Energy Act (EEG), whose third version came into action in January 2009.

Stanley – High-Tech on Wheels

The technical basis of the self-driving Stanley was adopted virtually unchanged from a standard VW Touareg. But then the development team transformed Stanley into a high-tech laboratory on wheels. Numerous sensors and four interconnected laser detectors gather data which the driver-less car then uses to stay on the road. The system was supplemented with a stereo visual display, highly-developed radar equipment and an extremely accurate, satellite-supported GPS navigation system, which digitally processed the car's location to within the exact millimetre.

This concentrated flow of information feeds the high-performance computer centre, located in the off-road vehicle's luggage compartment, consists of seven interconnected computers. Using 1.6 GHz processors and complex, and unique, software, it gives all the steering, acceleration and deceleration commands which then controlled "Stanley" electronically via "Drive-by-Wire" systems that can react to any particular features of the route in real time. ▸

"Drive-by-Wire"(short DBW) refers to driving, or steering, without mechanical power transmission. All commands are passed on to the relevant devices electronically by a network that governs the digital exchange between sensors and actuators. Drive-by-Wire systems have been used in most VW models since the mid-1990s.

charging the car battery. According to Thomas Drescher, an engineer at Volkswagen, **"That is why solar roofs have become more important, especially for electric vehicles."** So far, this alternative usage has not been applied. "The production is as yet too expensive." explains Drescher.

Herbie Becomes Reality

The self-driving car

In the Volkswagen research centre ERL a standard VW Touareg was transformed into a robot car that raced ahead of the pack at the "Grand Challenge."

On a course with tunnels, barracks and a hangar in the bone-dry desert landscape near Las Vegas, a dozen beeping and howling vehicles drive around. It is probably the world's craziest car race, the "Grand Challenge": a race for unmanned vehicles.

In total, 193 teams from across the globe have to surmount 210 kilometres as fast, and as safely, as possible; the winner will receive two million dollars. This sound like a manageable task, were it not for one minor detail: None of these cars has a driver! That is to say it is not as much a sporting challenge so much as a question of who has the most innovative technology. Equipped with GPS, an army of sensors and multiple computers; the vehicles have to find their way themselves. Meanwhile, their developers must sit back and watch as soon as the starting signal is heard. Previously, such self-driving cars were called Dudu or Herbie and stared in

various motion pictures. Today their names are Stanley or Junior – and they are real.

Stanley has been developed in co-operation with Electronic Research Laboratory (see box) in California which is part of both Volkswagen corporate research and the University of Stanford. Since 2005, Stanley has demonstrated that cars can, indeed, drive all by themselves: after years of hard work and 6 hours 54 minutes of racing through the hot Nevada desert, Stanley was the first to cross the finishing line – winning the "Grand Challenge".

Two years after the success of Stanley, the race for autonomous vehicles went into its second round in 2007. This time, in the course of the "Urban Challenge", the aim was to take a car to the starting grid which would be able to prove itself in city traffic. For VW, this task was taken on by a Passat Variant, the so-called Junior.

The simulated small town on the former air force base Victorville, near Los Angeles, offered some special challenges for Stanley's little brother: an approximately 100 kilometre long course with simulated heavy traffic, real two-way traffic flow and a jungle of traffic signs. The assessment was based not only on the time needed to pass through the course but also the degree of safety with which the prototypes drove. Whilst Stanley only had to recognise and avoid obstacles in 2005, Junior had to actually understand his environment. Sebastian Thrun, Professor for Artificial Intelligence at Stanford University and leader of "Team Junior", characterised this challenge for the engineers with one phrase: "The instinct for traffic." The team successfully showed this capacity in Junior's case: The VW finished second.

But why bother? When developing autonomous cars, engineers and research departments have access to a whole bag of tricks with which to experiment – it is here that what is technically possible becomes reality. Later some of these features find their way into serial models, for example as assistance systems, and help to make driving more comfortable – and above all safer..

The Passat Junior – successor of the self-driving Stanley.

The Electronic Research Laboratory (ERL)

is the central research centre of the Volkswagen group in the USA. Its presence, in the heart of Silicon Valley, allows the Volkswagen Group to work directly with the world's leading high-tech companies. Together with our partners, it is at ERL that the central work on the development and construction of innovative features and applications that are used in Volkswagen Group vehicles go through further analysis and testing. When founded in 1983, the ERL had only three full staff members: today, after moving into Palo Alto in December 2002, the research centre provides stimulating jobs for more than 40 employees.

Stanley's Last Round

After a two year tour through technical museums worldwide, Stanley's last trip ended in November 2008 at the Smithsonian National Museum of American History in Washington D.C.
Here, the prototype can be seen in the capital city of the US at the centre of the permanent exhibition 'Robots on the road?' "Stanley is an excellent example of how the innovative power of science is influencing the current American society in this new millennium." says Brent D. Glass, Director of the Smithsonian.

National Museum of American History, On the National Mall
4th Street and Constitution Avenue,
N.W., Washington, D.C
http://americanhistory.si.edu

Shift to reverse, activate parking assistant, step on the gas, and let the assistant do the bothersome steering.

Useful Helpers

Driver-assistance systems

For Volkswagen, the development of driver-assistance systems is nothing less than the pursuit of our vision of accident-free driving. "The leading cause of motor vehicle accidents is the human being." says Prof. Dr. Jürgen Leohold, head of Volkswagen Group research. "We have to address this and develop appropriate solutions." Today, Volkswagen are at least part way towards realising these solutions.

Parks in even the tightest of spaces

Reverse parking manoeuvres – the worst nightmare manoeuvre in every driving test. The winding and manoeuvring required, often numerous times, is inconvenient even for the experienced driver. This is where the second-generation Parking Steering Assistance "Park Assist" comes into play: it enables nearly automatic reverse parking parallel to the road. The driver merely operates the gas pedal, clutch and brake, while the car steers the vehicle into the parking space, which has been measured and calculated before using sensors. Whereas the older version required a parking space of at least 1.4 metre longer than the vehicle, the new system is able to work with only 1.1 metre. Yet, the driver always remains in control of the car and can stop the assistant at any time by intervening in the steering process or by stopping the parking by braking.

While the semi-automatic "Park Assist" is equipped as standard in several models, Volkswagen has already presented a new vision for the future of driver-assistance technology at the 2008 Hannover Fair: The "Park Assist Vision" is technically capable of manoeuvring a car into a parking space completely automatically – without the driver even being on board. However, the assistant is as yet still being trialled. Currently, autonomous driving technology is illegal on German roads.

Adjusted – Adaptive chassis control DDC

Sporty driving dynamics or great driving comfort – up until now, drivers have always had to choose between them. However, thanks to intelligent adaptive chassis control, Volkswagen has now succeeded in coupling these two qualities together in one vehicle, for the first time. This highly innovative system ensures that the suspension is constantly adapting to suit the shifting road and driving conditions.

This is made possible using electronic adjustable dampers. Each individual shock absorber is connected to a control-device which calculates the optimum setting for each individual wheel from the sensor data and the other system information – such as steering, braking and driving assist systems – that it receives. This allows the system to react within milliseconds to bumps in the road, changing lanes or bendy roads.

Well-damped: The new Golf GTI with adaptive chassis control DDC.

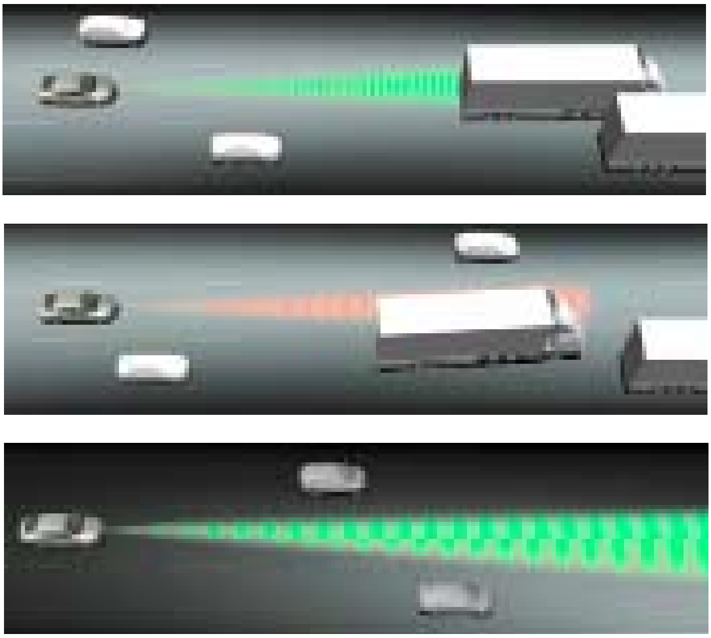
Secure driving on bendy roads – XDS

The electronic stability program (ESP) is by now a tried and tested driving assistant that acts as an anti-skid system; keeping the car on the right track. The control unit is not much more than sophisticated mathematical operation: the system knows whether you are tackling a sharp left or right bend simply by looking at the angle of the steering wheel of the electro-mechanical steering system and, if need be, decelerates the individual wheel in order to hold the vehicle on the right track.

Those who like to drive sportily, and at the same time safely, will enjoy XDS, a functional extension of the electronic limited-slip differential, integrated in the ESP system. The function builds up extra braking pressure on the inner wheel of the car on a bend. So, XDS compensates for the under-steering that is typical of front-wheel drive vehicles, when driving fast through bends. And it makes the Golf go round bends even more keenly at pace.

Always keeps its distance

The ACC automatic distance control can be considered to be the big brother of the cruise control system – one which maintains a regular distance from the vehicle ahead. If activated, the ACC automatically adjusts the car’s speed, in order to maintain the preset distance. This function is made possible by radar sensors that continually compute the



The distance control ACC recognises the traffic ahead and adapts the speed automatically.

distance of the vehicle ahead. This makes the ACC automatic distance control a major strain-relieving, comfort-enhancing driver aid.

If approaching a slower vehicle ahead, or if another vehicle cuts in front, the automatic distance control slows down the car by initiating corrective controls in the engine management and, if necessary, in the braking system too. However, the radar sensor is not capable of detecting stationary obstructions, such as the end of a tailback or crash barriers, however. If the required rate of deceleration exceeds 30 percent of the vehicle's maximum stopping power, the driver will be prompted by visual and audible warning signals to apply the brakes manually.

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