BMW ConnectedDrive 2013.
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1. BMW ConnectedDrive 2013: Highlights.

BMW is further consolidating its standing as the world's leading provider of online-based in-car services by introducing some major enhancements while also making its BMW ConnectedDrive services easily accessible. The new mobility products represent a further milestone in the on-going success story of BMW ConnectedDrive and take automotive infotainment into a whole new dimension.

- The refocusing of BMW ConnectedDrive turns complete, intelligent connectivity between passengers, vehicle and the outside world into a reality.

- Many BMW models are to be fitted with a built-in SIM card as standard from July 2013.

- The freedom to pick and choose mobility services ensures maximum flexibility und heralds individual, tailor-made solutions that are of unique benefit to the customer.

- The BMW ConnectedDrive Store can be accessed and used both from the vehicle and from a home PC.

- The variable running periods available for particular services, ranging from just one month to one year or longer, provide added convenience.

- New browser and BMW Apps-ready applications mean the infotainment options are virtually boundless.

- Online Entertainment offers limitless music pleasure with access to 12 million songs and over 250 professionally created channels.

- Intelligent Emergency Call system including precise vehicle location and detection of accident severity offers more extensive functionality than will be required by law from 2015.

- New ConnectedDrive services specially tailored to the demands of e-mobility and future mobility form part of the standard specification on the BMW i models.

- The BMW ConnectedDrive internet portal, the fully networked BMW i navigation system, the BMW i Remote app as well as the BMW ConnectedDrive Information Plus service are all designed to ensure a perfectly interlinked user experience.

- The BMW i ConnectedDrive services are there to assist the driver when at home and can accompany them all the way to their final destination while using further forms of transport. As such, BMW i is setting a marker for the future of mobility.

2. Refocusing of BMW ConnectedDrive: Complete connectivity, a whole new level of flexibility and a remarkably wide array of mobility services.

BMW ConnectedDrive has been synonymous with forward-looking concepts and technologies in the domain of automotive connectivity for some years now. By refocusing on tailor-made mobility services and new, highly innovative service functions, BMW is further consolidating its leading status in this field, at the same time as ringing in a new era for BMW ConnectedDrive services with a customer portal, a clearly structured layout and a diverse product offering designed for flexible usage. In the process, BMW is once again demonstrating the technological edge that it has held over the competition for many years.

Target: BMW ConnectedDrive in many markets and for all vehicles.
From the outset, BMW ConnectedDrive has been geared towards the mobility requirements of tomorrow and of its users. The carmaker's pioneering role is exemplified by its early integration of the iPhone using interface technology in BMW cars back in 2007, as well as the multitude of apps for in-car use introduced since 2011. The reorientation of the services now turns comprehensive, intelligent connectivity between passengers, vehicle and the outside world into a reality, while the new and enhanced service features are to be made available for all models by means of a SIM card integrated into the vehicle.

Over the course of 2013, the BMW ConnectedDrive service portfolio will be extended to a further 14 markets in addition to the 11 where it is already available. The objective is to have around five million BMW cars linked up worldwide via ConnectedDrive with the help of the built-in SIM card by the year 2017. This shift in strategy makes BMW the first carmaker to firmly commit itself to the goal of achieving blanket connectivity. This will see BMW customers reap the benefits of a steadily increasing number of innovative new functions with extremely high practical value. A current example of this is the Intelligent Emergency Call system with automatic vehicle location and accident severity detection: this can significantly cut the time that elapses between the incident occurring and the emergency and rescue services arriving on the scene, making it an invaluable aid following an accident. It will be offered in nearly all markets and model series as standard in future.

Clearly structured, easy to understand and simple to book.
To ensure that customers have a clear picture of what's on offer, BMW

ConnectedDrive will in future be based on just two mainstays: besides the driving assistance systems with their convenience and safety functions, the optimised BMW ConnectedDrive services comprising the entire infotainment and mobility portfolio will now be more clearly structured, more readily understood and also individually bookable via various channels. Meanwhile, there is a dedicated customer section for the ConnectedDrive services offered by the BMW i sub-brand (see Chapter 5).

Flexible and personalised: everything's available, nothing's compulsory.

As part of the concept's reorientation, BMW has dispensed with the previous package solutions. In future, customers will be able to decide for themselves which of the available mobility services they would like to take advantage of. Individual services can furthermore be activated for a limited period, such as one month, one quarter or one year. Such freedom of choice ensures maximum flexibility und heralds individual, tailor-made solutions that are of unprecedented benefit to the customer. Plus, it enables the vehicle's range of functions to be enhanced considerably over time or updated, meaning that a BMW can still boast the very latest technology even after years of use. For the first time, it is also possible to customise services for the second owner and/or in a used BMW. Last but not least, the new option-based model results in cost savings in many cases, as well as permitting a lower starting price.

Access via customer portal or BMW ConnectedDrive Store.

The new, networked world of BMW can be entered via the online customer portal ("My BMW ConnectedDrive"), which has a far more up-to-date, attractive and clearly presented design following the revamp. After logging in to a password-protected area, the user is able to configure personalised and/or vehicle-related settings. As access is assured throughout the vehicle's life, subsequent owners are also able to book further networked services or adapt them to their personal requirements, so that used BMW vehicles continue to be fully compatible with BMW ConnectedDrive. Services can be selected and booked with the greatest of ease at the newly created BMW ConnectedDrive Store.

BMW ConnectedDrive Store: accessible any time, any place.

Supreme user friendliness is further ensured by the multi-channel approach. Apart from Internet access, customers are also able to pay a visit to the new BMW ConnectedDrive Store – where many of the services and vehicle apps can be booked – from the comfort of their BMW, which is why it is open around the clock. Consequently, the desired options can be activated without delay and used within a matter of minutes, even while away on business trips or on holiday.

3. Customer portal and new BMW ConnectedDrive Store: Convenient access at any time of the day, even while on the move.

The first point of call for customers wishing to make use of the services offered by BMW ConnectedDrive for themselves and their vehicle is the new-look BMW ConnectedDrive customer portal “My BMW ConnectedDrive” on the Internet. There they will find all information, products and functions in an easy-to-understand and clearly presented menu arrangement.

One-off registration of driver and vehicle over the Internet.
The journey into the world of BMW starts for new customers and new vehicles alike with the built-in SIM card that is already activated at the factory. The next step is the online registration of the user and vehicle(s). Once registration has been completed, customers are able to access their personal, password-protected BMW ConnectedDrive area, make individual settings and manage vehicle-related data and services.

Personal area: maximum control, perfectly simple to use.
In their personal area, customers will find a graphic of their own vehicle model, including the number plate and selected colour. Below this, the current vehicle status is displayed, together with the active services that have been booked. Next to this is where individual services can be configured or feature add-ons activated. This allows the scope of information and entertainment functions to be adapted to individual requirements at any time.

Thanks to the wealth of BMW ConnectedDrive services, a BMW can be kept right up to date for many years. And whenever customers wish to browse the constantly expanding range of services and vehicle apps, a click of the mouse will take them straight to the brand-new BMW ConnectedDrive Store with its vast choice of products for both BMW and BMW i drivers and cars.

The new BMW ConnectedDrive Store: open around the clock.
The newly created BMW ConnectedDrive Store, which offers BMW customers access to the complete spectrum of services and vehicle apps, is the only one of its kind to date in the competitive segment. The store is open around the clock and can be entered via various password-protected channels. Apart from the customer portal that can be conveniently called up from a computer at home, the store can also be accessed while on the move by means of the BMW’s in-car system. As a result, BMW customers are even

able to select and book individual services while on business trips or on holiday, and then use them within minutes.

Flexible choice of services available for variable periods.
Another key customer benefit resulting from the refocusing of the BMW ConnectedDrive strategy is the move away from the package solutions that were previously the norm. Instead, BMW ConnectedDrive has split up its portfolio of mobility services into individual options, which can be booked and used separately and combined together as the customer desires. For added convenience, particular services are available for variable periods, ranging from just one month to one year or longer. This places the customer completely in the driving seat, as they can activate the functions and services that suit them best and at just the right time, such as while travelling on holiday. The various running period options furthermore allow the functionality of specific services to be tested out in practice for a limited time. For BMW and BMW i customers, this all adds up to unrivalled product diversity, the utmost individuality and flexibility, as well as considerably lower starting prices.

Making purchases at the BMW ConnectedDrive Store.
Once customers have logged in to the BMW ConnectedDrive Store, they are presented with an overview of the registered vehicles, the booked options and the remaining services that can be booked for their BMW. Alongside this can be seen the costs for the services, as well as the total and remaining running periods. Users furthermore have a facility for activating/deactivating their products, reconfiguring them or extending their running periods. Management of the BMW ConnectedDrive services really couldn't be easier or more convenient.

Another summary shows a complete list of the services that are available especially for the customer's model. The product overview is completed by further information such as costs and features. A host of new options can be additionally booked here. What's more, they are enabled via the vehicle's air interface, meaning they are fully available for use in a matter of minutes. With the new BMW ConnectedDrive Store, BMW will in future be offering customers an always up-to-date range of services and vehicle apps that can be configured flexibly and individually, is being constantly added to, and is currently quite unique amongst the competition.

On the move: access via the in-car menu in every BMW.

Customers are able to visit the BMW ConnectedDrive Store at any time of the day, even while they are travelling in their car or away on trips. They can call up a summary of all BMW ConnectedDrive services available for their vehicle in the instrument cluster's Control Display and scroll through the store menu using the iDrive Controller. Featuring a layout that has been optimised for the on-board system, the product page provides information on the features and costs of the selected services as well as the running period options. Once customers have identified themselves with their BMW password – the username is completed automatically – all that remains to be done to finalise the order is to confirm the selection, the desired period and the payment method stored in the customer portal. Within the space of a few minutes, the booked option will be activated and is then ready to use.

4. BMW ConnectedDrive services: Now more powerful than ever thanks to new services and apps.

BMW is further consolidating its standing as the world's leading provider of web-based in-car services by introducing some major enhancements at the same time as making its BMW ConnectedDrive services easily accessible. BMW ConnectedDrive customers are now able to further improve their mobile Internet experience with the help of browser-based applications (vehicle apps) in BMW Online such as "Kicker", "Qype", "Number Plate Search" or the German postal service app "Deutsche Post". All that is needed to use the browser-based apps is an Internet connection to the BMW servers, as provided at all times by the vehicle's built-in SIM card.

For yet greater convenience while travelling, there is the BMW Connected app for smartphones, which includes functions such as web radio, Wiki Local, Facebook, calendar, plus several more besides. All applications, regardless of whether they are vehicle apps used via BMW Online or smartphone apps, are controlled using the intuitive iDrive controller and visualised in a uniform manner in the Control Display with the familiar menu structure. In addition to all future BMW ConnectedDrive customers, the extended range of services is also available to a large number of existing customers at no extra charge.

Third-party apps mean the infotainment possibilities are virtually boundless.

The highly flexible app concept makes it possible to incorporate not just the applications specially developed by the BMW Group, but also BMW Apps-ready applications from other providers. With the advent of these BMW Apps-ready applications, BMW is giving customers the option of continuing to use their favourite or familiar service providers when driving in their car, too. This will allow the wide array of infotainment functions that BMW drivers enjoy when at home or out and about to be smoothly transferred to their vehicle in future.

With these BMW Apps-ready applications, the range of functions can basically be expanded at will. The prerequisite for all apps is that they meet the BMW requirements for distraction-free operation. In order to ensure optimum integration of third-party applications into the vehicle, the BMW Group offers providers a special Software Development Kit (SDK). This contains specific tools that are intended to help the third-party providers develop compatible, vehicle-adapted versions of their apps that are befitting of the cars' premium

status. The current portfolio comprising Pandora, MOG, Aupeo, Stitcher, Baidu Music, Douban FM and Snippy is being gradually extended by the addition of numerous exciting third-party apps such as Deezer, Napster, Rhapsody, TuneIn Radio, Audible and Glympse. From this summer, application-based integration will also be compatible with smartphones running the Google Android operating system. With a market share of over 50 per cent, Android is now the most widely used operating system for smartphones.

Easier voice commands thanks to natural speech recognition.
The new generation of the BMW Navigation system Professional adds various new speech functions to the BMW ConnectedDrive Mobile Office portfolio, most notably a dictation function that employs a full speech recognition system to simply transcribe the driver's words. The dictated text can then be sent by SMS or email. The multilingual dictation function can recognise six languages at present. Punctuation marks and instructions such as "new line" can also be dictated. The speech recognition service is performed outside the vehicle by BMW cooperation partner Nuance.

The range of office functionalities offered by BMW ConnectedDrive has been expanded by another speech-based feature, too. The voice memo function, in contrast to the dictation function, allows the driver to make direct voice recordings of up to two minutes in length and immediately send them by email if required.

Limitless listening pleasure with BMW Online Entertainment.
Online Entertainment from BMW ConnectedDrive now offers non-stop, premium-quality listening pleasure. With this new optional extra, the customer receives a car equipped with the necessary technology for using the latest cloud-based infotainment services directly from the vehicle's Multimedia menu without having to do everything via their smartphone. In addition to the technical enabling of the vehicle, the optional extra Online Entertainment also includes a one-year flat-rate subscription for music and data that gives the customer continuous access to over 12 million songs and more than 250 professionally produced music channels in all countries where it is available (UK, DE, NL, FR, ES, IT). Using this sort of service via a private smartphone would incur considerable costs when driving abroad. The customer just has to choose one of the BMW music partners for whom they received the one-year flat-rate music subscription from Online Entertainment. What's more, drivers can continue to enjoy endless audio entertainment outside their car too, as the flat-rate music subscription is also valid for any device supported by the provider. Any personal playlists are stored in the service cloud, where they can be accessed directly from any device and in the car. The rara music service is

already available, Napster is in the pipeline, and other providers may follow as and when required. The intuitive iDrive Controller is used to search for the desired track or artist in the Control Display. As soon as the first few letters have been entered, all possible matches for artist, album and song title will appear. Once an album has been selected, it starts to download to the vehicle's hard drive. When the first track for a relevant section has been loaded, it will begin playing while further songs from the album continue to be downloaded in the background. The upshot of this is that customers will always have a sufficient supply of music already downloaded to their vehicle should they encounter reception dead spots during the journey. In contrast to the streaming-based services for smartphones, this means there is no need to fear unexpected pauses in areas with poor network coverage.

As Online Entertainment provides a universal platform for in-car entertainment, BMW is looking into the possibility of incorporating further infotainment sources, such as audio books or cloud players.

Intelligent Emergency Call with automatic vehicle location.
An automatic emergency call system is set to become mandatory for all new vehicles in the EU from 2015. BMW already offers this function today, together with far more extensive functionality than will be required by law from 2015, in the form of Intelligent Emergency Call from BMW ConnectedDrive. Should an airbag be deployed, for instance, the system will transmit an automatic emergency call to the BMW call centre including the precise location of the accident site. Apart from the vehicle's exact position and direction of travel, details of the vehicle model and all the data gathered by the sensors in the car are relayed to the call centre as well. This information provides indications as to the nature and severity of the collision, while the deployment of the car's restraint systems gives an idea of the number of people injured and allows frontal, rear, side or even multiple collisions to be identified and differentiated. On the basis of all accident-related data, the call centre decides which and how many emergency services are required at the accident site (e.g. doctor, paramedic, fire brigade, helicopter). The data also enables the alerted rescue crews to prepare the appropriate medical care for those involved in the accident before they have even arrived at the scene. The call centre furthermore stays in contact with the vehicle's occupants until the emergency services arrive, speaking to them in their native language where possible. As well as automatic activation, the system also allows the driver or front passenger to trigger the emergency call manually in order to help other road users in distress by alerting the call centre.

Real Time Traffic Information (RTTI) warns of traffic jams as they happen.

Available as an option, the RTTI (Real Time Traffic Information) system uses the mobile phone network and the SIM card built into the vehicle for ultra-fast transmission of very detailed data. The real-time information, which is taken into account when calculating routes and possible diversions, is relayed to the vehicle with unrivalled reliability and precision. RTTI covers motorways and major highways, as well as country roads and main roads in urban areas. In order to provide the driver with precise information on traffic density, GPS data from fleets and mobile radio units, road sensors, local authority traffic management systems and many more sources besides are used to obtain as much data as possible. A live traffic jam map with colour-coded road markings in green, yellow, orange and red now visualises the current traffic flow states even more sensitively as well as providing information on roadworks, accidents and other events affecting traffic. The information is updated every minute and encompasses the dense European road networks extending through Germany, the United Kingdom, France and Italy, plus, from July 2013, Belgium, the Netherlands, Austria, Spain, Denmark, Ireland, Norway, Poland, Portugal, Sweden, Switzerland and the Czech Republic.

LTE mobile high-speed Internet available for use in every car.

The BMW LTE Car Hotspot already makes it possible to enjoy mobile Internet in your car today at the high speeds offered by LTE (Long-Term Evolution) technology. The BMW LTE Car Hotspot acts like a home router, forming an interface between the mobile device and the World Wide Web. All that is required apart from the BMW Car Hotspot is an LTE-capable SIM card, which is inserted into the hotspot. Once it has been put into service in the vehicle, the adapter works just like any hotspot, allowing the passengers in the vehicle to surf the Internet at high speed with as many as eight mobile devices at the same time. Mobile Internet at LTE speeds is already available now in Germany and many other places throughout Europe. In Germany, the Federal Network Agency has been pushing ahead with the rollout of the LTE networks in rural areas in particular, and 100% coverage with LTE-capable networks is expected by around the end of 2014. Incorporating LTE technology into the vehicle by means of a built-in SIM card means that the BMW Group is ideally poised to take the portfolio of BMW ConnectedDrive in-vehicle features to a whole new level.

5. Connected Mobility:
Total connectivity with the help of BMW i ConnectedDrive services.

BMW i stands for a whole new conception of premium mobility and calls for a new generation of flexible, simplified mobility services that are designed to enable vehicles to be linked seamlessly into the customers' individual lifestyles. BMW i will be the world's first fully networked sub-brand offering tailor-made, state-of-the-art BMW i ConnectedDrive services.

BMW i ConnectedDrive services as standard for BMW i models.
For this purpose, all new BMW i models will come as standard with an integral SIM card together with BMW ConnectedDrive services that have been specially devised for electric mobility and future mobility demands. Because the card is built in, it ensures an optimum connection to the BMW ConnectedDrive services throughout the vehicle's life. The BMW i is furthermore equipped with a navigation system that already features BMW i ConnectedDrive services, and has been systematically tailored to the specific requirements of electric mobility and of flexible, individual, convenient mobility in tomorrow's world. Examples of this include the Driving Range Assistant, an overview of the available charging stations, efficient route calculation especially for electric vehicles, Intelligent Emergency Call, the facility for accessing public transport options, BMW TeleServices including Battery Guard to protect against deep discharging, as well as further services that are accessible in the BMW i Remote app and the BMW ConnectedDrive internet portal. Should the customer wish to use further products from BMW & BMW i ConnectedDrive services, such as Concierge Services, Internet or RTTI, they can be booked individually from the comfort of their home computer by visiting the BMW ConnectedDrive Store (see also Chapter 3).

BMW i ConnectedDrive services always at the focus of attention.
The BMW i3 comes with two top-quality displays for the exchange of information between vehicle and driver and for operating the infotainment and communications functions. There is a large 6.5-inch screen positioned on top of the steering column, where all driving-related data such as speed and range appears, and a second 8.8-inch screen in the centre of the dashboard for displaying, for example, the information from the navigation system, which is connected to the outside world via BMW i ConnectedDrive. This central display also serves to keep the driver and front passenger fully informed of the vehicle's status and the drive system's operating mode. The two displays have

been designed to interact in such a way that the information shown is split between them to optimum effect, as the situation requires.

Total networking facilitates mobility planning.

The driving range of electrically powered vehicles is very much dependent on driving style. The BMW eDrive technology aboard the BMW i3 is designed to allow the vehicle to cover a distance of 160 kilometres (100 miles) on a full battery charge. Even before setting off, the BMW i ConnectedDrive services provide the driver with realistic estimates of the vehicle's current range. One of the key elements of the networked navigation system is a dynamic range map, which delivers precise, reliable readings by factoring in all relevant parameters along the planned route. The battery's charge status, driving style, activity of electric comfort functions and the selected driving mode are all taken into account for the calculation, along with the route's topography and current traffic levels. The system is therefore able to make allowance for the extra energy used up for both an upcoming climb and stop-start traffic or traffic jams, and lower its range calculation accordingly. Up-to-the-minute and detailed real-time traffic data is added to the equation, too. High-performance analysis and evaluation of the information is carried out permanently via the BMW ConnectedDrive servers. Every BMW i is constantly in contact with these servers thanks to the built-in SIM card, and this networking provides ultra-precise real-time information at all times.

Dynamic range display for all driving modes.

Taking the vehicle's current location as a starting point, the dynamic range display from BMW i ConnectedDrive joins up all the points that can be reached with the available energy reserves to form a spidergram in the navigation display. Since the driver is able to actively influence the vehicle's energy consumption and therefore its range by switching the driving mode, the graphical representation of the range calculation is always made available in two variants, allowing the driver to view the relevant current range in both COMFORT and ECO PRO mode. The driver is furthermore able to see the range that would be available if the ECO PRO+ mode was selected, so that it is always possible to know how much extra range could be obtained by changing the driving mode. The Driving Range Assistant can detect when the remaining driving range might become critical and advise the driver to choose a more efficient driving mode, a more economical route or an available charging station in the vicinity if necessary. BMW i therefore brings BMW ConnectedDrive networked services and BMW EfficientDynamics energy management together to create a perfect symbiosis.

Available charging stations are shown in the vehicle.
Once the destination has been reached, the driver can call up a display of charging stations nearby and even see whether they have any free spaces or not. When plugged into one of today's public fast-charging facilities, it takes just 30 minutes to charge the battery to 80%, meaning the car can be topped up with enough energy for a further 120 kilometres (75 miles) during the lunch break or a shopping trip. Thanks to the collaboration with car park operators and public charging station providers and the networking with smartphones and navigation systems, the BMW i ConnectedDrive services grant customers highly reliable access to the public charging infrastructure, as well as enabling a simple and transparent means of payment using the BMW i ChargeNow card.

Connected Mobility: public transport to be incorporated into route planning in future.
If the BMW i ConnectedDrive services detect traffic disruption or city centre road closures along the planned route through urban centres, drivers will in future have the option of incorporating local public transport connections into the route planning. All relevant transport connections together with stops and departure times from a specified location can be called up in advance in the instrument cluster display. Drivers are also able to see where they have to change lines during the journey, how far they have to walk to their destination on the final leg and when they will arrive at their destination. The Intermodal Route, as it is known, is calculated on the BMW servers using the information provided by the local public transport operators and transmitted to the vehicle via the built-in SIM card. This technology makes it possible to keep expanding the networked mobility portfolio in future so that the very latest mobility options can continue to be offered to customers after they have bought their car. Once a public transport journey has been selected, the driver is first directed by the navigation system to a public car park close to where the journey starts. After leaving the vehicle, BMW i ConnectedDrive uses the BMW i Remote app (available for Android and iOS) to guide the customer to the correct stop, instruct them when and where they need to change lines, and finally direct them to their end destination on foot with the greatest of ease. Further BMW i mobility services are already in development as part of a steady expansion of the networked mobility portfolio of BMW i and BMW ConnectedDrive.

BMW i Remote app: vehicle monitoring, mobility planning and efficiency optimisation.

The BMW i Remote app allows an upcoming journey in a BMW i car to be planned out in advance easily and conveniently by means of a smartphone. Using this application, which has been purpose-developed for the demands of electric mobility and is available for the iOS and Android operating systems, the driver is able to access all vehicle data or route-related information anywhere at any time. For example, a vehicle status checklist can be called up on the smartphone that retrieves the current vehicle data via the BMW server. The driver can additionally view the vehicle's location and the destinations in the surrounding area that are within range based on the current battery charge level. The vehicle's interior can also be set to the desired temperature by remote control, either immediately or in time for departure using the timer control. Even the high-voltage battery can be adjusted to the optimum temperature in advance in order to maximise the driving range. If the vehicle is plugged into a public charging station or the BMW i Wallbox, the charging procedure can likewise be controlled remotely and even programmed to run at times when electricity is cheaper (e.g. at night) with the timer function. Using either the BMW i Remote app or the My BMW ConnectedDrive customer portal, it is possible to search for and select both navigation destinations and charging stations with free spaces, and then relay them to the vehicle. No matter whether they are shown in the navigation system or on the smartphone or home computer, all relevant charging stations appear together with an indication of whether they currently have any free spaces or not.

The pedestrian navigation function included in the BMW i Remote app takes the local public transport network into account and conveniently directs drivers to their final destination after leaving the vehicle. Whether the journey was planned in the vehicle or at home, the destination appears directly in the BMW i Remote app as soon as the driver has left their car. BMW i thereby facilitates an individual, sustainable and easy form of mobility with seamless guidance from start to finish.

Away from their car, drivers are additionally able to evaluate their personal driving style and compare it with other BMW i drivers, allowing them to hone the way they drive by recognising where there is room for improvement.

6. Highly automated driving: Travelling Europe's motorways with the electronic co-pilot.

With the aim of offering motorists vehicles equipped with cutting-edge driver assistance systems for supreme convenience and safety in the future, the engineers at BMW Group Forschung und Technik, the company's research and technology arm, have for a number of years been working on an electronic co-pilot for highly automated driving on the motorway. A prototype vehicle from BMW Group Forschung und Technik already drove along the A9 motorway from Munich towards Nuremberg with no driver intervention back in 2011. The research work has now reached the stage where highly automated changes between motorways are possible at motorway intersections. This is a further key step towards the universal handling of motorway networks, something that will in future allow customers to enjoy a continuous highly automated driving experience.

The principal technologies required for highly automated driving were developed by the BMW Group Forschung und Technik engineers over the course of the preceding BMW TrackTrainer and Emergency Stop Assistant research projects. The BMW TrackTrainer is capable of lapping race tracks in highly automated driving mode while following the racing line in order to provide some very targeted driver tuition. The BMW Emergency Stop Assistant, meanwhile, performs a highly automated manoeuvre to bring the vehicle safely to a stop if the driver is suddenly incapacitated by illness.

The research prototype for highly automated driving is able to brake, accelerate and overtake all by itself, but always in accordance with the prevailing traffic situation and while adhering to all traffic regulations. The team of specialists have already clocked up around 10,000 test kilometres (approx. 6,200 miles). So that this highly automated research vehicle can operate fluidly in road traffic without attracting attention, its operating strategies must be clearly defined. One of the fundamental components from which these strategies are derived, apart from accurate positioning of the vehicle in its own traffic lane, is the unfailing detection of all vehicles and objects in the immediate vicinity. This is achieved by fusing the data from diverse and complementary sensor technologies, including LIDAR, radar, ultrasound and camera scanning on all sides of the vehicle. Despite this 360° sensing capability, there is little on the outside to tell the vehicle apart from a standard production model.

It is of particular importance to the researchers that the technology study's level of intelligence is constantly enhanced. At motorway slip roads, for example, the research prototype behaves cooperatively by leaving enough space to allow road users on the slip road to filter onto the motorway. The latest advance is the vehicle's capability to negotiate motorway intersections without intervention from the driver, enabling it to change motorways. At the "München - Nord" motorway intersection, for instance, the car is already able to switch automatically from the A9 to the A92 heading towards the airport, and back again. The main challenges to be successfully overcome by the research team included the very fine lateral control in tight corners, as well as the clarity of points on the high-precision digital map in places where several roads converge.

The BMW Group's next big target is highly automated driving on European motorways with all of the accompanying challenges – in other words, travelling through tollgates, roadworks and beyond national borders. That prompted the BMW Group to enter into a research partnership with international automotive supplier Continental in January 2013. The collaborative project between the BMW Group and Continental is set to run until the end of 2014, by which time several test prototypes fitted with near-production technology should have been built.