Mission to moon: AUDI AG supports the German Team at Google Lunar XPRIZE

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Moon landing mission: AUDI AG supports the German Team at Google Lunar XPRIZE

Audi is taking off for the moon – together with the Part-Time Scientists team. The group of German engineers are working within the framework of the Google Lunar XPRIZE competition to transport an unmanned rover onto Earth’s natural satellite. Audi is supporting the Part-Time Scientists with its know-how in several fields of technology – from quattro drive and lightweight construction to electric mobility and piloted driving. The moon rover will be named the “Audi lunar quattro.”

“The concept of a privately financed mission to the moon is fascinating,” says Luca de Meo, Audi Board Member for Sales and Marketing. “And innovative ideas need supporters that promote them. We want to send a signal with our involvement with the Part-Time Scientists and also motivate other partners to contribute their know-how.” Luca de Meo is presenting the partnership today at the international innovation forum Cannes Innovation Days.

Prof. Dr. Ulrich Hackenberg, Audi Board Member for Technical Development: “We are pleased to support the project with our know-how in lightweight technology, electronics and robotics.”

The goal: a 500 meter drive on the lunar surface
The US$ 30 million plus Google Lunar XPRIZE is a competition to challenge and inspire engineers and entrepreneurs from around the world to develop low-cost methods of robotic space exploration. To win the Google Lunar XPRIZE, a privately funded team must successfully place a robot on the moon’s surface that explores at least 500 meters and transmits high-definition video and images back to Earth.

AUDI AG is incorporating its technological know-how into optimization of the rover of the Part-Time Scientists, the only German team competing for the Google Lunar XPRIZE. Their prototype lunar vehicle has already been recognized during the course of the competition by a jury of aerospace experts with two Milestone Prizes.

As a cooperating partner, Audi is primarily supporting the team with its expertise in lightweight construction and electric mobility, with quattro permanent all-wheel drive and with piloted driving. Audi is also providing wide-ranging assistance in testing, trials and quality assurance. In addition, the Audi Concept Design Studio in Munich is revising the moon rover, which will be named the “Audi lunar quattro.”
The lunar vehicle with the Audi lunar quattro should launch into space by the end of 2017 on board a launching rocket and will travel more than 380,000 kilometers to the moon. The trip will take around five days. The target zone is north of the Moon’s equator, close to the 1972 landing site of the Apollo 17, NASA’s last manned mission to the moon.

**The Audi lunar quattro: top speed 3.6 km/h**

The Part-Time Scientists developed their lunar vehicle, which is largely made of aluminum, during various rounds of testing undertaken in locations such as the Austrian Alps and Tenerife. An adjustable solar panel captures sunlight, and its generated electricity is fed to a lithium-ion battery that powers the four wheel hub motors.

The theoretical maximum speed is 3.6 km/h – but more important on the rugged surface of the moon are the vehicle’s off-road capabilities and ability for safe orientation. A swiveling head at the front of the vehicle carries two stereoscopic cameras as well as a camera for scientific purposes.

“With Audi we have acquired a strong partner that will bring us a big step forward with its technological and mobility capabilities,” said Robert Böhme, founder and head of the Part-Time Scientists. “We look forward to future interaction and a fruitful partnership.”

The Part-Time Scientists team was initiated in late 2008 by Robert Böhme, who works as an IT consultant in Berlin. The majority of the roughly 35 current engineers on the team come from Germany and Austria. Experts from three continents support the team, including former leading NASA employee Jack Crenshaw from Florida. Supporters of the group, in addition to Audi, include numerous research institutions and high-tech companies including NVIDIA, Technical University of Berlin, the Austrian Space Forum (OeWF) and the German Aerospace Center (DLR).

The Google Lunar XPRIZE, which started off with more than 25 teams, is currently in its final round. Participants in the competition, in addition to Part-Time Scientists, include 15 teams from around the world including Brazil, Canada, Chile, Hungary, Japan, Israel, Italy, Malaysia and the United States.
Trip to the Moon: the Google Lunar XPRIZE competition

The US$ 30 million plus Google Lunar XPRIZE is a competition to challenge and inspire engineers and entrepreneurs from around the world to develop low-cost methods of robotic space exploration. To win the Google Lunar XPRIZE, a privately funded team must successfully place a robot on the moon’s surface that explores at least 500 meters and transmits high-definition video and images back to Earth.

The purpose of the Google Lunar XPRIZE is to promote the implementation of breakthrough ideas that are innovative, unconventional and cost-effective. One aspect of this is that participants must obtain at least 90 percent of their project funds from sources other than governmental institutions. According to cost estimates by the Part-Time Scientists, launching a rocket to transport their rover, more than 380,000 kilometers distance to the moon, will cost around 24 million euros, including the necessary insurance policies.

The mission, which must be completed by December 31, 2017, will take approximately five days, according to the Part-Time Scientists. Their targeted landing zone is north of the moon’s equator, not far from the 1972 landing site of the Apollo 17, NASA’s last manned mission to the moon. This is a rather inhospitable zone – with temperatures fluctuating up to 300 degrees Celsius.

The Google Lunar XPRIZE is currently in its final round, with 16 teams remaining. Along with the Part-Time Scientists, who officially registered for the competition in June 2009, there are four other teams that won a total of US$5.25 million in Milestone Prizes, in recognition of technological progress: Astrobotics (United States), Moon Express (United States), Team Indus (India) and Hakuto (Japan).

After successful test demonstrations, the Part-Time Scientists – the only German team in the Google Lunar XPRIZE – received Milestone Prizes for development of their rover (“Mobility Prize”) and their optical systems and sensors (“Imaging Prize”). The team’s total winnings for these two Milestone Prizes was US$750,000.
Creative visionary: the Part-Time Scientists team

The Part-Time Scientists team was founded in late 2008 at the initiative of Berlin IT consultant Robert Böhme, one year after the Google Lunar XPRIZE began. Currently, the group consists of around 35 people – most of them young engineers – and most from Germany and Austria. The team is backed up by experts on three continents.

There was a time when people were in a hurry to get to the moon. The competition between East and West ended on July 21, 1969 when astronauts of the Apollo 11 mission became the first humans to walk on the lunar surface. There was a total of six manned lunar landings, but hardly anyone remembers the names of most of the astronauts. The moon has always been associated with Neil Armstrong and Buzz Aldrin.

Buzz Aldrin, the second human to step onto the moon, is also represented at the Part-Time Scientists’ office in Berlin-Hellersdorf – in the form of a life-size cardboard figure. The team led by Robert Böhme has been leasing office space in this industrial area since April 2015. “We need a place where we can hammer, be noisy and create a mess at three in the morning. This is just the right place for that,” explains team leader Robert Böhme.

“The thing that fascinates me about space travel is its unique nature. It doesn’t have anything to do with a product that is sold to hundreds of customers. Each mission is an adventure,” says Karsten Becker. The team member from Hessen, Germany is the electronics specialist who is responsible for developing the communications link to the Rover. “What matters to us is a high level of engineering ingenuity, not the prize money,” he says.

That is also very credible considering that everyone on the team has been working on a volunteer basis for years now. The core of the team consists of ten to 35 people. A total of 50 space fanatics, physicists, mathematicians and experts are assisting in the effort, including Jack Crenshaw – an old NASA warhorse. The 80 year old space program veteran has experience computing flight paths for the Apollo missions.

In 2009, the Part-Time Scientists presented a prototype of their first exploration vehicle. It was named “Asimov” in tribute to Russian-American biochemist and science fiction author Isaac Asimov. The first lander prototype followed in 2010, and it was named after the French science fiction author Jules Verne.
Current sponsors of the group, along with Audi, include several research institutes and high-tech companies. Among them are NVIDIA, the SLM Solutions Group, CITIM GmbH, the Technical University of Berlin, the Technical University of Hamburg at Harburg, the Austrian Space Forum, the Technical University of Vienna, LeitOn GmbH, ProfitBricks GmbH, Schneider-Kreuznach GmbH and ZweiGrad Industrial Design. Also collaborating with the team is the German national aeronautic and space research center (Deutsches Zentrum für Luft- und Raumfahrt, or DLR). AUDI AG hopes that its involvement with the Part-Time Scientists will motivate other partners to contribute their know-how as well.

Robert Böhme: “There is a lack of visionaries”
Ever since the Part Time-Scientists was established, much has been happening in the life of Robert Böhme. He has had in-depth talks with Bill Gates, and in January 2015 he received the prize winnings of 750,000 US dollars from the Google Lunar XPRIZE Foundation. Böhme has accomplished quite a lot. But the real goal is still far away – 384,400 kilometers away, which is the distance from the Earth to the moon.

This great distance would make some people unsure of themselves, but Robert Böhme does not shy away from the challenge. “It is good to have something that is greater than yourself. It helps you to grow,” says the 29 year old, whom his colleagues describe as an eternal optimist who drives the team forward. Böhme is the captain who keeps his entire team on course – a team that is dispersed over all points of the compass – and he makes public appearances as its spokesperson.

The first streaks of gray are already appearing in his hair, but Böhme talks with the conviction of a person who stands behind what he does. The IT specialist, whose primary job is still at an IT security company, gradually grew into his leadership role. “The most difficult step for me was to leave the details to others,” he admits. “But at some point I realized that there are people who can solder printed circuit boards much better than I can. And I realized that it is my job to ensure that they can do this without disruptions.”

Back in 2008, when he was 22 years old, someone smashed into Böhme’s car, and he received a settlement of 16,000 euros. He transferred 10,000 dollars of this amount to the Google Lunar XPRIZE as his registration fee to enter. A friend had forwarded him an email about the contest.

Robert Böhme has always set his own personal goals, and he is a self-starter. He likes to hike to sort out his thoughts, but he likes to participate in virtual
communities even more. Even before the Part-Time Scientists, he set up an Internet radio platform that was based on the open source principle; prior to that he directed a large community for Linux beginners. As a fan of the early Star Trek movies, he always had his eye on outer space. “As a child, I was fascinated by the tricorder that could medically diagnose a person from a distance,” recalls Böhme. “But today, people rely too much on a sort of optimization mania. There is a lack of visionaries.”

Karsten Becker: “The world needs more engineers”

When Karsten Becker pushes buttons on his remote control unit, he is not switching television stations. Rather he is moving something else – on the moon. Becker is developing the communications link to the Audi lunar quattro, the rover. It is this link that will determine whether it can be controlled on the lunar surface. “The first time I heard about the project, I was fascinated,” says the electronics specialist. “We don’t let ourselves be sidetracked by people who say that it can’t be done.”

On Becker’s table there are a screwdriver, a couple of cables and a packet of gummi bears. Sitting on the window sill is a crate of floor plate samples for the rover that have just been delivered. Like everyone else on the Part-Time Scientists team, Becker has spent all of his free time over the past several years furthering the team’s mission.

Shortly after he attended a presentation given by Robert Böhme at a Chaos Computer Camp in 2009, the team member from Hessen decided to join the Part-Time Scientists. Since early 2015, the project ceased to be just a hobby project, and the former doctoral candidate at the Technical University of Hamburg now works full-time at the team’s new office in Hellersdorf. He coordinates processes within individual groups and communicates with suppliers. Along with Robert Böhme, Karsten Becker is another part of the team’s public face.

It was in high school where the son of a pilot first came into contact with electrical engineering and information technology. “On one project I was controlling a robot arm,” he recalls. “I have to do these things myself; I like hands-on work. There is nothing better than playful motivation, and the Part-Time Scientists team is a wonderful vehicle for this. We can tell every five year old child: ‘Look, I am building a moon vehicle!’ That is how you excite children about engineering. And I am firmly convinced that the world needs more engineers than it does lawyers or bankers.”
Jürgen Brandner: “The moon is a springboard to Mars.”

Jürgen Brandner is one of the Austrians on the team. Once a month he flies from Salzburg to Berlin to talk to colleagues at the local office. “We generally sit together until midnight,” reports Brandner. “We do not have any strict working procedures like in a normal job. Our enthusiasm for the project often has us working voluntarily 16 hours straight in the office without even noticing the time.”

This dedication to the work at hand comes from the realization that they have found a task that they can be really passionate about. The catalyst for the Part-Time Scientists was that like-minded people were coming together who otherwise would have simply muddled along alone working in their basements. Many in the group share the circumstance of having at one time or other wanted to pursue an entirely different career.

At one time, Jürgen Brandner nearly applied to work on a Formula 1 team. When he heard about the Google Lunar XPRIZE, he wrote to a number of its German participants. Now, as a member of the Part-Time Scientists team the Austrian is responsible for ensuring that the mechanics of the Rover operates properly. His primary involvement with the team is to develop all mechanical components.

The 37 year old does not see any insurmountable barriers to his ideas. “We need the moon as a springboard for a journey to Mars,” he explains. “That is why we are sending a 3D printer with the mission. Although it will only print small cubes, we want to demonstrate that it can work. In the future, it will be necessary to build components on the moon. To attempt to transport all of the material on a spacecraft from Earth would cost too much in terms of the energy it takes to overcome gravity.”

When we hear Brandner talk like this, we wonder why he doesn’t write science fiction books instead of fantasy novels. To him, the daily exercise of writing is the ideal counterbalance to the world of wires, monitors, cable and solar cells. The Austrian still has a surprise in store for his German colleagues should the Audi lunar quattro land on the moon’s surface. “The drop containers will open, and out will come a red-white-red flag,” chuckles Brandner. “That will grab their attention!”
“With enthusiasm and passion”: interview with designer Jorge Diez

Jorge Diez, designer at Audi Concept Design in Munich, talks about designing the first Audi to drive on the moon.

Señor Diez, in designing an extraterrestrial vehicle like the lunar rover, are you striving for an extraterrestrial design or an extraordinary design?

Diez: Here at Audi Concept Design in Munich we are very open-minded, because we work on a lot of different future concepts. In our department, we need to continually test the limits of a design. Designing the lunar rover is of course a task that requires an entirely new approach. First, we must precisely look at the conditions under which the rover will drive on the moon, and then the design must be made to accommodate the project’s technical requirements.

So, does the lunar rover need to look entirely different than a normal car?

Diez: Good automotive design must express the strengths of the object, and in a sporty car, it is necessary to convey the feeling of dynamism. It is a bit different with the lunar rover: Here, the design must display the technology and all of its components while still expressing its Audi identity. In every type of vehicle, the goal is to develop the brand’s design language in the vehicle’s individual context – this also applies to the lunar rover.

The lunar rover will primarily be defined by its highly specialized technology which must not be impaired by the design. Do you perceive these technical requirements as a hindrance, or do they present you with new opportunities?

Diez: At first, this is perceived as a bit of a hindrance, but then it becomes more of a challenge. We need to clearly understand that a lunar rover is driven under conditions which simply do not exist in our world. The temperature differences are extreme – there is a difference of 300 degrees Celsius between the side of the moon facing away from the sun and the side with solar radiation. In designing the rover, a high-performance thermal management system is therefore needed. The next aspects to be considered are materials and lightweight design. Due to the radiation on the moon, the rover must be made of high-strength aluminum and magnesium. And just like all normal Audi models, the vehicle must be very lightweight, because the transport costs, which are already very high, depend highly on its weight. Finally, the same basic specifications apply to both a lunar rover and an Audi on Earth – only they are much more extreme for the rover. They are: efficiency, lightweight design, e-tron power and the best drive system for each type of driving surface. A car from Audi has a quattro drive – and so
does the lunar rover. But on the moon we must protect the rover from the very fine sand that is powder-like.

*Is the lunar rover a vehicle in which form follows function?*

Diez: Yes, definitely. Because of conditions on the moon, we must intensively rethink every design detail, even the smallest of details. It is not simply elegance that counts here, but primarily the effectiveness of the rover. The design must serve the purpose of driving on the moon, but it must also express the familiar aesthetics that are expected of an Audi.

*In designing a car, you have large proportions available to you to develop its lines. The lunar rover is a very small vehicle – how does this affect the design process?*

Diez: The way in which we have drawn up the rover is more similar to the approach we use in interior design. In this area, Audi has the highest quality in the entire automotive world. In the rover we work very much as we do on the interiors of our cars. We design it element by element with absolute perfection. In the rover, there are no large surfaces or long lines by which we would normally visualize movement. It expresses something entirely different. With this knowledge in mind, we work on the details until we have achieved perfection. When combined to make a whole, these details form an iconic and logical design.

*Is it important for the viewer to recognize the rover as an Audi at first glance?*

Diez: Audi design is continually developing further, but its philosophy remains the same. We come from the Bauhaus tradition of functional forms and technical precision. We have core values that people can see in each of our designs, regardless of whether it is an airplane or a piece of furniture. This essence will also be visible in the rover, but it will be interpreted in a very unique way.

*Does the rover offer any hints about future Audi design?*

Diez: Perhaps not in its styling, but certainly in the way in which we take on the challenge of creating something beautiful that must prove itself under all thinkable extreme conditions. Each of us on the team is full of passion about this process. This design comes from our hearts and our dedication – and that is why we are able to overcome existing boundaries and limits.
Designed for extreme conditions: the Audi lunar quattro and its technology

Today, the Part-Time Scientists’ lunar rover already fascinates with its highly specialized technical solutions. Now Audi is assisting to make it the Audi lunar quattro – even lighter, more versatile and with higher performance.

The Part-Time Scientists’ lunar rover, whose development has spanned many years and extensive test iterations, impresses in all technical areas with its highly specialized and de solutions. The vehicle provides its own energy: A solar panel whose total surface tail area measures around 300 square centimeter captures the light of the sun and converts it into electricity.

It is supplemented by a compact lithium-ion battery located centrally in the chassis; its energy must be sufficient for the 500 meter long drive that is required by Google Lunar XPRIZE contest rules. When the sun is shining on the moon’s surface, temperatures rise to as much as 120 degrees Celsius due to the lack of an atmosphere.

The chassis is also designed for rugged duty. Double wishbone suspensions are used at all four of the wheels that can each be rotated over 360 degrees. Four wheel hub motors power the drive system – their interplay makes the rover an e-quattro. Its theoretical top speed is 3.6 km/h.

However, much more important on the lunar surface is the ability to overcome rough obstacles and to navigate reliably. Mounted to a moving head at the front of the vehicle are two cameras that acquire detailed 3D images. A third camera is used to study lunar materials and takes high-definition images.

Many of the lunar rover’s components are made of high-strength aluminum, and the rover’s total weight is 35 kilograms. In advanced development of the vehicle into the Audi lunar quattro, its weight will be further reduced by the use of magnesium and other modifications to its design, although the vehicle might grow somewhat in size. Every gram counts twice in transporting the rover to the moon – weight savings reduce the lander’s fuel reserve requirements, and they also reduce costs for the launch vehicle.

The Audi working group that is assisting the Part-Time Scientists currently consists of ten employees who represent different technical departments. In addition to lightweight design competence, they have much more know-how to
offer, especially expertise related to the quattro permanent all-wheel drive system and the electrical e-tron drive system. The goal here is to further improve performance by additional improvements to the electric motors, power electronics and battery.

The brand with the four rings is also providing wide-ranging assistance in testing, trials and quality assurance. Specialists from Quality Assurance will study the rover’s parts for wear using their high-tech tools and methods. The motors and electronic components of the future Audi lunar quattro must pass stress tests in climate chambers.

The Part-Time Scientists are pleased with the collaboration. “With Audi we have acquired a strong partner that will bring us a big step forward with its technological and mobility capabilities,” said Robert Böhme, founder and head of the team. “We very much look forward to future interaction and a fruitful partnership.”
quattro, TDI, ASF, quality and piloted driving: the pioneering successes of Audi

Audi is synonymous with innovation, perhaps more than any other automaker. It was a pioneering spirit that made the brand with the four rings a top global competitor, and it continues to embody this spirit. Audi has realized key accomplishments with its quattro permanent all-wheel drive, TDI engine, lightweight construction of car bodies based on the ASF principle and, last but not least, its uncompromising quality thinking. At present, the brand is pushing as quickly as possible to incorporate technologies for piloted driving.

Launching into a new era: the Audi quattro

The angular coupe that Audi presented at the 1980 Geneva International Motor Show launched a new era. The Audi quattro was the world’s first car to feature a lightweight, efficient and fast-running permanent all-wheel drive system. The technology was so new and unusual that Audi only dared to introduce it on the market in a niche role. The original quattro was produced in a limited edition series for sporty customers.

Right from the start quattro technology enjoyed overwhelming success in motorsport. Its illustrious accomplishments include four titles in the Rally World Championship, three victories at the Pikes Peak mountain race, driver and brand championship titles in the Trans-Am series, two DTM titles, ten national super touring car championships and one touring car world cup. The R 18 e-tron quattro won the 24 hours of Le Mans race between 2012 and 2014. This hybrid prototype has a part-time all-wheel drive system. The quattro drive also left indelible impressions in advertising. The quattro ski jump commercial from 1986 has long been considered a marketing classic.

What began as the radical idea of a small, independent engineering team in the late 1970s has long since grown into a world success and a key pillar at Audi. Today, it is available in all model series – as either optional or standard equipment. It is built in different configurations adapted to each individual model. To date, the brand with the four rings has produced over 6.5 million cars with quattro drive systems. It offers the all-wheel drive system in more products than any other premium automaker, currently ranging over 180 models.

Pioneering Audi achievement: the TDI engine

The three letters TDI represent the second solid pillar of the brand – here too Audi accomplished a crucial pioneering feat. The Audi 100 2.5 TDI, which was
presented at the 1989 IAA show in Frankfurt/Main, had a five-cylinder turbo diesel engine with direct injection and all-electronic control under its hood. Initiated in 1973 in response to the oil crisis, it became the product of goal-oriented development work conducted over many years.

Ever since, the brand has continually extended its lead and achieved many milestones. TDI technology has made the diesel engine a global success, and it played a crucial role in enabling the interplay of hefty torque, smooth engine running and pioneering fuel efficiency. The TDI engine from Audi has also proven its potential in motorsport – the world’s toughest testing grounds. It made its debut at the 24 hours of Le Mans race in 2006, and since then it has claimed eight overall victories in ten starts.

To date, Audi has produced more than eight million cars with TDI engines. In recent years, the technology has made a significant contribution towards reducing the brand’s EU new vehicle fleet CO₂ emissions by an average of three percent per year. The Audi A3 ultra, with its 1.6-liter TDI, has a combined fuel consumption of just 3.2 liters of fuel per 100 km (85 g/km CO₂). At the other end of the scale there is the 4.2 TDI that confidently powers the Audi A8 flagship with 283 kW.

Now, the next big step for the brand with the four rings is electrification of the TDI. The technical matrix is broad-based, ranging from electrically-driven compressors that assist the turbocharger in building its power to the V6 engine with plug-in hybrid technology, which will soon make its debut in the large Q7 SUV. Audi is convinced that the TDI engine still has a great future ahead of it.

The new body invention: ASF from Audi

The third supporting pillar is lightweight design. Back in 1982, a small team already began to work with aluminum as a material that is around two-thirds lighter in weight than steel. Audi practically had to re-develop the design of the body and production processes from the ground up – and the result was the Audi Space Frame, ASF, which saves around 40 percent in weight compared to a conventional steel body.

The first Audi A8 to feature the ASF construction method made its debut in 1994, followed by the Audi A2, Audi TT, Audi R8 and two further generations of the Audi A8. Audi has built 800,000 cars using the ASF construction method over the past 21 years, and it has continually advanced the technology – along with the all-aluminum ASF, hybrid solutions with steel were introduced. In the new high-performance R8 sports car, the multimaterial Space Frame integrates large parts
made of carbon fiber reinforced polymer (CFRP). It weighs just 200 kg while offering excellent rigidity, acoustics and crash properties.

**Quality – a mindset at Audi**
Along with the innovative strength of Audi comes another pervasive strength – quality. It is part of the brand’s DNA, and it is a mindset that is an integral component of corporate culture. At Audi, all thoughts and actions focus on the customer who should remain enthused about the product over many years.

Together with the quattro drive, TDI and the ASF, quality thinking was also a crucial factor in the advance of Audi into the premium segment. Back in 1982, the Audi 100 was already coming off the line with many galvanized body panels, and from 1985 it was even fully galvanized – rust, which had been the nemesis of cars for decades, was no longer an issue. Ever since, the brand with the four rings has consistently elevated its quality standards.

Quality means continually raising the bar a bit higher. Numerous independently conducted tests, surveys and analyses confirm the leadership role of Audi in quality, and customers experience it daily in their cars. Every Audi sets standards in its class for material selection and a high-quality impression. Sophisticated surfaces, joints with precise fits to the tenth of a millimeter, meticulously tuned actuating forces, precise acoustic and touch feedback – all of these details combine to produce the overall image of Audi quality.

**Piloted driving**
Another field of technology in which the brand with the four rings has been carrying out pioneering work for years is piloted driving. The new technologies that Audi will introduce in series production models before the end of this decade can take over driving in certain situations if the driver so wishes. Their precursor can already be experienced in the new Audi Q7: The optional adaptive cruise control with traffic jam assist also takes over the steering if traffic is slow and moving at speeds of no more than 65 km/h.

The central driver assistance controller (zFAS) makes a decisive contribution to the lead that Audi enjoys in the area of piloted driving. It processes the information from the sensors to produce a detailed picture of the vehicle’s environment. The zFAS is only about as big as a tablet PC; its modular concept makes it flexibly scalable and therefore future-proof.

The brand has been demonstrating for years just how emotional piloted driving can be. Audi piloted cars are driving on freeways, they can master twisty hill climbs and fast racetracks. The Audi RS 7 piloted driving concept completed a
circuit of the Grand Prix racetrack at Hockenheim without a driver in October 2014, hitting top speeds of 240 km/h, as the world’s sportiest piloted driving car. At the start of 2015, an Audi A7 piloted driving concept drove on public highways from Silicon Valley to Las Vegas to the Consumer Electronics Show (CES).