



Technology and Innovation Communications

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Compact

Audi at 2015 CES

- **Audi hears the word**
- **From racetrack to road – piloted driving**
- **New cockpit architecture in the Audi Q7**

Ingolstadt/Las Vegas, January 6, 2015 – A four-core processor processing eight billion operations per second. A virtual tachometer with a needle that is rendered anew 60 times per second to ensure absolutely fluid motion. 3D sound to match a concert hall and appearing to come from every direction, an Audi tablet as a multimedia control panel and simple wireless communication between your mobile devices and your car all demonstrate how diverse the future of the automobile is at Audi. All this and convenience, too: piloted parking and innovative Audi wireless charging (AWC) technology pave the way for electric mobility. A laser headlight shining ahead hundreds of feet and a car lapping the famous Hockenheim speedway at 240 km/h (*149.1 mph*) without a driver – Audi is a leading and driving force in all technology areas relating to electronics and electrics. At CES in Las Vegas, the world’s most important electronics exhibition, Audi makes a splash with a host of new technologies

Even today, many customers view their car as more than just a vehicle – it is a “mobile device”. Audi drives forward networking of its models both inside and outside the car. At CES, Audi presents a wide range of innovations in the technology fields of controls and displays, infotainment, connectivity and lighting technology, in driver assistance systems and in piloted driving.

Audi’s new hardware and software solutions are flexible and intelligent, and they provide added operating comfort. Take the new Audi TT* and the new Audi Q7*: here, all the driver needs to do is to issue the voice command “take me to the nearest Italian restaurant” and the navigation system immediately will display the corresponding route. This big SUV’s new all-in-touch MMI will let the driver scroll and zoom as on a smartphone. Every entry will trigger a haptic feedback.

*The collective fuel consumption of all models named above and available on the German market can be found in the list provided at the end of this MediaInfo.



Audi connect, a rich portfolio of networked applications, also offers new solutions. In the new Audi Q7, the driver can use a smartphone to link up with the software environment of Apple Car Play and Android Auto. The system also provides the driver with access to Napster's and Aupeo!'s music worlds and to online updates of navigational maps. A virtual cockpit shows all of the car's displays in the Audi TT (standard) and the Audi Q7 (optional). This fascinating digital instrument combination boasts elaborate 3D graphics and animations as well as great scope for customization.

Driver assistance systems is another area where Audi opens a new chapter in the new Audi Q7. Solutions such as the Predictive Efficiency Assistant and adaptive cruise control including congestion assistant point the way towards upcoming piloted driving technology. The brand recently showed how much emotional appeal this can have when the driverless Audi RS 7 piloted driving concept raced around Hockenheim speedway, a Grand Prix circuit in Germany, at a top speed of 240 km/h (*149.1 mph*) making it the sportiest piloted car in the world.

To mark 2015 CES, an Audi A7 piloted driving concept will motor from Stanford in Silicon Valley to Las Vegas. The car's zFAS driver assistance controller will upload data collected during the journey to the Cloud where it will be processed, then transmitted back to the car, enabling the car to permanently expand its data repository and making it an intelligent and adaptive vehicle.

Four spectacular cars round off Audi's presence in Las Vegas. They are the standard TT Roadster, RS 7 Sportback* and R8 LMX as well as the Audi prologue piloted driving showcar, which was purpose-built for CES.



Summary

Audi at 2015 CES

“Next chapter” is the motto for Audi’s presence at the Consumer Electronics Show (CES), which will be held in Las Vegas, Nevada, from January 6th through 9th, 2015. At this most important electronics fair in the world, Audi, the brand with the four rings, will present its available technology and its projects for tomorrow.

Audi’s CES presence is centered on the car’s communication with its surroundings. Focus topics include piloted driving, new Audi connect solutions, new infotainment modules, control and display concepts and new developments in lighting technology. Among the highlights of Audi’s CES presence are the hybrid-powered Audi prologue piloted driving showcar and the interior model of the new Audi Q7, itself debuting at the Detroit auto show

“Digitalization and networking in all areas are the megatrends of the present,” says Prof. Dr. Ulrich Hackenberg, board member for technical development at AUDI AG. “The car is becoming a mobile device on four wheels. Connectivity is the key to the future and a crucial area of our development work. We have continually pioneered the use of electronic technologies for years now.”

Extremely convenient: driver assistance system and piloted driving

Driver assistance systems make driving more pleasant, safer and more efficient. They are available in almost all of Audi’s model lines. Debuting in the Audi Q7, to be launched in 2015, are groundbreaking solutions such as the Predictive Efficiency Assistant, the Trailer Assistant and adaptive cruise control including a congestion assistant.

For the company’s next big step, Audi will introduce its new technologies for piloted driving before the end of this decade. These can take over driving in certain situations if the driver wishes them to do so. Audi has been performing pioneering work in this area for years and shown how thrilling piloted driving can be. In October 2014, the Audi RS 7 piloted driving concept lapped the Grand Prix circuit at Hockenheim at speeds up to 240 km/h (*149.1 mph*) with no driver on board, making it the sportiest piloted driving car in the world.



Audi has presented its solutions for piloted driving and driving in congested areas at CES in previous years. Now, in time for 2015 CES, the brand sets another milestone with the Audi A7 piloted driving concept featuring a wide range of standard and close-to-standard sensors, which will drive from Stanford in Silicon Valley via Bakersfield to Las Vegas.

Contributing to Audi's edge in piloted driving is the central driver assistance controller (zFAS), which processes information gathered by the sensors to create a detailed impression of the car's surroundings. Audi connect's superfast online connection will route this data to a Cloud-based IT backend. There, the data will be processed using machine learning algorithms and artificial intelligence before it is transmitted back to the car. The car thus continually expands its intelligence as it drives, ceaselessly improving its performance in complex situations. At the same time, other users of this technology can also benefit from this accumulation of information.

Farsighted: Audi's lighting innovations

Audi has been a leader in automobile lighting technology for years. Groundbreaking innovations available in several current model lines include matrix LED headlights for intelligent and flexible illumination of the road surface as well as dynamic turning signals.

Another world first is the laser highbeam available in Audi's high-end R8 LMX edition model. Its range is more than 500 feet. At CES, Audi will introduce Audi Matrix laser technology as the next step, a laser light providing high-resolution and finely tuned illumination of the roadway ahead. Another innovation is construction area lighting. This projects two markedly bright light strips onto the road, thus visualizing the car's width.

Attractive and intuitive: controls and displays in the TT and the Q7

Clear and intuitive operation has always been a strength of Audi. At CES, the brand will show the most recent advances in control and display technology as available in the new Audi TT and the upcoming Audi Q7.

One highlight is the Audi virtual cockpit. This fully-digital combined instrument provides the driver with minutely rendered, brilliant 3D graphics of all information and offers different display modes to choose from on its 12.3-inch TFT monitor. Audi virtual cockpit is powered by the T 30 graphics processor made by Audi's cooperation partner NVIDIA.



Audi will also present innovations in control technology. The TT and the new Q7 will feature MMI terminals with an all-new interface logic. This will emulate the concept of modern smartphones, where flat hierarchies replace sprawling menu trees.

Four elements: the traditional push-turn knob, the multifunction steering wheel, natural voice operation accommodating everyday speech, and a touchpad accepting signs and multi-finger gestures, are available to control the system's numerous functions, which include telephone, radio, media and navigation. In the Audi TT, the MMI all-in-touch's interface is on the knob, while in the Audi Q7, it is a separate surface. The system provides haptic feedback after every entry.

All-round networking: Audi connect

The term Audi connect covers all applications and developments networking the car with its owner, the Internet, public infrastructure and other automobiles. This is another field of technology where Audi continually expands its lead.

A central hardware element, the Audi connect module, connects the car with the internet via LTE, the fastest available transmission standard. The car's passengers can connect their mobile devices to a WLAN hotspot, which also provides the driver with customized online in-car services from the Audi connect portfolio. One of the innovations in this area is Online Media Streaming, which offers access to Napster and Aupeo! music services, and online updating of the navigational map.

Additional services will be available in the new Audi Q7, among them the Audi smartphone interface. Depending on whether a customer connects an iOS or an Android device, the interface will call up the Apple Car Play or Android Auto platform onto the car's MMI monitor. At the core of the offering is an enormous selection of music titles. In addition, both platforms provide navigation and messaging functions and appointment reminders.

Future car-to-X technologies are another key element of Audi connect. These will enable Audi models to interact with traffic lights in a city to navigate traffic faster and more efficiently. Another solution will permit cashless payment in a parking garage or at a kerbside meter, a third one will identify speed limits and spot dangers and also relay the corresponding information to other cars.

Another innovation presented by Audi at CES is the Audi mobile key. Here, a smartphone or a smartwatch provides access to the vehicle, making them highly flexible complements to existing keys. The mobile key uses Near Field Communication (NFC), which is available even when the mobile device's battery is empty.



Powered by NVIDIA: infotainment

At CES, Audi will be showing attractive innovations in infotainment. One of these can be seen in the Audi phone box in the new Q7, which permits easy pairing of a smartphone. It can now inductively charge compatible phones under the Qi standard.

Another first is 3D sound. In the new Audi Q7, the premium sound systems from Bose and Bang & Olufsen integrate additional speakers which open up height as a spatial dimension. A sophisticated algorithm extracts information for the third dimension from conventional stereo or 5.1 recordings and processes it for reproduction via the speaker array.

Audi to set new standards in infotainment with its Modular Infotainment Matrix and its technology network. The brand's revolutionary approach involving a modularized electronic architecture brings Audi's development cycles closer to those in the fast-paced consumer electronics business.

2012 saw the debut of the Modular Infotainment Matrix (MIB) with an NVIDIA T 20 chip as its heart in the Audi A3*. A mere one-and-a-half years later, the MIB's second stage has been deployed in the Audi TT and in the new Audi A6* and A7 Sportback*. Again, an NVIDIA processor plays a key role. The T 30 is a quad-core chip running a 3D graphic program from specialist software manufacturer. Rightward to render brilliant graphics on two displays simultaneously. Thanks to the matrix' modular structure, Audi can keep it continuously up-to-date and quickly integrate attractive innovations from consumer electronics.

Another chip from NVIDIA, the Tegra 4, powers the Audi tablet debuting in the new Q7. With an active 10.1-inch display, the Audi tablet's will provide mobile rear-seat entertainment. In the car, the tablet will connect itself to the on-board infotainment and navigation system via WLAN. What is special about the Audi tablet is that it has been expressly designed for use in the car. This means it is both high-class and robust. Of course, it can also be used on a WLAN outside the car.

Audi as driving force: electronic architecture

To expand its lead in hardware, Audi set up the Progressive Semi Conductor Program (PSCP) in late 2010. Under the program, Audi directly involves not just its system suppliers but also semiconductor makers. It is a key factor for future innovations.

As in hardware, so Audi develops solutions of its own in software – a task falling mainly to e.solutions GmbH, a subsidiary.



In vehicle electrics, Audi has developed a new, scalable architecture, the 48 volt onboard partial network. It will soon complement conventional 12 volt networks and permit deployment of new high-performance electric components. These will include an electric compressor as a supplementary turbocharger or an extra-strong generator capable of recuperating a higher amount of kinetic energy and, when used as a motor, transforming the car's powertrain into an efficient mild hybrid.

Future power: electromobility – charging without a cable

Under the name e-tron, Audi resolutely advances the electrification of the powertrain. One of many aspects in this is contactless charging of all- or part-electric e-tron models. Audi is putting great effort into induction-based supply of energy, known as Audi wireless charging (AWC).

The brand has developed a power matrix offering numerous options so as to provide each customer with a solution filling his or her precise needs. Approaches range from a 48-volt onboard network to plug-in hybrid powertrains. These marry the advantages of a combustion engine with those of electric traction, providing the customer with long range, power and efficiency all at the same time.

The launch of the A3 Sportback e-tron* in 2014 was Audi's successful entrance into plug-in hybrid technology. This will now be swiftly rolled out across the model range, with the medium and top segment next in line. A new e-tron model is set for introduction every year. At the same time, Audi is working on purely-electric vehicles with high-capacity batteries and powerful motors requiring no compromises in terms of range and usability.

A look into the future: Audi models at CES

Four spectacular cars round off Audi's presence in Las Vegas. They are the TT Roadster, RS 7 Sportback and R8 LMX production models as well as the Audi prologue piloted driving showcar which was purpose-built for CES.

The showcar expresses progressive technology in its entire character. Its brightly lit interior fuses the car's architecture with the display and control concept to create a novel unit. The entire front of the instrument is executed as a three-part touch display. Add to this an innovative, ultrathin and flexible OLED (organic light-emitting diode) display.



The showcar's hybrid powertrain has a muscular 4.0 TFSI working together with a powerful e-motor. System power output of 505 kW (677 hp) and a combined torque of both engines of 950 Nm (*700.7 lb-ft*) enable the Audi prologue piloted driving to accelerate from 0 to 100 km/h (*62.1 mph*) in 3.5 seconds. Its CO₂ emissions are 185 g/km (*297.7 g/mi*).

– End –

Fuel consumption of the models named above:

Audi TT:

Combined fuel consumption in l/100 km: 7.5 – 4.2** (*31.4 – 56.0 US mpg*);
Combined CO₂ emissions in g/km: 174 – 110** (*280.0 – 177.0 g/mi*)

Audi TT Roadster:

Combined fuel consumption in l/100 km: 7.5 – 4.2** (*31.4 – 56.0 US mpg*);
Combined CO₂ emissions in g/km: 174 – 114** (*280.0 – 183.5 g/mi*)

Audi Q7:

Combined fuel consumption in l/100 km: 10.7 – 7.2** (*22.0 – 32.7 US mpg*);
Combined CO₂ emissions in g/km: 249 – 189** (*400.7 – 304.2 g/mi*)

Audi A7 Sportback:

Combined fuel consumption in l/100 km: 9.5 – 4.7** (*24.8 – 50.1 US mpg*);
Combined CO₂ emissions in g/km: 221 – 122** (*355.7 – 196.3 g/mi*)

Audi RS 7 Sportback:

Combined fuel consumption in l/100 km: 9.5** (*24.8 US mpg*);
Combined CO₂ emissions in g/km: 221** (*355.7 g/mi*)

Audi R8 LMX

Combined fuel consumption in l/100 km: 12.9 (*18.2 US mpg*);
Combined CO₂ emissions in g/km: 299** (*481.2 g/mi*)

Audi A3:

Combined fuel consumption in l/100 km: 8.3 – 3.2**; (*28.3 - 73.5 US mpg*)
Combined CO₂ emissions in g/km: 194 – 35** (*312.2 – 56.3 g/mi*)

Audi A6:

Combined fuel consumption in l/100 km: 9.6 – 4.2** (*24.5 – 56.0 US mpg*);
Combined CO₂ emissions in g/km: 224 – 109 (*360.5– 175.4 g/mi*)**



Audi A3 Sportback e-tron:

Combined fuel consumption in l/100 km: 1.7 – 1.5** (*138.4 – 156.8 US mpg*);

Combined electricity consumption in Wh/km: 124 – 114**

Combined CO₂ emissions in g/km: 39 – 35 (*62.8 – 56.3 g/mi*)**

**The fuel consumption and the CO₂ emissions of a vehicle vary due to the choice of wheels and tires. They not only depend on the efficient utilization of the fuel by the vehicle, but are also influenced by driving behavior and other non-technical factors.

With 1.591.100 deliveries to customers as of November 2014, the Audi Group has exceeded its total sales volume of 2013 (1.575.500). As one of the most successful models, the Audi A3 has been awarded the title of “World Car of the Year 2014” by an international jury of journalists (combined fuel consumption in l/100 km: 7.1 – 3.2; combined CO₂ emissions in g/km: 165 – 85). In 2013, the company reported revenue of €49.9 billion and an operating profit of €5.03 billion. The company operates globally in more than 100 markets and has production facilities in Ingolstadt and Neckarsulm (Germany), Győr (Hungary), Brussels (Belgium), Bratislava (Slovakia), Martorell (Spain), Kaluga (Russia), Aurangabad (India), Changchun (China) and Jakarta (Indonesia). Since the end of 2013, the brand with the Four Rings has also been producing cars in Foshan (China). As of mid-2015, Audi will operate a production facility in São José dos Pinhais (Brazil), followed by San José Chiapa (Mexico) in 2016. Wholly owned subsidiaries of AUDI AG include quattro GmbH (Neckarsulm), Automobili Lamborghini S.p.A. (Sant’Agata Bolognese, Italy) and Ducati Motor Holding S.p.A. (Bologna, Italy), the sports motorcycle manufacturer. The company currently employs approximately 80,000 people worldwide, thereof approximately 55,800 in Germany. Total investment of around €24 billion is planned from 2015 to 2019 – primarily in new products and sustainable technologies. Audi is committed to its corporate responsibility and has anchored the principle of sustainability for its products and processes in its strategy. The long-term goal is CO₂-neutral mobility.