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Audi initiative defines key terms for mobility in the city of the future

- **Cities benefit from smart cars if they create interfaces**
- **Definitions give urban planners easier access to future technologies**
- **DIN specification 91340 defines 205 key terms in urban mobility**

Ingolstadt, 17 May 2017 – Audi has founded a working group together with city governments, business and scientific institutions, and produced with its partners a catalogue of terms for the city of the future. A DIN specification precisely defines more than 200 terms in automobile technology for "intelligent individual urban mobility." This is necessary to guarantee that urban planners can take account of impulses coming from interdisciplinary research and development while they design the smart city of tomorrow. Audi is convinced that cities will benefit from intelligent automobiles if they create the interfaces to match.

What is "driverless driving?" What is meant by "intelligent infrastructure?" What exactly does "piloted parking" look like? Seamless and sustainable mobility in cities is the aim of all urban planners. This is why DIN specification 91340 clarifies what we mean by "Car sharing," "Ride hailing" or "Fleet services." There will be "Drop-off areas" where drivers can leave their cars, before they park themselves without a driver.

In cities "Hubs" will be the places to change from one mode of transportation to another. A city is defined as "smart" when it is "skilled in handling problems and finding solutions." And a car is characterized as "intelligent" when it is "a system that is automated to a very large degree and that has comprehensive input variables and a complex control logic." The car of the future thus fits perfectly into the traffic concepts of the digitally networked city.

In addition to the Deutsches Institut für Normung (DIN; German Standards Institute), representatives of the fields of research (ETH Zurich), city government (Düsseldorf, Erfurt, Hamburg, Munich), industry (VW Commercial Vehicles), the Association of the German Automobile Industry (VDA) and city-linked organizations are taking part in this Audi initiative. DIN SPEC 91340 is addressed to everybody who is involved with urban mobility and therefore aims to have new models of cooperation. The official publication "DIN SPEC 91340 – Terminology of intelligent individual urban mobility" can be ordered from the publisher Beuth Verlag.

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Editorial note:
See the appendix for 30 examples (page 3) from DIN SPEC 91340.

The Audi Group, with its brands Audi, Ducati and Lamborghini, is one of the most successful manufacturers of automobiles and motorcycles in the premium segment. It is present in more than 100 markets worldwide and produces at 16 locations in 12 countries. 100 percent subsidiaries of AUDI AG include Audi Sport GmbH (Neckarsulm), Automobili Lamborghini S.p.A. (Sant'Agata Bolognese, Italy) and Ducati Motor Holding S.p.A. (Bologna, Italy).

In 2016, the Audi Group delivered to customers about 1.868 million automobiles of the Audi brand, 3,457 sports cars of the Lamborghini brand and 55,451 motorcycles of the Ducati brand. In the 2016 fiscal year, AUDI AG achieved total revenue of €59.3 billion and an operating profit of €3.1 billion. At present, approximately 88,000 people work for the company all over the world, more than 60,000 of them in Germany. Audi focuses on sustainable products and technologies for the future of mobility.

Appendix

[Excerpt: 30 examples from DIN SPEC 91340]

3.9 Automated driving

Piloted driving

Operating a vehicle with the gradual aid of assistance systems.

Note 1 regarding the term: "Automated driving" has various automation levels: Level 0: Driving without any automated driving functions ("No Automation") Level 1: Assisted driving ("Driver Assistance") Level 2: Partly automated driving ("Partial Automation") Level 3: Highly automated driving ("Conditional Automation") Level 4: Fully automated driving ("High Automation") Level 5: Driverless driving ("Full Automation")

[SOURCE: SAE J3016:2014-01, modified – definition translated]

3.10 Automated vehicle

Vehicle that is equipped with sensors and actuators and that acquires information from the environment, processes it in electronic control units, and, in certain situations, is able to select a specific behavior from multiple options in a manner that has been appropriately calibrated.

Note 1 regarding the term: Accordingly, these vehicles actively assist drivers during driving or drive themselves through a road network.

3.11 Automated parking

Piloted parking

Parking a vehicle with the help of driver assistance systems EXAMPLE For the different defined automation levels: Level 1 (assisted parking): Parking steering assist system Level 2 (party automated parking): Remotely controlled and monitored parking Level 3 (fully automated parking): Driverless parking (driverless valet parking)

Note 1 regarding the term: "Automated parking" has various automation levels: Level 0: Parking without automated driving function Level 1: Assisted parking Level 2: Partly automated parking Level 3: Fully automated parking

3.16 Carpooling

See carpool

3.17 Car sharing

The sequential use of motor vehicles that are used for short periods and with the use of a standardized procedure, with this sequential use being organized as a shared mobility offering Note 1 regarding the term: In a car sharing context, vehicle pickups and returns can be organized in a station-based or station-independent manner.

"Station-based car sharing" can work both as "return car sharing" ("round-trip car sharing") and as "one-way car sharing." In both of these, the vehicles are picked up from dedicated parking spaces for temporary use and are then parked in dedicated parking spaces after this use.

In "return car sharing," once the user is done using the vehicle, they park it at the same location where they picked it up. In "one-way car sharing," once the rental ends, the vehicle can also be parked in a dedicated parking space other than the one from where it was picked up. The second case is named "station-independent car sharing" or "free-floating car sharing." In this case, the vehicles are picked up from and returned to any permissible parking space on public roads and on explicitly defined additional parking spaces within an area or a group of spatially separate areas. Note 2 regarding the term: "Car sharing" is distinct from "car rental."

3.18 Car-2-car communications

Car-to-car communications Data exchange between motor vehicles

3.19 Car-2-x communications

Car-to-x communications Data exchange between a motor vehicle with other vehicles, with infrastructure, or with IT applications

Note 1 regarding the term: Within the context of traffic technology, traffic infrastructure is usually meant here (e.g., road traffic signal system, parking garages, traffic flow data servers, traffic control centers).

Note 2 regarding the term: There are several popular abbreviations within this context: "I" = "infrastructure," "R" = "rail," "V" = "vehicle."

3.20 Connectivity

The networking capability of electronic information and communication technologies

Note 1 regarding the term: Encompasses the ability to have data and information be exchanged between various electronic devices.

Note 2 regarding the term: Data is transmitted wirelessly or in a wired manner, in packet-switched or circuit-switched services, with standardized data transfer protocols.

Note 3 regarding the term: "Connectivity" is frequently also used to refer to network connection quality.

3.25 Demand-responsive transportation

DRT System of transportation offerings and transportation services in which their provision is adjusted as per the needs formulated by individual users Example Taxis, ride hailing, dial-a-ride, or medical transportation.

Note 1 regarding the term: Demand-responsive transportation offerings can be part of the offerings that make up local public transportation

Note 2 regarding the term: Demand-responsive transportation offerings can be created by making route-based and schedule-based offerings either fully or partially flexible.

3.26 Digital infrastructure

Technical equipment and facilities that ensure the generation, processing, propagation, and retrieval of digital data

Note 1 regarding the term: An essential component consists of broadband and wireless networks for fast data transmission.

Note 2 regarding the term: The collection, processing, and forwarding of data that can be acquired in public spaces will increase considerably. It will be used, among other things, for the future mobility management of cities.

3.27 Drop-off area

Area reserved for vehicles that are stopping briefly in order to drop off passengers.

Note 1 regarding the term: A drop-off area is not the same as a "cargo handling area."

Note 2 regarding the term: During the transition from partially automated to fully automated vehicle systems, "drop-off areas" and "loading and unloading zones" will be especially important.

3.29 Dynamic ride sharing

Ride sharing in which a ride sharing trip is assigned and booked at a point in time that is very close to the possible start of the trip. Note 1 regarding the term: Subcategory of ride sharing in which a highly developed technology that makes it possible to precisely match ride sharing supply and demand is used. This subcategory also includes subsegments of trips that are already ongoing at the time of assignment.

3.38 Driverless driving

Full Automation

Driving in which the automated system takes over all driving tasks on all road types and under all environmental conditions during the entire trip.

Note 1 regarding the term: The vehicle takes over all driving tasks completely from the start and all the way to the destination.

Note 2 regarding the term: All the people in the vehicle are passengers. [SOURCE: SAE J3016:2014-01, modified – definition translated]

3.39 Carpool

Carpooling

Group of people who share a vehicle on a regular basis in order to cover a common distance.

Note 1 regarding the term: The general conditions are agreed upon by the people involved in advance.

Note 2 regarding the term: The people involved can switch from being a driver to being a passenger and vice versa.

Note 3 regarding the term: In certain regulations, this term may be defined in a more specific manner.

3.59 Highly automated driving

Conditional Automation

Driving in which the automated system takes over all functions in order to fulfill the driving task in specific use cases, but in which the driver must always be able to take back control of the driving task within a specific time reserve after being prompted to do so by the system. [SOURCE: SAE J3016:2014-01, modified – definition translated]

3.60 Hub

<Traffic>Transfer point between traffic connections for one or more means of transportation

Note 1 regarding the term: A hub makes a significant contribution to direct transfers (passengers) or transshipping (goods) from various incoming destinations to various outgoing destinations that do not have the hub's location itself as a starting or destination point.

Note 2 regarding the term: The term "hub" is an English term.

3.61 Human Machine Interface HMI

Interface that people use in order to enter and receive information that needs to undergo machine processing

Note 1 regarding the term: See the term "interface" as well.

3.68 Informal transportation

Transportation offering that is available to the public and that is not part of officially authorized (formal) public transportation offerings, but is instead offered by the private sector as a way to tap into a potential market.

Note 1 regarding the term: In real life, there are not only informal transportation offerings of a legal character, but also offerings that do not comply with regulations.

Note 2 regarding the term: Informal transportation offerings can complement or compete with licensed transportation offerings.

Note 3 regarding the term: Informal transportation offerings often focus on niche markets and are frequently organized on a small scale.

Note 4 regarding the term: In developing and emerging economies, informal transportation offerings often provide the services that dysfunctional or nonexistent formal transportation offerings are unable to provide properly.

Note 5 regarding the term: New informal transportation offerings arising as part of the digital economy can be planned and structured centrally and, with significant amounts of venture capital, can be simultaneously rolled out in various geographic markets. [SOURCE: United Nations Centre for Human Settlements (Habitat), Informal Transport in the Developing World: 2000, modified – definition translated and shortened]

3.74 Intelligent system

A system that is automated to a very large degree and that has comprehensive input variables and a complex control logic.

Note 1 regarding the term: From the Latin "intelligens": Understanding, judicious.

Note 2 regarding the term: Within this context, the term "intelligent" is used both for technical and organizational units.

Note 3 regarding the term: The term "intelligent" is not synonymous with the term "smart."

3.75 Intelligent infrastructure

System structure that is significantly managed by automated control processes and highly developed data analysis and that independently acts and operates to network and control facilities, systems, devices, equipment, and conditions

Note 1 regarding the term: The exchange of information from management and control equipment and from the associated sensors is used in order to determine or anticipate the behavior of road users and other actors and to ensure sustainable, cost-effective and safe mobility that is compatible with urban settings

Note 2 regarding the term: Within this context, and taken in as broad a sense as possible, the term "infrastructure" includes, e.g., road traffic signal systems, sensors, (traffic) information systems, (traffic) control systems, and data networks.

3.83 Last mile

Section of a utility grid, telecommunications network, or route chain that directly connects customers or users
Note 1 regarding the term: The term is used not only in traffic planning and distribution logistics, but also in the power and communications industries.
Note 2 regarding the term: Last-mile transportation in urban center areas is especially relevant to infrastructure and logistics.
Note 3 regarding the term: The term "last mile" comes from the logistics sector and is becoming increasingly relevant to the field of individual mobility.
Note 4 regarding the term: The term "last mile" is not identical to the terms "micromobility" or "local mobility."

3.112 User

Person who uses services and infrastructure for a specific purpose
Note 1 regarding the term: Within the context of urban mobility, "users" are people who use transportation infrastructure in order to move themselves, other people, or goods from one location to another.
Note 2 regarding the term: In terms of road traffic regulations and of the Personenbeförderungsgesetz (German Passenger Transportation Act), animals are considered goods.
Note 3 regarding the term: Within the context of local public transportation, the term refers to passengers who use the offered service, vehicles, or infrastructure subsystems.
Note 4 regarding the term: Within the context of private transportation, the term refers to people who participate in public road traffic as pedestrians or by using a vehicle.

3.121 Passenger

Person who is transported in a vehicle without being involved in the latter's operation
Note 1 regarding the term: Being the only person who issues a command to depart, or actively selecting and entering a destination on or in a vehicle, has no bearing on the status of a passenger.
Note 2 regarding the term: There are two German terms that roughly mean "passenger": "Mitfahrer" and "Passagier." While these two terms are sometimes used synonymously, "Passagier" usually refers to a passenger on a commercial passenger transportation offering. [Source: DIN EN 16258:2013-03, 2.1.15, modified – notes 1 and 2 added]

3.141 Ride hailing

Transportation of a passenger or small group with a vehicle, called up for a specific trip request, from a commercial platform provider without a taxi license
Note 1 regarding the term: Synonyms include "transportation network companies" (TNC) as performing organizations, "ride booking," "ride sourcing," and "e-hailing."
Note 2 regarding the term: Trips are generated for each individual passenger. Options for grouping trips (pooling) that are declared as such are exceptions.
Note 3 regarding the term: "Rise sourcing" must be distinguished from "ride sharing."

3.142 Ride pooling

Grouping of the transportation needs of individual people on routes that are identical to a large extent with the use of vehicles that are not part of local public transportation. Note 1 regarding the term: As an umbrella term, "ride pooling" can include both offerings from carsharing agencies and carpools and from "ride sourcing." Note 2 regarding the term: In some "ride sourcing" offerings, "ride pooling" is explicitly offered as a separate product that can be chosen. The common incentive is the lower fare per passenger that results when a vehicle is shared with other passengers.

3.143 Ride sharing

Taking passengers on a trip, made by a private transportation vehicle, that is non-commercial and that would occur regardless.
Note 1 regarding the term: There is no trip generation.
Note 2 regarding the term: "Ride sharing" must be distinguished from "ride sourcing."
Note 3 regarding the term: It is possible for passengers to pay for the variable costs incurred by the vehicle owner by a percentage up to the proportional amount that corresponds to them without this changing the fact that the offering is essentially non-commercial.
Note 4 regarding the term: "Ride sharing" has existed in an organized form since the 1950s in the form of carsharing agencies, carpools, and organized informal carpools in which passengers with the same destination are picked up at defined locations ("slugging").

3.146 Mass location data

Data acquired by a group or object(s) so that it can be centrally aggregated, processed, or refined and then used in order to efficiently optimize a system

3.156 Smart

Skilled in handling problems and finding solutions
Note 1 regarding the term: The term is frequently used within the context of digitalization in order to describe a higher level of applicability, efficiency, and range of equipment, tools, or processes achieved with the help of digital measurement, analysis, and transmission functions.
Note 2 regarding the term: The term "smart" is not synonymous with the term "intelligent."

3.176 Over-the-air update

Update to a product's software via wireless data transmission

3.199 Fully automated driving

High Automation
Driving in which the automated system takes over all functions in order to fulfill the driving task and is able to automatically manage all situations in specific use cases even if the driver is unable to take back control of the driving task within a specific time reserve after being prompted to do so by the system
Note 1 regarding the term: In specific use cases that go beyond the capabilities of the system, assistance by a human driver may be required. [SOURCE: SAE J3016:2014-01, modified – definition translated, note added]