**Insert new paragraph 4.2.8., to read:**

4.2.8. The Regulation includes requirements for Data Storage System for Automated Driving (DSSAD), which refers to the data storage capability of a vehicle to monitor the safety performance of ADS. This system contributes to the evaluation of ADS performance and supports the identification of safety-relevant behavior during vehicle operation.

**Insert new paragraph 5.3.3., to read:**

5.3.3. Data Storage System for Automated Driving

5.3.3.1. The ADS vehicle shall be equipped with a DSSAD capable of monitoring the safety performance of the ADS in accordance with the provisions of this Regulation.

**Paragraphs 6.3.1.12., amend to read:**

6.3.1.12.[The manufacturer shall describe the following aspects of the data storage system:]

(a) [Storage location and crash survivability,]

(b) [Data recorded during vehicle operation and occurrences,]

(c) [Data security and protection against unauthorized access or use, and]

(d) [Means and tools to carry out authorized access to data.]

6.3.1.12. Data Storage System for Automated Driving

6.3.1.12.1. In accordance with Annex 7, the manufacturer shall describe the DSSAD installed on the ADS vehicle, including:

(a) Capability to record time-stamped data,

(b) Capability to record time-series data,

(c) List of recordable data elements,

(d) Means for enabling access to stored data, and

(e) Means for protecting data against unauthorized access and manipulation.

6.3.1.12.2. The manufacturer shall justify the omission of data elements listed in Annex 7.

**Insert new paragraph 6.3.2.10., to read:**

6.3.2.10. Data Storage System for Automated Driving

6.3.2.10.1.The manufacturer shall provide evidence demonstrating the following:

> (a)      Recording of the data elements listed under 6.3.1.12.1.(c),
>
> (b)      Storage of recorded data in accordance with Annex 7.

**Insert new paragraph 7.3.2., to read:**

7.3.2.  Assessment of the DSSAD

7.3.2.1 The documentation provided under paragraph 6.3.1.12. shall be verified for consistency with the provisions of Annex 7.

**Insert new Annex 7, to read:**

**Annex 7      Data Storage System for Automated Driving**

**1.     Purpose:**

1.1    This annex defines Data Storage System for Automated Driving (DSSAD) as the data storage capability of a vehicle to monitor the safety performance of ADS, and establishes requirements to enable the evaluation of ADS safety performance.

**2.     Data Storage and Security**

> 2.1    The DSSAD shall be capable of recording and storing time-stamped and time-series data elements as defined in Paragraph 5 of this Annex.
>
> 2.2    The DSSAD shall be protected against both unauthorized access and manipulation.
>
> 2.3    In the case of the data intended to be stored off-board the vehicle cannot be transmitted, it shall remain stored on the vehicle.

**3.     Data Format:**

> 3.1    Each data element listed in Paragraph 5 of this Annex shall be available in a standardized and readable format.
>
> 3.2    Time stamp data format
>
>> 3.2.1.  Time stamp data shall be recorded in a clearly identifiable way with following data:
>>
>>> 3.2.1.1.      The time stamped data element, as listed in paragraph 5.2.1.

3.2.1.2. The additional information noted in 5.2 for each time stamped data element as appropriate.

3.2.1.3. Date (Resolution: yyyy/mm/dd);

3.2.1.4. Timestamp

 3.2.1.4.1 Resolution: hh/mm/ss timezone e.g. 12:59:59 UTC;

 3.2.1.4.2 Accuracy: +/- 1.0 s.

3.2.2. A single timestamp may be allowed for multiple elements recorded simultaneously within the time resolution of the specific data elements. If more than one element is recorded with the same timestamp, the information from the individual elements shall indicate the chronological order.

## 4. Data Accessibility

4.1 All of the stored data defined in Paragraph 5 of this Annex shall be readily accessible to authorized entities as defined under national law.

[4.2 The manufacturer shall ensure the data is promptly available in a format that is standardized and readable as outlined in Paragraph 3.1. Information on interpretation of the outputted data must be documented by the manufacturer and provided upon the request of an authorized entity and interpretation shall not require any proprietary tools or systems.]

4.3 The DSSAD data (whether stored on or off-board the vehicle) shall be available and retrievable through an electronic communication interface that complies with a publicly available interface standard. It is recommended to use an internationally recognized standard.[1]

[4.4 The manufacturer shall ensure there is a method to access the data via the electronic communication interface and provide an information package about its usage to the relevant authority. The method of accessing data via this interface shall be documented by the manufacturer and provided upon the request of an authorized entity. If the data is [intended to be] stored onboard the vehicle then the manufacturer shall provide an authorized entity, free of charge, any tools or software which are required for access. If the data is [intended to be] stored offboard the vehicle then an authorized entity shall not [have to install any systems or require any proprietary tools or systems to access the data.]]

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[1] Contracting parties may further define administrative requirements for data accessibility under national law.

4.5 The stored data shall be retrievable even when the main onboard vehicle power supply is not available.

## 5. Data Elements:

5.1 The DSSAD shall record and store the data elements listed below.

5.2 Data elements of time-stamp data

5.2.1. The following table details the data elements of time-stamp data to be recorded, along with any additional information and recording condition.

| Event | Additional Information | Recording condition |
|---|---|---|
| Activation of the feature | ADS feature is activated by the:<br>(i)      system, or<br>(ii)      user | |
| Deactivation of the feature | ADS feature is deactivated by the<br>(i)      system, or<br>(ii)      user | Whilst the feature is active |
| Start of ADS fallback to user, if applicable | System-initiated deactivation of the ADS initiated due to:<br>(i)      Planned event,<br>(ii)      Unplanned event,<br>(iii)      ~~[Detection that fallback user is not available,]~~<br>(iv)      System failure,<br>(v)      Input to the driving controls, or<br>(vi)      Exit of ODD. | Whilst the feature is active |
| Start of ADS fallback to an MRC | MRC resulting from:<br>(i)      exit of ODD,<br>(ii)      ADS failure,<br>(iii)      collision detected,<br>(iv)      [~~Absence of a~~ **Detection that** fallback user **is not available**, if applicable, or]<br>(v)      failure of the fallback user to take control following a system-initiated deactivation of the ADS. | Whilst the feature is active |
| User input to the driving controls, if applicable | Application of:<br>(i)      brake control,<br>(ii)      acceleration control,<br>(iii)      steering control, or<br>(iv)      direction indicator. | Whilst the feature is active |

| | | |
|---|---|---|
| Prevention of user takeover, if applicable | Prevention of user takeover (if applicable) due to:<br>(i) Unintentional user input,<br>(ii) The current situation being unsuitable,<br>(iii) The current situation being unsafe, or<br>(iv) The user not being suitably engaged. | Whilst the feature is active |
| [Detection that fallback user is not available, if applicable] | | Whilst the feature is active |
| Start of Emergency Manoeuvre | | Whilst the feature is active |
| End of Emergency Manoeuvre | | Whilst the feature is active |
| Event Data Recorder (EDR) trigger input[2] | | Whilst the feature is active |
| Detected collision | | Whilst the feature is active |
| Detected severe failure[3] | The failure could include the following:<br>(i) ADS<br>(ii) Sensor<br>(iii) Other vehicle systems (mechanical, electrical, etc.) | Whilst the feature is active |

5.3 Time series data elements

5.3.1. The data elements shall be recorded in compliance with paragraph 5.3.X if the following thresholds are reached or conditions occur:
a) Detected collision
b) EDR trigger input (excluding last stop trigger)

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[2] Excluding any last stop trigger

[3] A failure would be severe if it is one that prevents the ADS from performing the DDT in accordance with the Paragraph of 4.2 this regulation.

| Data element | Condition for requirement | Recording interval/time (relative to time stamp) |
|---|---|---|
| Detected object distance, longitudinal | Mandatory if available | |
| Detected object distance, lateral | Mandatory if available | |
| Detected object relative velocity, longitudinal | Mandatory if available | |
| Detected object relative velocity, lateral | Mandatory if available | |
| Detected object classification | Mandatory if available | |
| Sensor data[4] | Mandatory if 'Detected object elements' are not available | |
| ADS-requested accel demand | Mandatory | |
| ADS-requested service braking demand | Mandatory | |
| ADS-requested parking brake demand | Mandatory | |
| ADS-requested steering demand | Mandatory | |
| Vehicle acceleration, longitudinal | Mandatory | |
| Vehicle acceleration, lateral | Mandatory | |

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[4] e.g. camera, radar, LiDAR, used by the ADS for decision making. This shall be documented in the information package provided to the Authorised Entity. This shall include a "Visual Representation" submitted to the Authorised Entity at the time of providing the DSSAD Data, and shall comply with the requirements of 3.1 and 4.4 of this Annex.

| ADS-determined vehicle speed | Mandatory | |
|---|---|---|