

DSSAD Guidance	ADS text	Comments
(New requirement)	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 behaviour during vehicle operation.	
(New requirement)	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.	
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.	

(New requirement)	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.	
(New requirement)	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.	

DSSAD Guidance		ADS text	Comments
1.	Introduction	1. Purpose	
	DSSAD refers to a capability of a vehicle to monitor the performance of its Automated Driving System (ADS). This document provides recommendations to enable evaluations of ADS performance.	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.	
	This document has been prepared to support WP.29 deliberations under the 1958, 1997, and 1998 Agreements.	(Deleted)	
2.	Terms and Definitions	(Deleted. Already described in other chapters.)	
		3. Definitions	

	This section defines terms used in this document. Use of these terms and their definitions is recommended in the development of legal requirements related to ADS and ADS vehicles.	(Deleted)	
	Source: WP.29 GRVA Guidelines and recommendations for Automated Driving System safety requirements, assessments, and test methods to inform regulatory development.	(Deleted)	
2.1	<i>Automated Driving System (ADS)</i> means the vehicle hardware and software that are collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis. ¹	(Deleted. Already described in other chapters.) 3.1. “ <i>Automated Driving System (ADS)</i> ” means the vehicle hardware and software that are collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis. ¹	
2.2	<i>(ADS) Function</i> means an ADS hardware and software capability designed to perform a specific portion of the DDT.	(Deleted. Already described in other chapters.) 3.5. “ <i>(ADS) function</i> ” means an ADS hardware and software capability designed to perform a specific portion of the DDT.	
2.3	<i>ADS feature</i> means an ADS designed specifically for use within an Operational Design Domain (ODD).	(Deleted. Already described in other chapters.) 3.6. “ <i>(ADS) feature</i> ” means an application of an ADS designed specifically for use within an Operational Design Domain (ODD).	

¹ This definition is based on SAE J3016 and ISO/PAS 22736 (Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles). These standards define levels of driving automation based on the functionality of the driving automation system feature as determined by an allocation of roles in DDT and DDT fallback performance between that feature and the (human) user (if any). The term “Automated Driving System” is used specifically to describe a Level 3, 4, or 5 driving automation system.

2.4	<i>ADS vehicle</i> means a vehicle equipped with an ADS.	(Deleted. Already described in other chapters.) 3.2. “ <i>ADS vehicle</i> ” means a vehicle equipped with an ADS.	
2.5	<i>Driver</i> means a human user who performs in real time part or all of the DDT and/or DDT fallback for a particular vehicle.	(Deleted. Already described in other chapters.) 3.9.2. “ <i>Driver</i> ” means a user who performs in real time part or all of the DDT and/or DDT fallback for a particular vehicle.	
2.6	<i>Dynamic Driving Task (DDT)</i> means the real-time operational and tactical functions required to operate the vehicle.	(Deleted. Already described in other chapters.) 3.3. “ <i>Dynamic Driving Task (DDT)</i> ” means the real-time operational and tactical functions required to operate the vehicle.	
2.6.1.	When the ADS is in operation, the DDT is always performed in its entirety by the ADS which means the whole of the tactical and operational functions necessary to operate the vehicle (i.e., the ADS performs “the entire DDT” as stated in the definition of an “Automated Driving System” under paragraph 2.1.). These functions can be grouped into three interdependent categories: sensing and perception, planning and decision, and control.	When the ADS is in operation, the DDT is always performed in its entirety by the ADS which means the whole of the tactical and operational functions necessary to operate the vehicle (i.e., the ADS performs “the entire DDT” as stated in the definition of an “Automated Driving System” under para. 3.2.). These functions can be grouped into three interdependent categories: sensing and perception, planning and decision, and control.	This paragraph is under ADS IWG discussion.
2.6.1.1.	Sensing and perception include:	(Deleted. Already described in other chapters.) 3.3.1. Sensing and perception include:	
	<ul style="list-style-type: none"> Monitoring the driving environment via object and event detection, recognition, and classification. 	<ul style="list-style-type: none"> (a) Monitoring the driving environment via object and event detection, recognition, and classification. 	

	<ul style="list-style-type: none"> Perceiving other vehicles and road users, the roadway and its fixtures, objects in the vehicle's driving environment and relevant environmental conditions. 	(b) Perceiving other vehicles and road users, the roadway and its fixtures, objects in the vehicle's driving environment and relevant environmental conditions.	
	<ul style="list-style-type: none"> Sensing the ODD boundaries, if any, of the ADS feature. 	(c) Sensing the ODD boundaries, if any, of the ADS feature.	
	<ul style="list-style-type: none"> Positional awareness. 	(d) Positional awareness.	
2.6.1.2	Planning and decision include:	(Deleted. Already described in other chapters.)	
		3.3.2. Planning and decision include:	
	<ul style="list-style-type: none"> Predicting actions of other road users. 	(a) Predicting actions of other road users.	
	<ul style="list-style-type: none"> Response preparation. 	(b) Response preparation.	
	<ul style="list-style-type: none"> Maneuver planning. 	(c) Manoeuvre planning.	
2.6.1.3	Control includes:	(Deleted. Already described in other chapters.)	
		3.3.3. Control includes:	
	<ul style="list-style-type: none"> Object and event response execution 	(a) Object and event response execution.	
	<ul style="list-style-type: none"> Lateral vehicle motion control 	(b) Lateral vehicle motion control.	
	<ul style="list-style-type: none"> Longitudinal vehicle motion control. 	(c) Longitudinal vehicle motion control.	
	<ul style="list-style-type: none"> Enhancing conspicuity via lighting and signaling. 	(d) Enhancing conspicuity via lighting and signalling.	
2.7	<i>ADS fallback response</i> means a system-initiated deactivation of the ADS or an ADS-controlled procedure to place the vehicle in a minimal risk condition.	(Deleted. Already described in other chapters.) 3.15.1. <i>ADS fallback response</i> means a system-initiated deactivation of an ADS feature or an ADS-controlled	This paragraph is under ADS IWG discussion.

		procedure to place the vehicle in a mitigated risk condition (MRC).	
2.8	<i>Fallback user</i> means a user designated to perform the DDT pursuant to an ADS fallback response.	(Deleted. Already described in other chapters.) 3.14.3. “Fallback user” means a user designated to perform the DDT pursuant to an ADS fallback response.	
2.9	<i>Minimal Risk Condition (MRC)</i> means a stable and stopped state of the vehicle that reduces the risk of a crash.	(Deleted. Already described in other chapters.) 3.17. “Mitigated Risk Condition (MRC)” means a stable and stopped state of the vehicle that reduces the risk of a crash.	
2.10	<i>Operational Design Domain (ODD)</i> means the operating conditions under which an ADS feature is specifically designed to function.	(Deleted. Already described in other chapters.) 3.12. “Operational Design Domain (ODD)” means the operating conditions under which an ADS feature is specifically designed to function.	
2.11	System-initiated deactivation of the ADS means a procedure by which the ADS initiates the transfer of performance of the DDT from the ADS to a vehicle user.	(Deleted. Already described in other chapters.) 3.15.2. “System-initiated deactivation of the ADS” means a procedure by which the ADS initiates the transfer of performance of the DDT from the ADS to a vehicle fallback user.	
2.12	User initiated deactivation of the ADS means a procedure by which the user initiates the transfer of performance of the DDT from the ADS to a vehicle user.	(Deleted. Already described in other chapters.) 3.15.3. “User-initiated deactivation of the ADS” means a procedure by which the user initiates the transfer of performance of the DDT from the ADS to a vehicle user.	
2.13.	(ADS) User means a human user of an ADS vehicle.	(Deleted. Already described in other chapters.)	

		3.14. “ADS user” means a human user of an ADS vehicle.	
2.14	Failure means the termination of an intended behaviour of an element (system, component, software) or an item (system or combination of systems that implement a function of a vehicle)	(Deleted. Already described in other chapters.) 3.20. "Failure" means the termination of an intended behaviour of an element or an item.	
2.15	(DSSAD) Triggering Event means a time stamped data element which triggers the recording and storing of time series data elements		Add to the definitions chapter in paragraph 3.
2.16.	“Emergency manoeuvre” is a manoeuvre performed by the system in case of an event in which the vehicle is at imminent collision risk and has the purpose of avoiding or mitigating a collision.		Add to the definitions chapter in paragraph 3.
2.17.	“Imminent collision risk” describes a situation or an event which leads to a collision of the vehicle with another road user or an obstacle which cannot be avoided by a braking demand with lower than 5 m/s ² .		Add to the definitions chapter in paragraph 3.
3.	Data Storage and Security	2. (The same text)	
3.1.	The data storage system should be sufficient to record and store the DSSAD time stamped data elements and time series data elements listed in Paragraph 6.	2.1. The DSSAD shall be capable of recording and storing time-stamped and time-series data elements as defined in <u>Paragraph 5</u> of this Annex.	
3.2.	The DSSAD shall be protected against both unauthorized access and manipulation.	2.2. (The same text)	

3.3.	In the case of the data intended to be stored off-board the vehicle cannot be transmitted, it should remain stored on the vehicle.	2.3	In the case of the data intended to be stored off-board the vehicle cannot be transmitted, it <u>shall</u> remain stored on the vehicle.	
4.	Data Format:	3.	(The same text)	
4.1.	Each data element listed in Paragraph 6 should be available in a standardized and readable format.	3.1.	Each data element listed in <u>Paragraph 5 of this Annex shall</u> be available in a standardized and readable format.	
4.2.	Time stamp data format	3.2.	(The same text)	
4.2.1.	Time stamp data should be recorded in a clearly identifiable way with following data:	3.2.1.	Time stamp data <u>shall</u> be recorded in a clearly identifiable way with following data:	
4.2.1.1.	The time stamped data element, as listed in paragraph 6.2.1.	3.2.1.1.	The time stamped data element, as listed in <u>paragraph 6.2.1.</u>	
4.2.1.2.	The additional information noted in 6.2 for each time stamped data element as appropriate.	3.2.1.2.	The additional information noted in <u>5.2</u> for each time stamped data element as appropriate.	
4.2.1.3.	Date (Resolution: yyyy/mm/dd);	3.2.1.3.	(The same text)	
4.2.1.4.	Timestamp	3.2.1.4.	(The same text)	
4.2.1.4.1	Resolution: hh/mm/ss timezone e.g. 12:59:59 UTC;	3.2.1.4.1.	(The same text)	
4.2.1.4.2	Accuracy: +/- 1.0 s.	3.2.1.4.2.	(The same text)	
4.2.2.	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.	3.2.2.	(The same text)	

5.	Data Accessibility	4.	(The same text)	
5.1.	All of the stored data defined in Section 6 of this guidance document should be readily accessible to entities as defined under national law.	4.1.	All of the stored data defined in <u>Paragraph 5 of this Annex shall</u> be readily accessible to <u>authorized entities</u> in accordance with national law.	
5.2.	The manufacturer should ensure the data is promptly available in a format that is standardized and readable as outlined in item 4.1. Information on how to interpret the data must be freely available, and interpretation shall not require any proprietary tools or systems.	[4.2.	The manufacturer <u>shall</u> ensure the data is promptly available in a format that is standardized and readable as outlined in <u>Paragraph 3.1.</u> Information on <u>interpretation of the outputted</u> data must be <u>documented by the manufacturer and provided upon the request of an authorized entity</u> and interpretation shall not require any proprietary tools or systems.]	
5.3.	The DSSAD data (whether stored on or off-board the vehicle) should 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. ²	4.3.	The DSSAD data (whether stored on or off-board the vehicle) <u>shall</u> 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. ²	
5.4.	The manufacturer should ensure there is a method to access the data via the electronic communication interface and provide an information package about its usage to authorized entities. The method of accessing data via this interface should be documented by the manufacturer and provided upon the request of the regulatory authority including any tools or software which	[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	

² Contracting parties may further define administrative requirements ~~technical specifications~~ for data accessibility under national law.

	are required for access. The regulatory authority should not require any proprietary tools or systems to access the data.	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.]]	
5.5.	The stored data should be retrievable even when the main onboard vehicle power supply is not available.	4.5. The stored data shall be retrievable even when the main onboard vehicle power supply is not available.	
6.	Data Elements:	5. (The same text)	
6.1.	The DSSAD should record and store the data elements listed below.	5.1. The DSSAD shall record and store the data elements listed below.	
6.2.	Data elements of time-stamp data	5.2. (The same text)	
6.2.1.	The following table details the data elements of time-stamp data to be recorded, along with any additional information and recording condition.	5.2.1. (The same text)	

Event	Additional Information	Recording condition
Activation of the feature	ADS feature is activated by the: (i) system, or (ii) user	
Deactivation of the feature	ADS feature is deactivated by the (i) system, or (ii) user	Whilst the feature is active
Start of ADS fallback to user, if applicable	System-initiated deactivation of the ADS initiated due to:	Whilst the feature is active

	(i) Planned event	
	(ii) Unplanned event	
	[(iii) Detection that fallback user is not available,]	
	(iv) System failure	
	(v) Input to the driving controls, or	
	(vi) Exit of ODD.	
Start of ADS fallback to an MRC	MRC resulting from:	Whilst the feature is active
	(i) exit of ODD	
	(ii) ADS failure	
	(iii) collision detected	
	[(iv) Absence of a Detection that fallback user is not available, if applicable, or]	
	(v) failure of the fallback user to take control following a system-initiated deactivation of the ADS.	
User input to the driving controls, if applicable	Application of:	Whilst the feature is active
	(i) brake control,	
	(ii) acceleration control,	
	(iii) steering control, or	
	(iv) direction indicator.	
Prevention of user takeover, if applicable	Prevention of user takeover (if applicable) due to:	Whilst the feature is active
	(i) Unintentional driver user input,	
	(ii) The current situation being unsuitable,	
	(iii) The current situation being unsafe or	

	(iv) The driver user not being suitably engaged.	
[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		Whilst the feature is active
Detected collision		Whilst the feature is active
Detected severe failure ³	The failure could include the following: (i) ADS (ii) Sensor (iii) Other vehicle systems (mechanical, electrical, etc.)	Whilst the feature is active

6.3.	Time series data elements	5.3.	(The same text)	
6.3.1.	The data elements shall be recorded in compliance with paragraph 6.3.1 if the following thresholds are reached or conditions occur:	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		(The same text)	
b)	EDR trigger input (excluding last stop trigger)		(The same text)	

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]	

³ A failure would be severe if it is one that prevents the ADS from performing the DDT in accordance with the **Paragraph provisions of 4.2 this Annex ~~IWG ADS guidance document.~~**

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	
ADS-determined vehicle speed	Mandatory	

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 4.1 and 5.4.