

Inventory of best ADS storage practices (Review of the existing national / regional activities and a proposed way forward for DSSAD)

This document aims at providing information on the existing national / regional activities on Data Storage System for Automated Driving (DSSAD) and individual contracting party recommendations for a proposed way forward for DSSAD, per the request of WP.29 at their 180th session (March 2020) and the revised Framework Document ECE/TRANS/WP.29/2019/34/Rev.2 (amended by ECE/TRANS/WP.29/2021/151). It is based on GRVA-14-40/Rev.1.

European Union

1. Review of the existing national / regional activities (European Union)

The European General Safety Regulation (GSR) does not require motor vehicles to be equipped with the DSSAD. However, the Event Data Recorder (EDR) on automated vehicles must collect and store information on whether the driver or the system was in control of the vehicle at the moment of the collision.

2. Way forward for DSSAD

The European Commission will be constructively contributing to the development of the DSSAD requirements at the UNECE. After March 2020, this might include consideration of collection by DSSAD of a wider range of data, useful for the purposes of in-service monitoring.

China

1. Review of the existing national / regional activities

China is developing mandatory national standards for DSSAD, which is expected to be completed by the end of 2022.

2. Way forward for DSSAD

The first step of drafting DSSAD is to solve the problem of determining and analysing the liability of automated driving accidents, at the same time the data sets for in-service monitoring for automated driving vehicles are also being studied.

France

1. Review of the existing national / regional activities

A - Mandatory for testing

National decree 2018-211 related to automated vehicles testing on public road

extract: *“The vehicles are equipped with a recording device making it possible to determine at any time whether the vehicle has been travelling in partial or total delegation of driving mode. The data is automatically and regularly deleted.*

In the event of an accident, the data recorded during the last five minutes are kept by the authorization holder for one year.”

B – Mandatory for vehicles with ADS

FR law defines since end of 2019 that data from DSSAD and EDR, that have to be in ADS vehicles, shall be accessible for the purpose to clarify responsibilities between the driver and the system, to facilitate compensation from insurance companies and to help in investigation and accident research.

The detail of the requirements is defined in the Mobility law (2019-1428 - November 2019) and its Ordinance 2021-442 of 14 April 2021.

2. Way forward for DSSAD

A proposal of a decree (not yet finalized) is ongoing to precise Mobility Law.

The proposal of the decree will specify the procedures for access to data from EDR and DSSAD in the event of a road accident by technical and safety investigation bodies, transport companies' insurance, the compulsory damage insurance guarantee fund and the police officers, in particular in cases where the vehicle manufacturer or his agent has remote access. It will also specify the retention period of the data by the vehicle manufacturer or his agent.

The proposal will precise with regards provisions relating to the procedures for accessing data from DSSAD, and without prejudice to the provisions of UN Regulation No. 157 (Automated Lane Keeping System (ALKS)) referred to above or of the forthcoming UN Regulation dedicated to DSSAD, prior to its placing on the market, that the manufacturer of the vehicle with ADS, or its representative, transmits to the competent authorities, (for analyzes in the event of an accident, for technical and safety investigations, as well as for monitoring and improving the road safety), an information file on the methods of [physical] access, extraction and interpretation of the data contained in the DSSAD and makes sure to guarantee the means and equipment allowing the complete transfer of the recorded data.

The proposal will also request, when the vehicle manufacturer or his representative has remote access to the data mentioned in I and that they are kept by means of a server/cloud/electronic register, that he shall send computer codes which allow access to the data of the register to the competent authorities pursuant to this article. The competent authorities will have to inform the manufacturers and their agents of the identity of the agents they have authorized to receive this data. These data will have to be available free of charge, in a standardized format [to be defined] within a period which may not exceed one month from the receipt of a written request, by post or e-mail.

The proposal may request that the manufacturer, or its representative, is required to keep this data for a period of six years, from the date of the accident in question.

The proposal will also contain an article for the application of Article L. 123-3 of the Code de la route (access by law enforcement to EDR and DSSAD data in the event of an accident or violation of the national law (as speed limits for example)).

FR also wish that as soon as possible, the data access interface in the vehicle must be, as most as possible, standard, and easy accessible for the police officer in the event of roadside control or any other need, whatever the model of the vehicle (a unique tool for connection to the vehicle).

Germany

1. Review of the existing national / regional activities

Since 2017 German law requires “data processing in the case of vehicles with a highly or fully automated driving function”. This act covered systems which require a driver to take over the dynamic driving task upon request from the system.

The main purpose of such data processing is to clarify responsibilities. The data may be used as well in a depersonalized form for accident research.

It is mandatory to store the position and time data captured by a satellite navigation system when:

- control of the vehicle changes from the driver to the highly or fully automated system and vice versa,
- the driver is prompted by the system to retake control of the vehicle or
- the system experiences a technical default.

In July 2021 the road traffic act has been amended to allow for the operation of automated driving systems which do not require a driver to take over the dynamic driving task. In July 2022 a related regulation has been passed to detail their approval and operation. This regulation also required the event-based storage of data related to the operation of the system. The data can be used to monitor the safe operation of the automated system and can be used for scientific research furthering the common welfare regarding public traffic.

Since Germany's desire is to globally harmonize technical vehicle requirements, Germany is strongly interested in an alignment of the DSSAD requirements currently being developed and their national requirements.

2. Way forward for DSSAD

In principal Germany favours an international harmonised regulation which technically enables the storage of a variety of data points. On this harmonised technical basis, national regulations can require specific data points to be stored and provided to authorities.

Germany assumes the DSSAD requirements will be revised after a certain period of time to include any additional requirements that may be necessary and/or changes based on experiences gathered with various implementations of automated driving systems.

Japan

1. Review of the existing national / regional activities

Japan incorporated the UN Regulation No. 157 into the national legislation on 3 January 2021 and made it mandatory to install the DSSAD for ALKS vehicles whose type is newly approved in Japan on and after 1 July 2022.

2. Way forward for DSSAD

Japan will continue to contribute to the WP29 activity to amend/develop the existing/new requirements for DSSAD.

Republic of Korea

1. Review of the existing national / regional activities

Korea has implemented DSSAD standards in the KMVSS 111-3(ALKS) in line with to UN R157 since 2020.

- Korea Motor Vehicle Safety Standard (KMVSS), Article 111-3(Partially automated driving system)
- Requirement the performance of DSSAD (Recorded occurrences of ADS, Data elements, Data availability, Protection against manipulation, Availability of DSSAD operation)

2. Way forward for DSSAD

The Automated driving development innovation projects has been carrying out for seven years since 2021.

- The automated driving project includes research on EDR and DSSAD of automated vehicles.
- The project aims to introduce a new domestic system for EDR and DSSAD of automated vehicles.

The Netherlands

1. Review of the existing national / regional activities

- **VSSF.** Development of a Vehicle Security and Safety Framework. This is a method to measure the maturity of an OEM in Security and Safety process for Vehicle software. RDW is developing it as a (self) certification framework which can be used in the type approval process.
- **VDLF.** Development of a Vehicle Driver License Framework. This is a method to test the autonomous capabilities of a vehicle, does the car behave like a driver, does it make the same choices? The VDLF results in a driver license for the vehicle.
- **ADAS Alliance.** Research has shown that consumers have little knowledge on how to use ADAS systems. This ADAS Alliance is supported by the Ministry, and its goal is to improve the knowledge and use of ADAS systems by consumers.
- **Testplan Roadsafety.** To determine Roadsafety issues of new developments in Vehicles and infrastructure (Road worker warning, ADAS (AEBS, LKA/LKS), Road lighting).

2. Way forward for DSSAD

- The Netherlands believes there are three important steps to test, admit and control automated components in vehicles and Autonomous vehicles:
 - VSSF for software in type approvals (see above)
 - VDLF for testing automated vehicles (see above)
 - DSSAD for monitoring the behaviour of the vehicle.
- That is why the DSSAD must also be used by a monitoring facility. With the data in the DSSAD, type approval authorities can check whether an automated component is still working within the boundaries of the type approval. They can check whether software updates are done (correctly), and check whether the vehicle still behaves like it is intended to do.

United Kingdom

1. Review of the existing national / regional activities

The United Kingdom of Great Britain and Northern Ireland (UK) is currently in the process of addressing national aspects related to the implementation and use of ALKS. Furthermore, the Law Commission of England and Wales and the Scottish Law Commission (the Law Commissions) have concluded a review of the legal framework for automated vehicles and have made recommendations, which are being considered, for the safe introduction of self-driving vehicles. Part of the implementation of ALKS and the Law Commissions' recommendations are related to data generated and stored by automated vehicles as well as access to that information.

The Law Commissions concluded that to ensure accountability by correctly establishing whether the human or the Automated Driving System (ADS) had responsibility for the vehicle, it is necessary to store location data alongside the timestamp, as witnesses are unlikely to recall the time of an incident with sufficient accuracy to match with the vehicle data. They also recommended that to support insurers and insurance claims relevant DSSAD data should be retained for 39 months from the date that it is recorded. This is to cover the standard 3-year limitation period for personal injury claims and a period to process a request for the data falling at the very end of the claims period. It was noted that the retained data

should include, but not be limited to, the date, time, and location of each activation/deactivation of the ADS, transition demand issued, and collision detected.

The Law Commissions also propose a new domestic process following type-approval for 'authorising' a vehicle to drive itself on British roads. This would include ensuring the vehicle met all local requirements, such as complying with data protection laws. The Law Commissions also propose a new in-use regulatory scheme to ensure vehicles' authorisation remains valid and to build an evidence base to demonstrate the safety of automated driving compared to human driving.

The UK is considering these recommendations alongside others made by the Law Commissions as it prepares for the introduction of ALKS and the wider spectrum of ADSs.

Additionally, work is underway to establish a Great Britain type approval scheme for automated vehicles. Part of this project involves examining the data requirements for in-use monitoring of automated vehicles. This involves a mixture of leading and lagging measures, with lagging measures providing greater specific information about an event and leading measures focusing on data-gathering of a wide range of situations. This in-use monitoring will help validate that the automated vehicle performance continuously meets or exceeds the required safety for its full operational lifetime, it will also likely supply data for the in-use regulatory authorisation scheme.

It should be noted that this work is still ongoing and subject to change.

2. Way forward for DSSAD

The UK envisages two main functions for the DSSAD: determining whether the ADS or a human driver is responsible for the vehicle at any specified time; and in-use monitoring of the ADS's driving behaviour.

In vehicles which could be controlled by both an ADS and a driver, the DSSAD should provide data to support determining liability and legal responsibility. Particularly in incidents where an EDR would not be triggered, such as a low-speed collision, speeding ticket or dangerous driving. This is important to prevent a human from being held responsible for the ADS's driving behaviour. In line with the Law Commissions' recommendation, location data should be recorded for this purpose with the timestamps for at least certain events (ADS activation, transition demands and collisions). There also is the need for the retention of such data by the DSSAD to be flexible so that it can meet the needs of individual Contracting Parties. As has been noted, the Law Commissions consider 39 months to be the requisite time in the UK, but this is likely to vary between countries.

Whilst personal data, particularly location data, is sensitive from a privacy standpoint, those issues should only arise when it comes to handling or processing. It should not constrain the capabilities of what data a DSSAD can obtain. Collecting location data was considered compatible with UK data protection laws by the Law Commissions, although it is appreciated that safeguards are required to ensure such information is only accessed by those who have a legitimate reason for it. The principle should be that Contracting Parties prevent the retrieval or processing of sensitive data, such as location, if this conflicts with local data protection laws. However, the capability of the DSSAD to collect such data should not be limited because of local data protection laws.

The DSSAD should also be used for in-use compliance and safety monitoring of automated vehicles. This would involve collection of additional data elements that can be used to determine if the system is operating in a safe manner throughout its lifetime. This is likely to involve the DSSAD needing to function at two levels.

Firstly, on a longer-term basis to collect data to support statistical comparisons between baseline human performance and the ADS based on particular events, such as collisions, near misses and emergency manoeuvres. This would help highlight any ADS that could require investigation or if an ADS is unsafe and needs to be withdrawn from service.

Secondly, in addition to longer term statistical data recording of the ADS's driving behaviour, higher fidelity data stored temporarily on a shorter-term basis for retrieval should the ADS be involved in a specific incident. This may be a collision or a report of unsafe behaviour from a member of the public or a passenger within the vehicle, for example. This data would aid investigation into the incident, particularly providing the reasoning behind the decision making of the ADS during the incident. This could allow the potential identification of unsafe behaviours, which if not addressed could cause further incidents. It may also help identify areas where improvements in regulations may be needed.
