UN Regulation No 160

(...)

5.6. Each vehicle fitted with an Automated Lane Keeping System (ALKS) as defined in UN Regulation 157, shall be designed in a way that the ALKS relevant data elements are made available for retrieval, subject to requirements of national and regional law, together with the data elements specified in Annex 4 Table 1. These ALKS relevant data elements and their format for retrieval are specified in Annex 4, Table 2.

Annex 4, Table 2

Data elements[1] and format

Data element	Recording interval/time (relative to time zero)	Data sample rate (samples per second)	Resolution
Automated Lane Keeping System Status[2]	-30.0 to 0 second relative to time zero	2	On, Off - Manually Deactivated, Off- Automatically Deactivated Faulted
ALKS - Transition Demand	-30.0 to 0 second relative to time zero	2	Driver Not Available, Driver Override, System Failure, Planned Event, Unplanned Event
ALKS - Minimum Risk Manoeuvre	-30.0 to 0 second relative to time zero	2	Yes, No
ALKS - Emergency Manoeuvre	-30.0 to 0 second relative to time zero	2	Yes, No
ALKS – System Override	-30.0 to 0 second relative to time zero	2	Steering Control, Brake Control, Accelerator Control

Kommentiert [GT1]: The 2 Hz sample rate may need to be revised as it may not be relevant since these data elements are simply event time flags.

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[1]   [Unless specifically defined in this Annex][Except for the definition of Automated Lane Keeping System Status], for the purposes of this annex, the definitions laid down in paragraph 2 of UN Regulation No 157 apply.

[2]   "Automated Lane Keeping System Status" means the operating mode of the Automated Lane Keeping System.

Data element	Recording interval/time (relative to time zero)	Data sample rate (samples per second)	Resolution
ALKS – Severe ALKS failure	-30.0 to 0 second relative to time zero	2	Yes, No

Kommentiert [GT1]: The 2 Hz sample rate may need to be revised as it may not be relevant since these data elements are simply event time flags.

Justification:

Why is it necessary to extend the EDR dataset by additional ADS-specific data elements to perform accident reconstruction/analysis (here: ALKS)?

"Automated driving systems (ADSs) perform the complete dynamic driving task (DDT) while engaged. In the absence of a human "driver", the ADS itself could be the only witness of a collision event."[3]

The specific data elements required for accident data reconstruction and analysis involving a vehicle with the Advanced Lane Keeping System (ALKS) are based on the "occurrences" specified in UN Regulation No. 157:

- Automated Lane Keeping System Status ("Activation" and "Deactivation" of the system)
- "Transition Demand"
- "Reduction or suppression of driver input" (Override)
- "Emergency Manoeuvre"
- "Minimum Risk Manoeuvre"
- "Severe ALKS failure"

These additional data elements supplement the information recorded by the EDR according to UN Regulation No. [160] "to facilitate the determination of the background and events leading up to a collision in an ADS-operated vehicle"[3].

For each road traffic accident including a vehicle with ALKS functionality it is essential to clarify whether the human driver or the system was under control of the vehicle or any intermediate step was ongoing regarding the transition of this driving task or (suddenly) a severe system failure has occurred. This information is absolutely needed to understand in which situations the ADS might have influenced the accident occurrence and outcome, for instance regarding the possibility to avoid the collision or to reduce its severity. In turn, this information helps to refine regulations based on findings from real-world accidents and to refine ADS functionalities including the interaction between human drivers and the ADS.

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[3] Source: SAE J3197 - Automated Driving System Data Logger – Revised July 2021