Explanatory notes:

* This document proposes two alternative options for how the status of lateral driving assistance systems could be recorded.
* To achieve harmonization, both options require definitions that are suitable for systems in both, 1958 and 1998 Agreement regions, i.e. need to be able to capture all relevant systems and need to be clear which category the systems fall under. The definitions proposed are largely based on UN Regulation No. 79 (1958 Agreement); continuous lateral control systems designed for other markets (1998 Agreement) that meet one of the definitions could be recorded as the respective system category; other continuous lateral control systems could be captured under separate definition (to be developed as needed) or recorded in a category ‘OEM-defined’. **We are seeking feedback if these definitions would be suitable for 1998 Agreement systems, or if they could be modified or extended (by adding different ACSF subcategories) to achieve suitable definitions.**
* Level 2 automated driving systems are a combination of a continuous lateral control function (ACSF) and a longitudinal control function (such as ACC). Therefore, level 2 system status could be captured with the suggested signals by recording the status of both the lateral and longitudinal control functions.
* Option 1 below:
  + Captures the relevant systems in 3 signals (ESF, CSF, ACSF) with the type of ACSF being recorded within the ACSF output parameter.
  + This option has the benefit of reducing the number of signals and having a clear structure. Industry confirmed that only one ACSF can be actively controlling at any one time, so this aspect can be recorded in a single signal.
  + However, one or more ACSF could be faulted at the same time, so the information that one system is faulted (e.g. ACSF category C due to failure or rearward-facing sensor failure) cannot be captured while another system is actively controlling (e.g. ACSF B1 which does not require rear sensors). The parameters have been prioritized in a footnote to indicate that the main priority is recording which system is actively controlling and record a failure of that specific system if it occurs while it was active during the recording interval (**we are seeking confirmation from industry if this logic is possible to implement**).
  + The three suggested signals could replace the following signals:
    - Emergency Steering Function status (included in list with changed ‘resolution’)
    - Lane Keep Assist Status
    - Emergency Lane Keeping Status
    - Lane Centering Assist
    - Parking Assist Status
    - Partial Driving Operating Status (driving automation system level 2)
* Option 2 below:
  + Captures the different ACSF categories in separate signals; ESF and CSF signals are identical to Option 1.
  + This option has the benefit that the failure status of each system can be recorded separately (even when turned off), but more signals are required compared to Option 1.
  + This option could replace the same signals listed under Option 1 above.
  + Note that only ACSF categories A, B1 and C have regulatory requirements defined under UN R79; i.e. other categories cannot be approved at the moment, but only have a definition in the regulation.

**Option 1:**

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| **No.** | **Data element name** | **Definition** |  |  |  |  |  |  | **Recording interval/time (relative to time zero)** | **Data sample rate (samples per second)** | **Minimum range** | **Accuracy** | **Resolution** | **Type** |
|  | Emergency steering function (ESF) status | ‘Emergency Steering Function’ means a control function which can automatically detect a potential collision and automatically activate the vehicle steering system for a limited duration, to steer the vehicle with the purpose of avoiding or mitigating a collision, with an obstacle obstructing the path of the subject vehicle or when the obstruction of the subject vehicle’s path is deemed imminent. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On but not intervening  On and intervening |  |
|  | Corrective steering function (CSF) status | ‘Corrective steering function’ means a control function within an electronic control system whereby, for a limited duration, changes to the steering angle of one or more wheels may result from the automatic evaluation of signals initiated on-board the vehicle, in order to:  - compensate a sudden, unexpected change in the side force of the vehicle,  - improve the vehicle stability (e.g. side wind, differing adhesion road conditions "µ-split"), or  - correct lane departure (e.g. to avoid crossing lane markings, leaving the road). |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On but not intervening  On and intervening |  |
|  | Automatically commanded steering function (ACSF) status | ‘Automatically commanded steering function’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action in order to:  - assist the driver in low speed or parking manoeuvring (Category A),  - assist the driver in keeping the vehicle within the chosen lane by influencing the lateral movement of the vehicle (Category B1),  - keep the vehicle within its lane by influencing the lateral movement of the vehicle for extended periods without further driver command/confirmation (Category B2),  - perform a single lateral manoeuvre (e.g. lane change) when commanded by the driver (Category C),  - indicate the possibility of a single lateral manoeuvre (e.g. lane change) but perform that function only following a confirmation by the driver (Category D), or  - continuously determine the possibility of a manoeuvre (e.g. lane change) and complete these manoeuvres for extended periods without further driver command/confirmation (Category E)  **[-further categories to be added as required for 1998 Agreement systems]**  **[-continuously influence the lateral movement of the vehicle for purposes other than Categories A to E (Category OEM-defined)]** |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Off  On - Actively Controlling (Category A)  On - Actively Controlling (Category B1)  On - Actively Controlling (Category B2)  On - Actively Controlling (Category C)  On - Actively Controlling (Category D)  On - Actively Controlling (Category E)  **[On - Actively Controlling (further categories)]**  **[On - Actively Controlling (Category OEM-defined)]**  Faulted on activation or while controlling (Category A)  Faulted on activation or while controlling (Category B1)  Faulted on activation or while controlling (Category B2)  Faulted on activation or while controlling (Category C)  Faulted on activation or while controlling (Category D)  Faulted on activation or while controlling (Category E)  **[Faulted on activation or while controlling (further categories)]**  **[Faulted on activation or while controlling (Category OEM-defined)]**  *Footnotes:*  *-Status ‘on-actively controlling’ to be recorded with priority over other statuses*  *-Status ‘faulted on activation or while controlling’ to be recorded only if a system fails when being activated or while being active during the recording interval*  *-Status ‘off’ to be recorded if all ACSF are turned off during the recording interval, even if one or more ACSF are faulted* |  |

**Option 2:**

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| **No.** | **Data element name** | **Definition** |  |  |  |  |  |  | **Recording interval/time (relative to time zero)** | **Data sample rate (samples per second)** | **Minimum range** | **Accuracy** | **Resolution** | **Type** |
|  | Emergency steering function (ESF) status | ‘Emergency Steering Function’ means a control function which can automatically detect a potential collision and automatically activate the vehicle steering system for a limited duration, to steer the vehicle with the purpose of avoiding or mitigating a collision, with an obstacle obstructing the path of the subject vehicle or when the obstruction of the subject vehicle’s path is deemed imminent. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On but not intervening  On and intervening |  |
|  | Corrective steering function (CSF) status | ‘Corrective steering function’ means a control function within an electronic control system whereby, for a limited duration, changes to the steering angle of one or more wheels may result from the automatic evaluation of signals initiated on-board the vehicle, in order to:  - compensate a sudden, unexpected change in the side force of the vehicle,  - improve the vehicle stability (e.g. side wind, differing adhesion road conditions "µ-split"), or  - correct lane departure (e.g. to avoid crossing lane markings, leaving the road). |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On but not intervening  On and intervening |  |
|  | Automatically commanded steering function (ACSF) category A status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to assist the driver in low speed or parking manoeuvring**. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |
|  | Automatically commanded steering function (ACSF) category B1 status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to assist the driver in keeping the vehicle within the chosen lane by influencing the lateral movement of the vehicle**. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |
|  | Automatically commanded steering function (ACSF) category B2 status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to keep the vehicle within its lane by influencing the lateral movement of the vehicle for extended periods without further driver command/confirmation**. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |
|  | Automatically commanded steering function (ACSF) category C status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to perform a single lateral manoeuvre (e.g. lane change) when commanded by the driver**. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |
|  | Automatically commanded steering function (ACSF) category D status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to indicate the possibility of a single lateral manoeuvre (e.g. lane change) but perform that function only following a confirmation by the driver**. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |
|  | Automatically commanded steering function (ACSF) category E status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to continuously determine the possibility of a manoeuvre (e.g. lane change) and complete these manoeuvres for extended periods without further driver command/confirmation**. |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |
|  | Automatically commanded steering function (ACSF) [category x] status | ‘Automatically commanded steering function category A’ means a function within an electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate control action **in order to [to be defined].** |  |  |  |  |  |  | -5.0 to 0 second relative to time zero | 2 | N/A | N/A | Faulted  Off  On – Actively controlling |  |