**Comparison/Contrast of Proposed DSSAD Recording Triggers**

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| **SG-DSSAD** | **OICA** | **SAE J3197** | **Germany** | **China** |
|  | Impact Event | Impact Event (including “deployment”, Delta V exceeds 8 km/h within a 150 ms time window, pedestrian impact, or rollover. | Impact Event |  |
|  |  |  | Near Misses |  |
|  | ADS Mode Change |  |  |  |
|  |  |  | Intervention by technical operator |  |
|  |  |  | Unplanned maneuvers |  |
|  |  |  | Operational failures |  |

**Comparison/Contrast of Proposed DSSAD Data Elements**

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| --- | --- | --- | --- | --- |
| **SG-DSSAD** | **OICA** | **SAE J3197** | **Germany** | **China** |
| Basic Information About Vehicle | | | | |
|  |  |  | VIN | Vehicle Identification # (VIN) (Grade A) |
|  |  |  | System Monitoring data and software version | DSSAD hardware version # (Grade A) |
|  |  |  | DSSAD hardware serial number (Grade A) |
|  | Software version of DSSAD or related RXSWIN number (FRAV cat B1) |  | DSSAD software version number (Grade A) |
|  |  |  |  | Code of event type (Grade A) |
|  | Time stamp (year-month-day) (FRAV cat A) |  | Time for triggered events | Time – Year (Grade A) |
|  |  | Time – Month (Grade A) |
|  |  | Time – Day (Grade A) |
|  | Time stamp (hour-minute-second) (FRAV cat A) | Time stamp of initial data record (hour, minute, and second) | Time – Hour (Grade A) |
|  | Time – Minute (Grade A) |
|  | Time – Second (Grade A) |
|  |  | Location data – Latitude-longitude | GPS (Longitude -Latitude -Altitude) | Longitude (Grade A) |
|  |  | Location data – Latitude-longitude | GPS (Longitude -Latitude -Altitude) | Latitude (Grade A) |
|  | Record complete flag (FRAV cat B1) | Record Complete Flag |  | Complete flag of event record (Grade A) |
|  |  |  |  | Accumulated miles (Grade A) |
|  |  | Vehicle heading |  | Vehicle orientation (Grade A) |
|  | Connectivity failure (FRAV cat C1) |  | Connectivity Data (latency-bandwidth) |  |
| Information about the Status and Dynamics of the Vehicle | | | | |
|  |  |  | Status of the electric power supply |  |
|  |  | ADS Reference Speed | Velocity | Velocity (Grade A) |
|  |  |  | Lateral and longitudinal Acceleration | Lateral Acceleration (Grade A) |
|  |  |  | Longitudinal Acceleration (Grade A) |
|  |  |  |  | Yaw Velocity (Grade A) |
|  |  |  |  | Roll Velocity (Grade B) |
| Information about Operation of ADS | | | | |
|  |  | Emergency vehicle warning flag |  |  |
|  |  | Data record trigger type |  |  |
|  | ADS Mode: Dynamic driving task, Emergency maneuver, Minimum risk maneuver (FRAV cat B2) | ADS Mode | Activated and deactivated safety systems, status of the systems, trigger |  |
| ADS Mode: Activation, deactivation of ADS system (FRAV cat C2) |
| ADS Mode: Transition demand, reason for transition demand (FRAV cat C2) |
|  |  |  | External commands sent to the automated driving system |  |
|  | ADS requested lateral motion control (FRAV cat B2) | ADS Vehicle Motion Control – ADS Requested Lateral Vehicle Motion Control |  | Lateral acceleration requested by ADS (Grade B) |
|  |  | Vehicle Indicated Status – Steering |  | Steering angle of steering wheel requested by ADS (Grade B) |
|  |  |  |  | Steering curvature requested by ADS (Grade B) |
|  |  |  |  | Front-wheel requested by ADS  steering angle (Grade B) |
|  |  |  |  | Steering pinion angle requested by ADS (Grade B) |
|  |  |  |  | Steering torque of steering wheel requested by ADS (Grade B) |
|  |  |  |  | Steering angle rate of steering wheel requested by ADS (Grade B) |
|  |  | ADS Vehicle Motion Control – ADS requested Gear |  | Gear requested by ADS(Grade B) |
|  |  |  |  | Speed requested by ADS (Grade B) |
|  | ADS requested longitudinal motion control (FRAV cat B2) | ADS Vehicle Motion Control – ADS requested Longitudinal Vehicle Motion Control |  | Longitudinal acceleration requested by ADS (Grade B) |
|  |  |  |  | Accelerator pedal position (%) requested by ADS (Grade B) |
|  |  | ADS Vehicle Motion Control – ADS requested braking[[1]](#footnote-1) |  | Brake pedal position (%) requested by ADS (Grade B) |
|  |  |  |  | Drive motor torque requested by ADS (Grade B) |
|  |  |  |  | Drive motor RPM requested by ADS (Grade B) |
|  |  |  |  | Wheel end torque requested by ADS (Grade B) |
|  |  | ADS Vehicle Motion Control – ADS requested Exterior Lighting  Vehicle Indicated Status – Exterior lighting | Status of illumination systems | Status of adaptive lighting systems requested by ADS (Grade B) |
|  |  | Dipped-beam headlamp (Grade B) |
|  |  | Status of main-beam headlamp requested by ADS (Grade B) |
|  |  | ADS Vehicle Motion Control – ADS Requested Hazard Flashers  Vehicle Indicated Status – Hazard Flasher Status | Status of hazard warning signal requested by ADS (Grade B) |
|  |  | ADS Vehicle Motion Control – ADS requested Turn Signals  Vehicle indicated Status – Turn Signal Status | Status of left turn signal light requested by ADS (Grade B) |
|  |  | Status of right turn signal light requested by ADS (Grade B) |
|  |  |  | Environmental and weather data (Temp, lux, windshield wiper on/off) | Status of Windscreen wipers requested by ADS (Grade B) |
| Information about Driving Environment | | | | |
|  |  |  | Environmental and weather data (Temp, lux, windshield wiper on/off) |  |
|  |  |  |  | Type of Perceived Target (Grade A) |
|  |  |  |  | Relative Position of Perceived Target  (X direction-front) (Grade A) |
|  |  |  |  | Relative Position of Perceived Target  (Y direction) (Grade A) |
|  |  |  |  | Relative Speed of Perceived Target  (X direction) (Grade A) |
|  |  |  |  | Relative Speed of Perceived Target  (Y direction) (Grade A) |
|  |  |  |  | Relative Position of Perceived Target  (X direction backward) Grade A) |
|  |  | Annotated image |  | External Image [[2]](#footnote-2) (Grade A) |
|  |  |  |  | External Video 1 (Grade A) |
| Information about Operation and Status of the Driver | | | | |
|  | Failure to connect external user (tele-operator, platooning driving cases) (FRAV cat C2) |  |  |  |
|  |  | Passenger-initiated Emergency Stop (PES) (if equipped) |  |  |
|  |  | Request to Intervene |  |  |
|  |  |  | Count and operation times of the ADS |  |
|  |  |  | Count and point in time of remote approval of alternative maneuvers |  |
|  |  |  |  | Availability of the driver to take over the DDT (Grade A) |
|  |  |  |  | Whether the safety belt of the driver is fastened (Grade A) |
|  |  |  |  | Whether the driver is present in the driver’s seat (Grade A) |
|  |  |  |  | Accelerator pedal position (%) (Grade A) |
|  |  |  |  | Brake pedal position (%) [[3]](#footnote-3), [[4]](#footnote-4) (Grade B) |
|  |  |  |  | Brake Pedal Status 2 (Grade B) |
|  |  |  |  | Steering Wheel (If applicable) Angle [[5]](#footnote-5) (Grade B) |
|  |  |  |  | Steering Torque 4 (Grade B) |

1. If negative longitudinal acceleration is included in ADS requested longitudinal vehicle motion control, then this data element is optional. [↑](#footnote-ref-1)
2. At least either external image or external video shall be recorded. [↑](#footnote-ref-2)
3. The brake pedal status may not be recorded if the brake pedal position (%) has been recorded. [↑](#footnote-ref-3)
4. If the upper limit of effective brake pedal opening is less than 100, this upper limit may be used as the upper limit of the range of minimum data recording capacity. [↑](#footnote-ref-4)
5. At least either steering wheel angle or steering wheel torque shall be recorded. [↑](#footnote-ref-5)