**EDR for HD Vehicles Discussion Worksheet**

**Purpose/Goals** (per WP29-179-19 comparison document)

* Accident analysis

**What should not be included** (per WP29-179-19 comparison document)

* Detecting who is driving
* Identifying the owner/holder of the vehicle on the basis of the stored data.
* [Allowing for the tracking of the owner/the user/the holder of the vehicle]
* Providing information about the surroundings of the vehicle

**EDR Event Triggers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Agreed EDR Triggers | SAE J2728 | R160 | EC/TRL Recommendations | OICA | Comments/Justifications |
| Acceleration (longitudinal) trigger: Vehicle speed changes at a rate higher than the [programmable] threshold set between [8.0 km/h/s (5.0 mph/s) and 22.5 km/h/s (14.0 mph/s).] The vehicles speed change can be either positive or negative, and persists beyond that threshold for at [least 0.5 second. The acceleration event start will be the time that the threshold is crossed. | **Acceleration (longitudinal) trigger:** Vehicle speed changes at a rate higher than the programmable threshold set between 8.0 km/h/s (5.0 mph/s) and 22.5 km/h/s (14.0 mph/s). The vehicles speed change can be either positive or negative, and persists beyond that threshold for at least 0.5 second.The acceleration event start will be the time that the threshold is crossed. Common threshold setting is 11.3 km/s (7.0 mph/s) | 5.3.1.1. - Change in longitudinal vehicle velocity more than 8 km/h within a 150 ms or less interval.  5.3.1.2. - Change in lateral vehicle velocity more than 8 km/h within a 150 ms or less interval | Update with EC recommendation | Sudden Deceleration: Change in longitudinal vehicle velocity between 8.0 km/h/s and 22.5 km/h/s and persists beyond that threshold for at least 0.5 seconds. | China recommendation:   * 7 km/h/s or lower * Integrate more than one condition (vehicle status, brake or stop) simultaneously   EC/TRL still doing research on thresholds – recommendations TBD |
| **[Last stop trigger]** | **Last stop trigger:** The intent of this trigger is to capture an event when the vehicle has come to a complete stop for a period of time. The last stop event start will be the time the threshold is crossed. A suggested threshold is when the vehicle speed falls below 3.0 km/h (1.9 mph) for 15 seconds or more. To prevent last stop events from being overwritten due to the movement of the vehicle after an incident of interest, the last stop trigger cannot reoccur until the vehicle speed reaches a speed of 24.0 km/h (14.9 mph) or more for a minimum of 6 seconds. The act of turning the ignition off will not directly trigger a last stop event. See also the discussion in 3.2.2 regarding the last stop event buffer. |  | **See last stop trigger recommendation under safety system/VRU section below.** | Last Stop: The vehicle speed is reported as 0 (which may wait for 15 seconds or less after). The last stop trigger cannot reoccur until the vehicle speed reaches a speed of 24.0 km/h (14.9 mph) or more for a minimum of 6 seconds. The act of turning the ignition off will not directly trigger a last stop event. | **US has reservations on this trigger** |
| **Safety system trigger:** Systems that are installed for control or [driver alerts from safety systems] should trigger an event record.   * + Safety restraint system deployment   + ABS System   + Adaptive cruise control/automated braking   + Electronic stability control   + [others] | **Safety system trigger:** Systems that are installed for control or driver alerts from safety systems should trigger an event record. Such as:   * + Safety restraint system deployment   + ABS System   + Adaptive cruise control/automated braking   + Electronic stability control | 5.3.1.3. - Activation of Non-reversible occupant restraint system.  5.3.1.4. - Activation of Vulnerable road user secondary safety system  If a vehicle is not fitted with any Vulnerable Road User (VRU) secondary safety system, this document requires neither recording of data nor fitting of such systems. However, if the vehicle is fitted with such a system, then it is mandatory to record the event data following activation of this system. | 5.3.1.3. Activation of Non-reversible occupant restraint system.  5.3.1.4. Activation of Vulnerable road user secondary safety system  If a vehicle is not fitted with any Vulnerable Road User (VRU) secondary safety system, this document requires neither recording of data nor fitting of such systems. However, if the vehicle is fitted with such a system, then it is mandatory to record the event data following activation of this system.  [change of acceleration that exceeds a threshold of between 8 and 22.5 km/h/s for more than 0.5 s which is equivalent to between 0.23 and 0.64g (potential hard braking trigger based on SAE J2728)]  [If the speed of the vehicle falls below 3 km/h for a more than 15 s (potential last stop trigger based on SAE J2728)]  [To prevent last stop events from being overwritten due to the movement of the vehicle after an incident of interest, the last stop trigger cannot recur until the vehicle reaches a speed of 24.0 km/h or more for a minimum of 6 seconds.]  [automatic braking system (AEB) ] [an active safety system such as AEB is designed to reduce the risk of a collision occurring and to reduce the severity should it still occur; in the former case, triggering from the AEB would result in recording data from a non-collision event] *see comment* | Activation of an active safety system: indicated by equivalent J1939 signal as in the table below:  System (Safety Restraint System) – Trigger (Non-zero crash type)  System (ABS) – Trigger (ABS active)  System (Automated Emergency Braking) – Trigger (Forward collision emergency braking active)  System (Electronic Stability control) – Trigger (Yaw control or rollover (foundation brake control)  *Notes - Last stop + ESC/AEBS doesn’t work on loss of power. Becomes last stop only – redundant*  *5 records min in a buffer.*  *Wear leveling may require more.* | **EC/DE:** with regard to AEB as a trigger, we would be interested to hear the views of the participants on a possibility to refer to the “Emergency Braking Phase” only, as referred to in Proposal for the 02 series of amendments to UN Regulation No. 131 “Uniform provisions concerning the approval of motor vehicles with  regard to the Advanced Emergency Braking System (AEBS) for M2, M3, N2 and N3 vehicles” (Informal document GRVA-12-50/Rev.1), paragraphs 5.2.1.2 and 5.2.2.2.:  “*When the system has detected the possibility of an imminent collision, there shall be a braking demand of at least 4 m/s² to the service braking system of the vehicle*”.  The aforementioned demand could work as a trigger (instead of acceleration trigger) where AEB is fitted. This would limit the probability of data being recorded in cases where no collision has occurred. |
|  | No back up power source | Passenger car has 150ms – for airbag deployment. |  | HDV does not have currently.  Other units will also not have power to give sensor data.  Can lose some events. How many? |  |

**Data Elements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Agreed Data Elements | J2728 Data Element | R160 Data Element | EC/TRL Recommendations | OICA | Comments/Justifications |
|  | ***Alternate vehicle ID***  (Vehicle unique alpha-numeric identifier substitute for the VIN) |  |  | Not recommend | Made red due to privacy concerns. |
| Event data recording complete | ***Event data recording complete*** (This data indicates whether a complete set of data that the event data recording device is designed to capture was successfully recorded by and stored in the device.) | Complete file recorded | Complete file recorded (M2, 3 and N2, 3) | Event Data Recording Complete (This data indicates whether a complete set of data that the event data recording device is designed to capture was successfully recorded by and stored in the device.) | Pre-trigger Data (OICA Supports)  Post-trigger Data |
| [Exclude from scope] | ***Event date*** (The date when the event occurred) | Excluded from scope |  | recommend | * Needed to link data to specific events * EC recommends that it be excluded from scope – Prohibited by EU law. * Can an alternative metric be developed? * US and UK are concerned that exclusion of this element may restrict usefulness of EDR data. |
| Discussed but no decision  EC ok – but provisional pending privacy review | ***Engine hours*** (Number of hours that the engine has been operated from time of control unit first use to the time of the event trigger.) |  |  | recommend | Reconstructionists support engine hours over ignition cycles (serves as a “relative time” to help link trigger to actual crash events)  SAE - May assist in tying last stop or any incident specific trigger to actual crash event. |
| Discussed but no decision  Not supported by EC | ***Odometer*** (total vehicle distance at the time of the event trigger) |  |  | recommend | SAE - May assist in tying last stop or any incident specific trigger to actual crash event.  DE – need general “time stamp” information – more discussion to identify correct data element to assist the linkage of triggered event to crash.  Perhaps we can record “relative” times.  May provide insight on age/maintenance of vehicle. |
|  |  | Power cycles |  | ? Not sure if HDV have this..  Maybe less cycles on trucks – some “always running” |  |
| [Exclude from scope] | ***Latitude*** (Vehicle position per GPS at the time of the event trigger.) |  |  | Not recommend |  |
| [Exclude from scope] | ***Longitude*** (Vehicle position per GPS at the time of the event trigger.) |  |  | Not recommend |  |
| [Exclude from scope] | ***Event time*** (The time when the event occurred) | Excluded from scope |  | recommend | See parallel discussion under event date |
| ***HD EDR Unit Hardware Part #*** | ***HD EDR Unit Hardware Part #*** |  |  |  | Number must not be unique vehicle identifiers |
| ***HD EDR Unit Software Part #*** | ***HD EDR Unit Software Part #*** |  |  |  | Number must not be unique vehicle identifiers |
|  | ***[HVEDR make*** (Manufacturer name for HDEDR)] |  |  | Truncated VIN | China would like this info |
|  | ***[HVEDR model*** (Model number for HDEDR)] |  |  | Truncated VIN | China would like this info |
|  | ***HVEDR serial number*** (Serial number for HDEDR) |  |  | ~~Not recommend~~  VIN – Serial number gives exact build. | China would like this info  TRL prefers not to include a  “unique” identifier such as serial # |
| ***Vehicle make*** (Manufacturer name for HD vehicle) |  |  |  |  |  |
| ***Vehicle model*** (Model number for HD vehicle) |  |  |  |  |  |
| ***Vehicle serial number*** (Serial number for HD vehicle) |  |  |  |  | Made red due to privacy concerns. |
|  | ***Rear axle ratio*** (Ratio of transmission output shaft speed to tire rotation rate) |  |  | Not recommend | Include in vehicle configuration? |
|  | ***Tire size*** (Tire size in revolutions per km) |  |  | Not recommend | Include in vehicle configuration? |
| Trigger thresholds  (Lists currently configured trigger thresholds) | ***Trigger thresholds***  (Lists currently configured trigger thresholds) |  |  | Trigger thresholds  (Lists currently configured trigger threshold(s)) |  |
| Trigger threshold activated  (Indicates which trigger threshold was activated to cause EDR recording) | ***Trigger threshold activated***  (Indicates which trigger threshold was activated to cause EDR recording) |  |  | Trigger threshold activated  (Indicates which trigger threshold was activated to cause the recording the event) |  |
|  | ***VIN*** (Indicates the vehicle identification number (VIN) assigned by the vehicle manufacturer) |  |  |  | Truncated VIN – Is part of Tachograph in EU. |
|  | ***Vehicle configuration***  (A free-form text field for vehicle configuration)  PGN 65259 and PGN 65242 for available ECU HW and SW part number.  ~~Record of ECU’s installed on vehicle (vehicle data bus identifiers)~~ |  |  | Truncated VIN | Need to define what needs to be included in the “vehicle configuration” data element  In SAE the vehicle configuration refers to the information needed to verify correct tire size and thus verify correct vehicle speed recordings. |
| [Vehicle Safety System Manifest]  (Include internationally regulated safety systems) |  |  |  |  | Key safety systems that are already a data element don’t need to be captured here (we will know their status)  Safety systems that are not discreet elements? How to define what a “safety system is” |
| Vehicle speed (vehicle indicated) | ***Vehicle speed*** (The longitudinal speed of the vehicle that is calculated or estimated from the vehicle speed sensor (VSS).) | Speed, vehicle indicated | Speed, vehicle indicated (M2, 3 and N2, 3) | Vehicle speed (The longitudinal speed of the vehicle that is calculated or estimated from the vehicle speed sensor (VSS).) | R39 defines “vehicle speed”  See notes in pre-crash lat/long acceleration data element |
| Not required | ***Front axle left wheel speed*** (ABS wheel based speed) |  |  | Not recommend. |  |
| Not required | ***Front axle right wheel speed*** (ABS wheel based speed) |  |  | Not recommend. |  |
| Not required | ***Rear axle left wheel speed*** (ABS wheel based speed) |  |  | Not recommend. |  |
| Not required | ***Rear axle right wheel speed*** (ABS wheel based speed) |  |  | Not recommend. |  |
| Retarder torque mode (state signal indicates which mode is generating, limiting, or controlling retarder torque) | ***Retarder torque mode*** (state signal which indicates which retarder mode is generating, limiting, or controlling retarder torque) |  | Retarder Status (driver control status) (M3, N3) | Retarder torque mode (state signal which indicates which retarder mode is generating, limiting, or controlling retarder torque)  *Notes - On trucks can cause ABS events – and vehicle instability; Engine brake or regenerative braking.*  *Is a step in ACC radar control braking, early collision mitigation step.*  *May be difficult to split regen vs engine brake due to vehicle vs powertrain deceleration command not split.*  *?* |  |
| Brake status – parking (Indicates the status of the switch that is installed to detect whether or not the parking brake has been applied.) | ***Brake status – parking*** (Indicates the status of the switch that is installed to detect whether or not the parking brake has been applied.) |  |  | Brake status – parking (Indicates the status of the switch that is installed to detect whether or not the parking brake has been applied.)  *Notes - Roll away is a big issue. Driver forgets park brake.* |  |
| Brake status – service (Indicates the status of the switch that is installed in brake system to detect whether the service brake has been applied. This switch is usually used to turn on the brake lamps.) | ***Brake status – service*** (Indicates the status of the switch that is installed in brake system to detect whether the service brake has been applied. This switch is usually used to turn on the brake lamps.) | Service brake, on/off | Service brake, on/off (M2, 3 and N2, 3) | Brake status – service (Indicates the status of the switch that is installed in brake system to detect whether the service brake has been applied. This switch is usually used to turn on the brake lamps.) |  |
| Engine speed | ***Engine speed*** (Rotational speed of the engine output shaft.) | Engine rpm | Engine rpm (M2, 3 and N2, 3) | Engine speed (Rotational speed of the engine output shaft.) |  |
| Engine load (percent of available torque being generated) | ***Engine load*** (percent of available torque being generated) | Engine throttle, % full (or accelerator pedal, % full) |  | Engine load (percent of available torque being generated) |  |
| Not required | ***Clutch switch*** (Indicates the status of the switch that is usually installed in or connected to the clutch pedal to detect whether or not the clutch pedal is depressed.) |  |  | Not recommend. |  |
| Accelerator pedal position (Ratio of the throttle pedal opening (driver’s operation) in percent.) | ***Accelerator pedal position*** (Ratio of the throttle pedal opening (driver’s operation) in percent.) | Engine throttle, % full (or accelerator pedal, % full) | Engine throttle, % full (or accelerator pedal, % full) (M2, 3 and N2, 3) | Accelerator pedal position (Ratio of the throttle pedal opening (driver’s operation) in percent.) |  |
| ABS brake control status – tractor ((Indicates the status of the ABS brake control system on the vehicle/tractor, active or not active.) | ***ABS brake control status – tractor*** (Indicates the status of the ABS brake control system on the vehicle/tractor, active or not active.) | Anti-lock braking system activity | Anti-lock braking system activity (M2, 3 and N2, 3) | ABS brake control status – tractor (Indicates the status of the ABS brake control system on the vehicle/tractor, active or not active.) |  |
| Not required | ***ABS warning lamp status – tractor*** (Indicates the status of the ABS warning light on the vehicle/tractor, on or off.) |  |  | Not recommend. redundant to control status. |  |
| ABS brake control status – trailer ((Indicates the status of the ABS brake control system on trailer(s), active or not active.  Active if ABS brake control is active for any trailer.) | ***ABS brake control status – trailer*** (Indicates the status of the ABS brake control system on trailer(s), active or not active.  Active if ABS brake control is active for any trailer.) |  |  | ABS brake control status – trailer (Indicates the status of the ABS brake control system on trailer(s), active or not active.  Active if ABS brake control is active for any trailer.) |  |
| Not required | ***ABS warning lamp status – trailer*** (Indicates the status of the ABS warning light on trailer(s), on or off.  On if ABS warning light is on for any trailer.) |  |  | Not recommend. redundant to control status. |  |
| ACC mode (Control status of adaptive cruise control.) | ***ACC mode*** (Control status of adaptive cruise control.) | Adaptive Cruise Control Status (driving automation system level 1) | Adaptive Cruise Control Status (M2, 3 and N2, 3) | ACC mode (Control status of adaptive cruise control.) |  |
| Not required | ***ACC set distance mode*** (Driver setting of following distance sensitivity.) |  |  | Not recommend. | TRL sees some value – will confirm next mtg |
| Not required | ***Cruise control set speed*** (The speed to which the cruise control is set.) |  |  | Not recommend. | This may be useful for addressing liability |
| Cruise control states (the current state or mode of operation by the cruise control device) | ***Cruise control states*** (the current state or mode of operation by the cruise control device) | Cruise Control System Status | Cruise Control System Status (M2, 3 and N2, 3) | Cruise control states (the current state or mode of operation by the cruise control device) |  |
| [Not required] | ***Time to collision with relevant object*** (The time to collision is the duration after which the predicted travelling paths of host vehicle and relevant object lead to a distance of 0 m between both.) |  |  | Not recommend. | TRL sees some value – will confirm next mtg  What is a “relevant” object – vehicles? Other obstacles? |
| Forward collision advanced emergency braking system state) | ***Collision warning level*** (Forward collision advanced emergency braking system state) | Advanced emergency braking system status | Advanced emergency braking system status (M2, 3 and N2, 3) | Automatic Emergency Braking (Forward collision advanced emergency braking system activation) |  |
| [Not required] | ***Speed of forward vehicle*** (Absolute velocity of the preceding vehicle situated within 250 m in the same lane and moving in the same direction.) |  |  | Not recommend. | TRL sees some value – will confirm next mtg |
| [Not required] | ***Distance to forward vehicle*** (Distance to the preceding vehicle situated within 250 m in the same lane and moving in the same direction.) |  |  | Not recommend. | TRL sees some value – will confirm next mtg |
| Not required | ***XBR control mode*** (ABS status indicating external brake request) |  |  | This may be better represented by J1939 PGN 61487.   |  |  | | --- | --- | | 5676 | Forward Collision Advanced Emergency Braking System State |   And intent is in J2728 as XBR PGN 64964 SPN 291 | Better for liability |
| Not a data element – see note | ***Lane departure warning – right*** (Warning command from lane departure detection.) |  |  | Not Recommend | Information included in overall system status format |
| Not a data element – see note | ***Lane departure warning – left*** (Warning command from lane departure detection.) |  |  | Not Recommend | Information included in overall system status format |
| Lane departure warning system state (Indicates the status of lane departure warning system.) | ***Lane departure warning system state*** (Indicates the status of lane departure warning system.) | Lane departure warning system status | Lane departure warning system status (M2, 3 and N2, 3) | Lane departure warning system state (Indicates the status of lane departure warning system.) |  |
| Steering wheel angle (Angle of the steering shaft connected to driver control.) | ***Steering wheel angle*** (Angle of the steering shaft connected to driver control.) | Steering input | Steering input (M2, 3 and N2, 3) | Steering wheel angle (Angle of the steering shaft connected to driver control.) |  |
| **ROP engine control** (Stability control of engine retarder for rollover protection) | ***ROP engine control*** (Stability control of engine retarder for rollover protection) | Stability control | Stability control (M2, 3 and N2, 3) | Not recommend | TRL favors capturing both interventions |
| stability control status [(only on foundation brake application/control)] | ***ROP brake control*** (Stability control of wheel brakes for rollover protection) | Stability control | Stability control (M2, 3 and N2, 3) | Stability control braking (Stability control of wheel brakes for rollover protection or yaw control |  |
| ***YC engine control*** (stability control of engine retarder for yaw control) | ***YC engine control*** (stability control of engine retarder for yaw control) | Stability control | Stability control (M2, 3 and N2, 3) | Not recommend |  |
| ***YC brake control*** (stability control of wheel brakes for yaw control) | ***YC brake control*** (stability control of wheel brakes for yaw control) | Stability control | Stability control (M2, 3 and N2, 3) | Maybe only Brake control needed. Just call it stability control status (OEM can add more detail) |  |
| Vehicle dynamic control VDC system state (active/disabled – can it be combined into a single signal with stability control above?) | ***VDC system state*** (VDC fully operational) |  |  | VDC system state (VDC fully operational) |  |
| ***Blind spot system status*** (Operating status of system – including warning) | ***Blind spot system status*** (Operating status of system) |  | Blind spot information system status (M2, 3 and N2, 3) | Not recommend. | Format discussion will need to decide on what system status/operation should be captured.  Follows principle employed in light duty EDR |
|  | ***~~Blind spot warning~~*** ~~(Warning command to operator)~~ |  |  | ~~Blind spot warning (Warning command to operator)~~ | ~~Merged with above~~ |
| Crash [impact mitigation] system activation notification (i.e, airbag firing notification signal)  (Indicates detection and type of crash by installed crash mitigation system)  (not “ecall” per se) | ***Crash notification*** (Indicates detection and type of crash by installed crash mitigation system) | Accident emergency call system status | Accident emergency call system status ([M2], [M3], [N2], [N3]) | Crash notification (Indicates detection and type of crash by installed crash mitigation system)  *Note - These aren’t the same. Both air bag crash type and Call status (no J1939 definition) should be logged if equipped*  *J1939 Crash Notification message has (SPN 4973)*  *Type of crash event.*  *00000b = no crash*  *00001b = frontal crash*  *00010b = rear crash*  *00100b = side crash (left)*  *01000b = side crash (right)*  *10000b = rollover* | Look at potential air bag data elements first to see if this is redundant |
| Accident emergency call system status |  | Accident emergency call system status | Accident emergency call system status ([M2], [M3], [N2], [N3]) |  |  |
| Seat belt status (driver) (Shows if buckled or not) | ***Seat belt status (driver)*** (Shows if buckled or not) | Safety belt status, driver | Safety belt status, driver (M2, 3 and N2, 3) | Seat belt status (driver) (Shows if buckled or not) |  |
| Seat belt status (front passenger) (Shows if buckled or not) | ***Seat belt status (front passenger)*** (Shows if buckled or not) | Safety belt status, front passenger 9 | Safety belt status, front passenger (M2, 3 and N2, 3) | Seat belt status (front passenger) (Shows if buckled or not) | Definition of “front passenger”/”passenger” needs further clarification for busses. |
| Safety restraint system status (Operating status of system) | ***Safety restraint system status*** (Operating status of system) | Air bag warning lamp[[1]](#footnote-1) | Air bag warning lamp (M2, 3 and N2, 3) | Safety restraint system status (Operating status of system)  *Note - Generally, all below would be part of air bag log only and only if equipped. Not part of non-airbag truck EDR. How to word R160 for truck with air bag? Likely new reg should exclude airbag data or rather reference. I.e., “not recommend” the below except where noted.*  *Recommend to also support R160 if fitted with airbags* |  |
| [Delta-V, longitudinal] |  | Delta-V, longitudinal | Delta-V, longitudinal (M2, 3 and N2, 3) | NOT Recommend | Data provided from air bag unit (if fitted) and derived from accelerometer not wheel speed sensor. |
| [Maximum delta-V, longitudinal] |  | Maximum delta-V, longitudinal | Maximum delta-V, longitudinal (M2, 3 and N2, 3) | NOT Recommend | Data provided from air bag unit (if fitted) and derived from accelerometer not wheel speed sensor. |
| [Time, maximum delta-V, longitudinal] |  | Time, maximum delta-V, longitudinal | Time, maximum delta-V, longitudinal (M2, 3 and N2, 3) | NOT Recommend | Data provided from air bag unit (if fitted) and derived from accelerometer not wheel speed sensor. |
| [Ignition cycle, crash]  Supported by EC but provisional pending privacy review |  | Ignition cycle, crash | Ignition cycle, crash (M2, 3 and N2, 3) | Ok. key cycle count. Though redundant if time, date, etc. | Reconstructionist indicate some inaccuracies with ignition cycles |
| [Ignition cycle, download]  Supported by EC but provisional pending privacy review |  | Ignition cycle, download | Ignition cycle, download (M2, 3 and N2, 3) | Ok. key cycle count reference by tool at download. | Reconstructionist indicate some inaccuracies with ignition cycles |
|  |  | Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver. | Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver. (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, front passenger[[2]](#footnote-2). | Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, front passenger (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Multi-event crash, number of event | Multi-event crash, number of event (M2, 3 and N2, 3) | If timestamps are excluded from EDR, then may need this. |  |
|  |  | Time from event 1 to 2 | Time from event 1 to 2 (M2, 3 and N2, 3) | If timestamps are excluded from EDR, then may need this. Also need some ID of which one is latest. |  |
|  |  | Lateral acceleration  (post-crash) | Lateral acceleration  (post-crash) (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Longitudinal acceleration  (post-crash) | Longitudinal acceleration  (post-crash) (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Normal acceleration  (post-crash) | Normal acceleration  (post-crash) (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Delta-V, lateral | Delta-V, lateral (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Maximum delta-V, lateral | Maximum delta-V, lateral (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Time maximum delta-V, lateral | Time maximum delta-V, lateral (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Time for maximum delta-V, resultant | Time for maximum delta-V, resultant (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Vehicle roll angle | Vehicle roll angle (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Vehicle roll rate[[3]](#footnote-3) | Vehicle roll rate (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Passenger air bag suppression status, front 9 | Passenger air bag suppression status, front (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Frontal air bag deployment, time to nth stage, driver**15**. | Frontal air bag deployment, time to nth stage, driver (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Frontal air bag deployment, time to nth stage, front passenger[[4]](#footnote-4), 9. | Frontal air bag deployment, time to nth stage, front passenger (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Side air bag deployment, time to deploy, driver. | Side air bag deployment, time to deploy, driver (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Side air bag deployment, time to deploy, front passenger. | Side air bag deployment, time to deploy, front passenger (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Side curtain/tube air bag deployment, time to deploy, driver side. | Side curtain/tube air bag deployment, time to deploy, driver side (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Side curtain/tube air bag deployment, time to deploy, passenger side. | Side curtain/tube air bag deployment, time to deploy, passenger side (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Pretensioner deployment, time to fire, driver. | Pretensioner deployment, time to fire, driver (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Pretensioner deployment, time to fire, front passenger9. | Pretensioner deployment, time to fire, front passenger (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Seat track position switch, foremost, status, driver. | Seat track position switch, foremost, status, driver (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Seat track position switch, foremost, status, front passenger 9. | Seat track position switch, foremost, status, front passenger (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Occupant size classification, driver | Occupant size classification, driver [M2] | NOT Recommend |  |
|  |  | Occupant size classification, front passenger9 | Occupant size classification, front passenger [M2] | NOT Recommend |  |
|  |  | Safety belt status, rear passengers[[5]](#footnote-5) | Safety belt status, rear passengers (M2, [M3], [N2], [N3]) | NOT Recommend |  |
| Tyre Pressure Monitoring System Warning Lamp Status |  | Tyre Pressure Monitoring System Warning Lamp Status | Tyre Pressure Monitoring System Warning Lamp Status (M2, 3 and N2, 3) |  |  |
|  |  | Longitudinal acceleration  (pre – crash) | Longitudinal acceleration  (pre – crash) (M2, 3 and N2, 3) | NOT Recommend | EC – Useful information – Captures sliding where vehicle dynamics don’t match tire rotational dynamics |
|  |  | Lateral acceleration  (pre – crash) | Lateral acceleration  (pre – crash) (M2, 3 and N2, 3) | NOT Recommend | EC – Useful information - Captures sliding where vehicle dynamics don’t match tire rotational dynamics |
|  |  | Yaw Rate13 | Yaw Rate (M2, 3 and N2, 3) | NOT Recommend |  |
| Traction Control Status |  | Traction Control Status | Traction Control Status (M2, 3 and N2, 3) | OK [OICA more discussion before accepting] |  |
|  |  | Vulnerable road user secondary safety system deployment, time to deploy | Vulnerable road user secondary safety system deployment, time to deploy (M2, [M3], [N2], [N3]) | ok |  |
| VRU System status |  | Vulnerable road user secondary safety system warning indicator status**[[6]](#footnote-6)** | Vulnerable road user secondary safety system warning indicator status (M2, [M3], [N2], [N3]) | VRU Alert (indicates VRU in range)  *Notes - MOIS R159 or Reversing Motion R158*  *Not as trigger due to frequent triggers* |  |
|  |  | Safety belt status mid-position front | Safety belt status mid-position front (M2, 3 and N2, 3) | NOT Recommend |  |
|  |  | Far-side impact centre air bag deployment, time to deploy9 | Far-side impact centre air bag deployment, time to deploy (M2, [M3], [N2], [N3]) | NOT Recommend |  |
|  |  | Corrective steering function status | Corrective steering function status (M2, 3 and N2, 3) | Lane keeping? (need to understand applicability to HDV…. and items below) |  |
|  |  | Emergency steering function status | Emergency steering function status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  | Automatically commanded steering function category A status | Automatically commanded steering function category A status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  | Automatically commanded steering function category B1 status | Automatically commanded steering function category B1 status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  | Automatically commanded steering function category B2 status | Automatically commanded steering function category B2 status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  | Automatically commanded steering function category C status | Automatically commanded steering function category C status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  | Automatically commanded steering function category D status | Automatically commanded steering function category D status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  | Automatically commanded steering function category E status | Automatically commanded steering function category E status (M2, 3 and N2, 3) | Lane keeping? |  |
|  |  |  | Intelligent speed assistance (ISA) system (M2, 3 and N2, 3) |  |  |
|  |  |  | Turn table (fifth wheel) angle (N3) |  |  |
|  |  |  | Auxiliary braking systems (Driver control status) (M3,N3) |  |  |
|  |  |  | Cross wind assist status (N3) |  |  |
|  |  |  | Moving Off Information System Status (M2, 3 and N2, 3) |  |  |
|  |  |  | VRU Proximity Sensing system Reversing Motion Status (M2, 3 and N2, 3) | MOIS R159 or Reversing Motion R158  Not as trigger due to frequent triggers |  |
|  |  |  | Passenger door status front (M2, M3) |  |  |
|  |  |  | Passenger door status middle (M2, M3) |  |  |
|  |  |  | Passenger door status rear (M2, M3) |  |  |
|  |  |  | Driver cab door status ([M2], M3) |  |  |
|  |  |  | Halt brake system status (M2, M3) |  | Used to understand whether the brake is held by action of the driver, or by bespoke control program based on other parameters (doors, cab door, etc) around the vehicle. |
|  |  |  | Passenger count ([M2], [M3]) |  |  |
|  |  |  | Wheelchair ramp status (M2, M3) |  |  |
|  |  |  | Stop Bell status ([M2], M3) |  |  |
|  |  |  | Passengers on Stairs ([M3]) |  |  |
|  |  |  | Driver Radio Status ([M2], M3, [N2], [N3]) |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

1. The air bag warning lamp is the readiness indicator specified in national air bag requirements and may also illuminate to indicate a malfunction in another part of the deployable restraint system. [↑](#footnote-ref-1)
2. List this element n times, once for each device [↑](#footnote-ref-2)
3. The manufacturer will indicate the direction of positive roll/yaw rate [↑](#footnote-ref-3)
4. List this element n - 1 times, once for each stage of a multi-stage air bag system. [↑](#footnote-ref-4)
5. List this element n times, once for each device in 2nd, 3rd, row [↑](#footnote-ref-5)
6. 17 Multiple safety system status indications can be combined into the air bag warning indicator [↑](#footnote-ref-6)