

Study on the benefits for road safety resulting from the installation of Event Data Recorders (EDRs)

Summary and conclusions of the stakeholder meeting held on 5th June 2014 in Brussels

1 Introduction

The aim of this study is to assist the Commission in deciding whether the fitting of Event Data Recorders (EDRs) in all vehicles or certain categories of vehicles could result in an improvement of road safety or have other possible consequences that would justify the costs associated with EU legislative measures or other measures to encourage adoption. As part of the consultation for the project, a stakeholder meeting was held on 5th June 2014 to obtain the opinions of stakeholders on a range of technical questions on Event Data Recorders.

The meeting was very successful: 36 stakeholders from 25 organisations attended and this provided a good level of information exchange. This document provides a high-level account of the main issues discussed at the meeting; this is not intended to reflect all representations made at the meeting, but to provide a summary of the key findings, areas of consensus, and points on which the views of the stakeholders varied.

2 EDR fitment, technical aspects and specifications: Passenger cars, Heavy commercial vehicles, Light commercial vehicles

2.1 Passenger cars

There was unanimous consensus that EDRs are equipped to “all or nearly all” new passenger cars sold in Europe and that these typically already meet Part 563 requirements. Numerous examples were given regarding first-hand experience of accessing EDR data using the Bosch tool (it was also noted that Kia and Hyundai also have specific EDR access tools).

There was agreement that the EDR system architecture should not be specified, and that this should be left to the manufacturer to decide how to integrate into the vehicle. However, the data recorded by the EDR and access to the data should be standardised as this promotes cost savings in manufacturing as well as making the exploitation of the data easier and more effective.

It was discussed that there was no reason why any European EDR specification should not improve on Part 563 in terms of sample rate, parameters recorded or the facility to trigger on accidents with vulnerable road users, although such changes would also result in increased costs. Suppliers indicated that it was feasible to use pedestrian detection systems to provide a signal to the EDR for triggering purposes. Such systems were not on the market when Part 563 was developed and the view was expressed from more than one stakeholder that all the available information from Advanced Driver Assistance

Systems (ADAS) and active safety systems should be used where possible. There was agreement that there was no technical reason why the function, status and activity of active systems could not be recorded.

In line with future road safety targets, EDR information provides an improvement in understanding accident causation and therefore also the appropriate countermeasures. There was a consensus view that legislation was needed to realise the benefits of EDRs – especially for VRU accidents – and this requires a minimum specification for:

- The data (type, rate) recorded by an EDR;
- The interface/tool used to access the EDR;
- The triggering conditions for the EDR; and
- The number of events stored by the EDR.

However, one stakeholder expressed the opinion that making the EDR mandatory was not required because the EDR itself does not solve any safety issues and the broad solutions for road safety improvement are already known. Several stakeholders considered that it may not be necessary to mandate fitment, because most vehicles are fitted anyway and most of the potential benefits can be realised without 100% fitment.

It was suggested that the most important factor was the standardisation of the data, access, and triggering conditions; this could form the 'first step' with a decision as to whether or not to mandate EDR fitment as a 'secondary step'.

2.2 Light commercial vehicles

There was much less information forthcoming about light commercial vehicles. The consensus view was that M1-derived vehicles were probably all fitted with EDRs because they also have an airbag control unit and have a system architecture similar to M1 vehicles, but that other N1 vehicles might not be fitted (when not equipped with an airbag control module). There was no specific information from the OEMs and suppliers at the meeting.

2.3 Heavy commercial vehicles

Heavy vehicles have a different system architecture (compared to cars), with distributed information stored in various subsystems around the vehicle, e.g. the engine control unit and the AEBS control unit. EDR-type data is present on many or most of European heavy commercial vehicles, but no specific information was forthcoming.

An alternative approach to EDR triggering is required for these vehicles required because even if equipped, the airbag is not an appropriate trigger for the EDR on heavy vehicles.

In a similar way to passenger cars, a strong view was expressed that any legislation should specify the technical requirements of the system, but not how the system was organised within the vehicle. Furthermore, it was agreed that the EDR should not be integrated within the digital tachograph because there is not enough space within the design package of the tachograph and the risk of tampering would be reduced if the EDR and digital tachograph functions were separated. One stakeholder indicated that the EDR data was more secure when distributed in the systems around the vehicle, although it was acknowledged that the way in which the data was accessed could be simplified and it would be beneficial if it could be accessed via a single download.

3 EDR data access and use; data protection and confidentiality issues

In general drivers are unaware that their vehicle has an EDR, what data is recorded, and who has access to the data. It was highlighted that this is a general concern. At present, the OEM typically provides a statement in the driver's manual regarding the data that may be stored in the vehicle, but the feeling was that this was probably not detailed enough, and that most drivers are still unaware because they do not read the manual. Several stakeholders thought that general consumer awareness of EDRs should be increased.

Attendees agreed that the data protection situation in Europe was clear and well-defined: EDR data is not personal unless the person accessing/using the data is also in the possession of information that can link that data to an individual. The European Directive on data protection¹ requirements are implemented at the national level and these form an effective framework.

Comments at the meeting reflected TRL's legal findings regarding ownership of the data and the situation in the US; the consensus view was that the owner of the vehicle also owns the data. However, there is a need for this arrangement to be formalised, as this is the first step in accessing the data. Specific fleets (commercial fleets for example) already include contractual requirements that specify the ownership of the EDR to the vehicle owner. Some insurance may also have clauses that allow the insurance company access to the data.

Stakeholders agreed that the owner of the data should have power over the data, unless a crime is suspected or is being investigated, in which case the authorities can access the EDR data as evidence. It was also agreed that the owner (or the driver if not the owner) should have transparency regarding who holds the data in question and what they are using it for.

Some views were that the driver that created the data, if they are not the vehicle owner, should also expect some say on access to the data. For example, in the case where they are different, the owner may be required to obtain the permission of the driver to provide a third party access to data, unless the police or the courts request the data.

OEM access to EDR data (for example during servicing) was discussed and a view expressed that this should not be allowed without the permission of the owner, although preventing access would in practice be difficult and outside the control of the vehicle owner. However, the OEM use information stored in the vehicle in order to maintain and service the vehicle appropriately and some vehicles have a variable service interval, which is only possible if the vehicle is monitoring how it is used. The benefits to the manufacturers in using the information to improve the safety of future vehicles can also only be achieved if the OEM has access to the data.

One stakeholder cited the situation of one manufacturer that stores vehicle data in 'cloud storage' off the vehicle. A view on the acceptability of this was not reached, but this

¹ Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, OJ L 281, 23.11.1995, p.31

raises the issue of the vehicle owner not having access control over the data and should be considered for the future.

Data security was raised in relation to CANBUS data being accessible externally. One stakeholder indicated that part of the CAN network was accessible via mobile data, but that the EDR was not on this network. The airbag control module is protected and not open to hacking because by design it is crucial that the data cannot be manipulated. Data security is crucial for EDR data and for this reason the storage location should be on a secure CAN and not merged with any other systems (eCall on cars, digital tachograph on heavy commercial vehicles). One stakeholder commented that excessive controls on EDR data were not required over and above what is already implemented as part of good design.

It was agreed that EDR data can be erased or overwritten with dummy data and that tutorials exist on the internet showing how to do this. It was suggested that the data should be read only once written, but it was not clear if this would conflict with the way current EDRs record data.

There was a general view that no additional tampering controls are required for passenger cars because there is probably not the opportunity between the accident and being apprehended to erase or edit the data. Furthermore, the physical access to the airbag module is very difficult without specialist knowledge, and even then is still a significant job.

It was agreed that national law governed the access to data and the law of the country in which the accident occurred would prevail. It was highlighted that the national laws throughout Europe might not be at the same level and this might have implications for some citizens, although those aspects with European Directives (e.g. data protection) have minimum requirements that apply throughout the EU.

There was strong agreement around the table that access to the EDR data could be standardised, although because there are currently only three different access tools (for passenger cars) there is no requirement for further standardisation. For heavy vehicles, it would be preferable to be able to access the data from a single location. For all vehicle types protection on the access point (both physical and encryption of the data) would provide security to prevent tampering, but such measures were generally considered unnecessary by stakeholders.

4 EDR safety benefits and costs

Monitoring systems have been shown to bring about reductions in accidents; however, there is no such evidence base for EDR. Benefits in the literature relate to commercial fleets and there is not the same evidence for private fleets. More research is required on the effect of EDRs on driving behaviour in private fleets.

One stakeholder had a strong opinion that the EDR does not provide a safety solution because the causes (and countermeasures) for accidents are already known: having EDR data on these accidents will not change the cause or provide a solution. Other stakeholders noted that EDR data from accidents would be important for research to establish the relative efficacy of different countermeasures, allowing manufacturers to focus on those that provide the greatest benefit. This would also assist regulators in having robust evidence on which to base action to encourage the systems that realise the greatest benefits.

There was consensus that an up to date specification for EDR should use all the information available and that the data provides an improved quality of evidence for accident causation and system effectiveness.

There was agreement that EDR data not a 'silver bullet' in terms of accident reconstructions and that other data will always be required in conjunction with the EDR data. Several stakeholders highlighted that EDR data would reduce the cost and increase the accuracy of accident reconstructions significantly.

Many benefits (access to justice, better reconstructions) are very difficult to monetise. The difficulties of this were highlighted, but the overall impact depends on how close to break-even the quantifiable costs and benefits lie.

5 EDR Implementation aspects

Differences were highlighted between the Part 563 and "Veronica"² specifications in terms of recording delta-v or acceleration and "if recorded" specifications. It was agreed that without acceleration data, derivation of crash pulses would be possible, but that resulting pulse reconstruction would be relatively coarse because the recording rate for delta-v is low (100 Hz). It was highlighted that delta-v is the best measure of crash severity. Greater benefits would therefore be possible by following the Veronica specification, but a view on whether these outweigh the benefits of harmonising with Part 563 was not reached at the meeting, although it is known that some US systems also record acceleration in addition to delta-v even though they are not required to do so.

The group again agreed that all the data pertaining to ADAS and active safety should be recorded and there is the scope and to go further than that specified by Part 563. Since the vehicle already records these, there is no additional cost for these parameters.

Part 563 states that the "data must be available". The unanimous view was that the wording of any European specification could be tightened to prevent EDR being sent to manufacturers for decoding report. This is relevant for legal cases, where this process breaks the chain of evidence.

There was agreement that specific training is required in the downloading and interpretation of the EDR data, but the current arrangements within each country regarding people authorised to access the data are sufficient.

For heavy vehicles, the EDR data should be stored (or accessed from) a single location so that the download of EDR is easier.

Validation of the EDR system and the resulting data must be made in real crashes. This could be achieved for most parameters by recording in the legislative frontal and side impact crash tests. Euro NCAP tests would also provide an opportunity to test at higher impact speeds. It was noted that not all functionality of an EDR can be validated this way.

The use or integration of the VIN³ being linked to the EDR data would be a benefit for legal cases and circumstances where the chain of evidence is important. However, the

² VERONICA I and II: <http://www.veronica-project.net>

³ Vehicle Identification Number

VIN is not generally required for research purposes (although some make/model/fitment might be included) and the inclusion of the VIN may make the data personal in conjunction with some other information.

The consensus view was that a centralised European database would not be required and as long as the data specification was standard, data could be compared as required. Creation of a database of EDR validations was flagged as a useful tool to compare EDRs.

6 Conclusions

The main conclusions of the stakeholder meeting can be summarised as follows:

- All (or almost all) new passenger cars are fitted with EDRs that meet Part 563 and therefore the fitment costs (for these vehicles) have already been incurred. Light commercial vehicles (M1-derived) are also generally fitted with EDRs that meet or nearly meet Part 563 requirements. Those light commercial vehicles with optional airbags (that are not fitted) do not have EDRs. Large commercial vehicles are all (or nearly all) equipped with distributed systems that store EDR-type data.
- Some specific vehicles may not be equipped with EDRs and for these vehicles, there will be additional costs to meet any requirements for mandatory fitment.
- EDR data should be specified in terms of what is recorded, how it is recorded, how recordings are triggered and how recordings are stored. There is no reason why these data specifications should not be mandated; the fitment of EDRs could be mandated at a later step, as EDRs are already fitted to the vast majority of vehicles. Nothing in any European country (technical or legal) prevents EDRs being made mandatory. The benefits to research do not require 100% fitment; however, for some issues (such as access to justice) it may be expected that the same quality of information is available to prove innocence or secure a conviction.
- There is no reason why any European specification should not improve on Part 563 in terms of sample rate, parameters recorded (including active safety systems) or the facility to trigger on collisions with vulnerable road users. Suppliers indicated that it was feasible to use pedestrian detection systems to provide a signal to the EDR for triggering purposes. Such systems were not on the market when Part 563 was developed and the view was expressed from more than one stakeholder that all the available information from Advanced Driver Assistance Systems (ADAS) and active safety systems should be used where possible.
- Additional requirements for a European EDR specification will result in increased costs (as yet unspecified) for changes to triggering parameters and/or the integration of new signals (e.g. from active safety devices).
- The system architecture of the EDR should be left to the manufacturer and should not be integrated with other systems (eCall on cars and digital tachograph on heavy vehicles).
- The owner of the vehicle is considered to be the owner of the EDR data (as is the case in the US) although there were some differing views on this. Clarification of the ownership of EDR data would be welcomed and would improve the procedure to access the data.
- EDR data by itself does not constitute personal data. However, if any individual can be linked to the data then this becomes personal data and the European data protection directive applies. This is implemented at the national level and compliance was considered appropriate and effective to ensure data protection.
- A range of safety benefits of EDRs have been identified relating to more accurate and cheaper accident reconstructions for research, information to assist manufacturers in improving design and safety systems and more effective access

to justice. While there is evidence that a driver's behaviour in response to EDR fitment leads to a reduction in collisions in commercial fleets, the same level of evidence is not present for private fleets where the motivations for safer driving are different.

- There is scope for inclusion of active safety systems in the EDR data specification. This data is recorded by the vehicle already and would not result in any additional cost to include codes for: system function (switched on or switched off), system warning and system activation (if different).
- Availability of the EDR data should be via a harmonised tool (or small number of tools) and the data should be accessed via a single point, the security of which should be left to the manufacturer, but ought to be on a protected CAN and have appropriate security to prevent manipulation. The specification should exclude the manufacturer decoding the EDR and providing a report because this breaks the chain of evidence important for legal cases.
- Certification of download tools and specific training for the download and interpretation of EDR data are required to ensure accuracy of the data and to realise any legal benefits. The requirements for the individuals authorised to access the EDR data are covered adequately by existing arrangements.
- Tampering of EDR data is currently possible with expert knowledge and tools. However, the 'man on the street' is unlikely to have the knowhow and opportunity to tamper EDR data. Physical and/or data encryption security are possible; this should be left to the manufacturer and should not conflict with the requirements and ease of access to EDR data download for those approved to do so.
- Linking the EDR data with the VIN provides a benefit for legal cases and chain of evidence. VIN data may also provide some data for research (make/model/fitment) but also may make the data personal if the VIN could be linked to an individual using any other data held. The VIN should be recorded if possible and removed from any anonymised data where the VIN is not necessary to realise the potential benefits.
- A central European database of EDR data is not required and was considered to be an unnecessary cost. Provided the EDR data specification is harmonised, data can be compared between countries using similar exploitation models that exist for accident data and other European statistics. However, a central database of validation data may be useful.