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Connected vehicles:
Cyber security, software updates and over-the-air issues

Proposal for amendments to Annex 7 of Consolidation Resolution of the Construction of Vehicles (R.E.3)

Submitted by the expert from the United Kingdom of Great Britain and Northern Ireland*

The text reproduced below was prepared by the expert from the United Kingdom of Great Britain and Northern Ireland, with the aim to clarify the provisions in Annex 7 to the Consolidation Resolution of the Construction of Vehicles (R.E.3). It is based on informal document GRVA-17-27. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

I. Proposal

Annex 7., amend to read:

"**Annex 7**

Provisions on Software Identification Numbers

Ⅰ1.   Introduction

UN Regulation No. **156** [15…] on uniform provisions concerning the approval of vehicles with regards to software update and software updates management system is defining "*RX Software Identification Number (RXSWIN)*" that means a dedicated identifier, defined by the vehicle manufacturer, representing information about the type approval relevant software of the Electronic Control System contributing to the UN Regulation No. X type approval relevant characteristics of the vehicle.

In order to make use of RXSWIN, relevant UN Regulations ~~can~~ **shall** refer, ~~by incorporation,~~ to this annex to introduce relevant definitions and provisions**.** ~~as follow:~~

Ⅱ2.   Definitions

For the purpose of this Consolidated Resolution and the UN Regulations referring to this annex:

2.1.   "*R~~x~~[X] Software Identification Number (R[X]SWIN)*" means a dedicated identifier, defined by the vehicle manufacturer, representing information about the type approval relevant software of the Electronic Control System contributing to the UN Regulation No. [X] type approval relevant characteristics of the vehicle. **Where [X] is the number of the UN Regulation that is referring to the provisions of this Annex.**

2.2.   "*Electronic Control System*" means a combination of units, designed to co-operate in the production of the stated vehicle control function by electronic data processing. Such systems, often controlled by software, are built from discrete functional components such as sensors, electronic control units and actuators and connected by transmission links. They may include mechanical, electro-pneumatic or electro-hydraulic elements. "The System", referred to herein, is the one for which type approval is being sought.

2.3.   "*Software*" means the part of an Electronic Control System that consists of digital data and instructions.

2.4.   "*Software Update Management System"* means a systematic approach defining organizational processes and procedures to comply with the requirements for delivery of software updates.

ⅠⅡ3.   Requirements for software identification number

For the purpose of this Consolidated Resolution and the UN Regulations referring to this annex:

3.1.   ~~For the purpose of ensuring the software of the System can be identified, an RXSWIN may be implemented by the vehicle manufacturer.~~

3.2.   ~~If the manufacturer implements an RXSWIN, the following shall apply:~~

3.2.1.   ~~The vehicle manufacturer shall have a valid approval according to UN Regulation No. XXX [Software Update Process Regulation].~~

Note - as an alternative to the above paragraph:

3.1.   The vehicle manufacturer shall have a Software Update Management System (SUMS) which, together with the vehicle type, shall comply with the technical requirements of the original series or later of UN Regulation No. 156.

3.1.1.   For the purpose of ensuring that the software relevant to the system can be identified, an R[X]SWIN shall be used. The R[X]SWIN may be held on the vehicle or, if the R[X]SWIN is not held on the vehicle, the manufacturer shall declare the software version(s) of the vehicle or single ECUs with the connection to the relevant type approvals to the Approval Authority.

3.~~2~~.2.   The vehicle manufacturer shall provide the following information **to the Approval Authority** ~~in the communication form of this Regulation (the Regulation referring to this annex)~~:

(a)   The R[X]SWIN **and, in the case where the R[X]SWIN is not held on the vehicle, the related software version(s)**;

(b)   How to read the R[X]SWIN or software version(s) in **the** case **where** the R[X]SWIN is not held on the vehicle~~.~~**;**

(c)   Details on how to access the information from the auditable register for all software versions relevant to the R[X]SWIN.

3.2.3.   The ~~vehicle manufacturer may~~ **Approval Authority shall** provide**,** in the communication form of the ~~related~~ **UN** Regulation **that is referring to this Annex,** a list of the relevant parameters that will allow the identification of those vehicles that can be updated with the software represented by the R[X]SWIN. The information provided shall be declared by the vehicle manufacturer ~~and may not be verified by an Approval Authority~~.

3.2.4.   The vehicle manufacturer may obtain a new vehicle approval for the purpose of differentiating software versions intended to be used on vehicles already registered in the market from the software versions that are used on new vehicles. This may cover the situations where type approval regulations are updated or hardware changes are made to vehicles in series production. ~~In agreement with the testing agency duplication of tests shall be avoided where possible.~~

IV.   ~~Production definitely discontinued and RxSWIN~~

4.1.   ~~If the holder of the approval completely ceases to manufacture a type of vehicle approved in accordance with this Regulation (the related Regulation referring to this annex), he shall so inform the authority which granted the approval. Upon receiving the relevant communication that authority shall inform thereof the other Contracting Parties to the 1958 Agreement applying this Regulation (the related Regulation referring to this annex) by means of a communication form conforming to the model in Annex [Communication form] to this the related Regulation.~~

4.2.   ~~The production is not considered definitely discontinued if the vehicle manufacturer intends to obtain further approvals for software updates for vehicles already registered in the market.~~

~~V.~~ ~~Necessary insertion in the Communication Form relevant to RxSWIN~~

~~*Note*: The communication form of the related Regulation referring to this annex shall include the mention Production definitively discontinued for such a case and shall include additional information regarding RXSWIN as follow (and marked in bold):~~

4. Amendments to the relevant UN Regulations

Note: The following paragraphs shall be integrated into or amended in the related Regulation referring to this annex.

In the paragraph titled "Definitions" the following sub-paragraph is inserted to read:

"**x.x.** **For the definitions with regard to Software Identification Number, refer to the Consolidated Resolution on the Construction of Vehicles (R.E.3), Annex 7, paragraph 2.**"

In the paragraph titled "Requirements" the following sub-paragraph is inserted to read:

"**x.x.** **With regard to Software Identification Numbers, the requirements of the Consolidated Resolution on the Construction of Vehicles (R.E.3), Annex 7., paragraph 3., shall apply.**"

In the paragraph titled "Product definitely discontinued" the following sub-paragraph is inserted to read:

"**x.x.** **The production is not considered definitely discontinued if the vehicle manufacturer intends to obtain further approvals for software updates for vehicles already registered in the market.**"

The Annex titled "Communication" is amended to read:

"

Communication

…

Additional information regarding R[number of this Regulation]SWIN:

R[number of this Regulation]SWIN: ....

Is the R[number of this Regulation]SWIN held on the vehicle: Yes/No

Information on how to read the R[number of this Regulation]SWIN, or the relevant software version(s) in the case where the R[number of this Regulation]SWIN is not held on the vehicle: ....

Description on how to access the information from the auditable register of all software versions relevant to the R[number of this Regulation]SWIN: ....

If applicable, list the relevant parameters that will allow the identification of those vehicles that can be updated with the software represented by the R[number of this Regulation]SWIN under the item above: ....

"

~~Communication~~

~~(Maximum format: A4 (210 x 297 mm))~~

issued by: Name of administration:

....

....

....

~~Concerning:[2]   Approval granted~~

~~Approval extended~~

~~Approval withdrawn with effect from dd/mm/yyyy~~

~~Approval refused~~

~~Production definitively discontinued~~

~~of a vehicle type, pursuant to UN Regulation No. [*this Regulation*]~~

~~Approval No.: ....~~

~~Extension No.: ....~~

~~Reason for extension: ....~~

~~(...)~~

~~(...)~~

~~Additional information regarding RXSWIN:~~

~~Information on how to read the RXSWIN or software version(s) in case the RXSWIN is not held on the vehicle: ....~~

~~If applicable, list the relevant parameters that will allow the identification of those vehicles that can be updated with the software represented by the RXSWIN under the item above: ...~~

~~"~~

II.   Justification

1.   The reason to implement the reference to Annex 7 to the Resolution R.E.3 into the system regulations is to allow for the relevant software(s) for that approval to be identified in service. Currently the use of R_XSWIN is at the discretion of the manufacturer because UN Regulation No. 156 does not mandate its use and since there are no requirements on the vehicle type in UN Regulation No. 156 if an R_XSWIN is not used there would be no means to identify the relevant software.

2.   The current wording of R.E.3 maintains that optionality, which limits the capability of authorities to identify software should an R_XSWIN not be used. This was a flaw that was identified in UN Regulation No. 157 that originally used the text from R.E.3 but was subsequently changed to require an R_XSWIN. Changing the wording in RE.3 to require an R_XSWIN does not mandate it in all circumstances, it would be only for those system regulations that refer to it. This is the activity that WP.29 has requested the GRs to undertake; to identify which UN Regulations are where there needs to be the capability to identify the relevant software(s). Manufacturers can currently use R_XSWIN in an optional, harmonised way without reference to R.E.3 as all the provisions relating to it are contained in UN Regulation No. 156. Therefore, there is no benefit in update and referencing the text in R.E.3 unless it is to mandate its use.

3.   It should be noted that R_XSWIN is simply a unique identifier and does not need to be in the format: R79ABCDE, as an example. Consequently, the software identification number

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[1]   Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

[2]   Strike out what does not apply.

of the ECU or component could be used as the R_XSWIN. However, it is appreciated that it is not likely since system approvals will tend to use many ECUs and software. Nevertheless, this is dealt with through utilising the fact that the R_XSWIN can be recorded off-board the vehicle. In this instance the unique identifier of the R_XSWIN acts as a reference to all the relevant software version(s) on the vehicle but that the manufacturer has to provide in the auditable register the list of the software version(s) under that R_XSWIN. If the manufacturer is employing a certifiable SUMS then this process should already be in place as they will need to be able to identify the software relevant to a particular approval on any vehicle approved to UN Regulation No. 156.

4.   This proposal here is utilising the amendments made in Supplement 2 to UN Regulation No. 157 where it was clarified that an R_XSWIN should always be used. Amendments are also made to the communication file so that relevant information about the R_XSWIN is clearly available.

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