

Proposal for Amendment 3

Submitted by the Chair (Republic of Korea) of the Informal Working Group on the Deployable Pedestrian Protection Systems of UN Global Technical Regulation No. 9. *

The text reproduced below was prepared by the experts of the Informal Working Group (IWG) of the Deployable Pedestrian Protection Systems (IWG-DPPS) on UN Global Technical Regulation No. 9 and proposes provisions on the preamble regarding the DPPS. The modifications to the existing text of the UN Global Technical Regulation No. 9 (ECE/TRANS/180/Add.7, Corr.1, Amend.1 and 2) are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2022 as outlined in proposed programme budget for 2022 (A/76/6 (part V, sect. 20) para. 20.76), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

In Section I: Statement of Technical Rationale and Justification:

1. *Renumber Paragraph 0 as Paragraph 0 bis, and add a new Paragraph 0 to read as follows:*

0. FOREWORD: UN Global Technical Regulation (GTR) No. 9, Pedestrian Safety, was established in the Global Registry on 12 November 2008. Development of the original GTR is discussed as “Phase 1” beginning with paragraph 0 bis. The GTR was amended by Corrigendum 1 on 12 November 2009, and by Corrigendum 2 and Amendment 1, affecting only the scope of the GTR, on 10 November 2010. Amendment 2 was established on 14 November 2018 and replaced the European Enhanced Vehicle-safety Committee (EEVC) lower legform impactor used for the bumper test with the flexible pedestrian legform impactor (FlexPLI). Development of Amendment 2 is discussed as “Phase 2” beginning with paragraph 133. Amendment 3 was established on [insert date when established] and added new requirements for vehicles equipped with a Deployable Pedestrian Protection System (DPPS). Amendment 3 is discussed as “Phase 3” beginning with paragraph 228. The informal working group that developed Amendment 3/Phase 3 notes that paragraph 122 in the discussion of Phase 1 has been superseded for vehicles equipped with a DPPS.

2. *After paragraph 227, add a new subsection C to read as follows:*

C. Phase 3

228. Sections 1. to [x]. reflect the development of Phase 3 of UN GTR No. 9 and are related to the development of test provisions for vehicles equipped with deployable pedestrian protection systems (DPPS), including prerequisites, without changing the headform impactors and their corresponding parameters for tests to the bonnet top.

1. INTRODUCTION AND GENERAL BACKGROUND

229. During the fifty-sixth session of GRSP (9-12 December 2014) the expert from Korea proposed the development of test provisions for active devices to further improve vehicle safety performance. It was noted that guidelines already existed for testing active bonnets (INF GR/PS/141 Rev. 1), however these were considered to be insufficient, and consent was sought from WP.29 and AC.3 to extend the mandate of the IWG on the development of phase 2 to GTR No. 9.

230. The proposal from Korea to develop an amendment to GTR9 with regards to test provisions for deployable systems of the outer surface to ensure an adequate protection of pedestrians was endorsed by AC.3 at its forty-eighth session (17 November 2016) and the mandate of the IWG on the development of Phase 2 was extended until December 2017.

231. The development of the test provisions for deployable systems was initiated by a Task Force under the umbrella of the IWG on phase 2 (TF-DPPS). After four meetings of TF-DPPS, the mandate of the IWG expired. Subsequently, AC.3 endorsed at its fifty-second

session (14 March 2018) the transformation of TF-DPPS into a new Informal Working Group (IWG-DPPS).

232. The TF-DPPS had held the following meetings:

- (a) 27-28 February 2017; Paris, France**
- (b) 28-29 March 2017; Paris France**
- (c) 7 September 2017; virtual**
- (d) 21-23 November 2017; Berlin, Germany**

233. The IWG-DPPS had held the following meetings:

- (a) 18-20 April 2018; Frankfurt/Main, Germany**
- (b) 5-7 September 2018; Brussels, Belgium**
- (c) 10 December 2018; Geneva, Switzerland**
- (d) 12-14 March 2019; Paris, France**
- (e) 3-4 September 2019; London, United Kingdom**
- (f) 28 November 2019; virtual**
- (g) 4-5 March 2020; virtual**
- (h) 15-17 September 2020; virtual**
- (i) 18 November 2020; virtual**
- (j) 20-21 January 2021; virtual**
- (k) 9-10 March 2021; virtual**
- (l) 27-28 April 2021; virtual**
- (m) 29-30 June 2021; virtual**
- (n) 14-15 September 2021; virtual**
- (o) 16-17 November 2021; virtual**
- (p) 9-10 February 2022; virtual**
- (q) 5-6 April 2022; virtual**
- ® 2-3 June 2022; hybrid**
- (s) 18-19-20 October; 2022; hybrid, OICA-Paris**
- (t) 8-9 Nov2022; virtual**
- (u) 15-16 Nov2022; virtual**

234. The meetings were attended by representatives of: EC, France, Germany, Italy, Japan, Korea, the Netherlands, Spain, UK, USA, CLEPA and OICA.

235. The meetings were chaired by Mr. Park (Korea), while the secretariat was provided by Mr. Kinsky (OICA) from February 2017 (TF-DPPS1) until September 2018 (IWG-DPPS 2nd session), and by Ms. Dausse (OICA) for the IWG meetings since November 2018.

[236. TRANS/WP.29/GRSP/2022/02 was proposed at the seventy-first session of GRSP and was a revised draft GTR not including the preamble. An informal document will be proposed to update the working document.]

2. PRINCIPLE of DPPS

237. DPPS should be activated as intended for pedestrian protection when the pedestrian is hit by a vehicle. To achieve this goal, the IWG agreed that requirements were needed to ensure that:

- The pedestrian's collision is detected, and
- The existing headform requirements in the GTR are met for a 35km/h head impact velocity as well as for vehicle speeds below the deployment threshold of the DPPS.

Only contact sensors are taken into consideration for detection on current DPPS.

238. This Regulation is to improve protection from injury caused by the vehicle front during a collision with a pedestrian. To assure that a DPPS operates properly and offers at least the same level of pedestrian protection as a conventional passive system, the IWG agreed that the system provisions listed in 237 are needed at a minimum. Additionally, the IWG discussed the need for two other system requirements:

- Higher speeds - Assurance that a DPPS system will deploy safely at pedestrian impact speeds above 40 km/h
- Body loading - Assurance that pedestrian body loading of a DPPS will not compromise its effectiveness prior to head impact

These needs may exist for DPPS systems in particular, as opposed to conventional passive systems. Members of the IWG expressed their concerns that at higher speeds, actuator limitations may prevent the timely deployment of a DPPS, while the negative effects of body loading may be exacerbated by a deployed system without sufficient support. Some members of the IWG found that a reasonable bonnet clearance at the location and prior to the head impact is needed to prevent a hard head contact due to a collapsing bonnet.

239. At this time, the IWG agreed that a regulatory need is not known with enough certainty to warrant the development of test procedures and requirements related to higher impact speeds and body loading. In other words, current DPPS systems that meet the requirements listed in paragraph 237 may also account for higher impact speeds and body loading. However, further research or the development of future DPPS may result in insights for which the effect of pedestrian body loading and protection at higher speeds may require special attention. Additionally, future accidentology may reveal a prominent safety need exists in current DPPS systems due to body loading and impacts at higher speeds. In either case, the GTR will be reviewed and adapted if and where necessary.

240. At the request of the United States, the IWG decided that, based on a determination by each Contracting Party or regional economic integration organization, either all requirements shall be demonstrated using the dynamic test in (insert cite), or, when the following conditions are fulfilled, all requirements may be demonstrated using the static test in (insert cite): [• Detection Test Area, Detection Verification, Determination of Head Impact Time, Protection at Speed below Lower Threshold].

3. DETECTION TEST AREA, LATERAL OFFSET LEG VERSUS HEAD

241. As one of the fundamental prerequisites to account for the potential safety benefits of DPPS, the pedestrian needs to be detected during an accident prior to head impact on the vehicle. The IWG discussed the required width of the area on the vehicle front where a pedestrian needs to be detected in order to purposefully initiate the system.

242. An earlier Task Force study was recalled by the expert from Germany in which it was shown that pedestrian impacts take place over the entire vehicle width (TF-BTA-6-07). In a later IWG meeting, LAB presented an analysis of fatal French accidents contained within the Etudes Détaillées d'Accidents (EDA) database (IWG-DPPS-18-08) The LAB analysis revealed that for all cases in which a pedestrian was struck outside the longitudinal frame rails of the vehicle, accounting for approx. 15-20% of the vehicle width, there were no subsequent head impacts to the bonnet (though about 1/3 of the cases did result in pelvis impacts to the bonnet). Thus, in principle and ideally, a detection of pedestrians in nowadays DPPS should be required accordingly.

243. Also, it was agreed that in many cases the pedestrian may tend to spin off at the outer widths of typically angled or V-shaped vehicle front end surfaces, without a head-to-bonnet impact. This effect is even more present when using a leg impactor as pedestrian surrogate without attaching any mass of a pedestrian hip, torso, arms, neck, and head, consequently limiting the load on the sensing system and therefore not being representative for a pedestrian.

244. In the light of these observations, the IWG investigated further definitions of a detection area.

245. The expert from Japan proposed the detection area, which would differ from the leg test area, being the area in the lateral direction of the vehicle in which activation of the DPPS is ensured in a vehicle-to-pedestrian impact (Task Force Document DPPS-3-03). Reason given was that only in this area a head impact test would be allowed with activated DPPS, while outside this area the DPPS was supposed to remain deactivated.

246. The expert from Germany suggested to use the bumper test area (BTA) as already defined for the lower extremity injury risk assessment based on the tests with the lower legform impactor. Since the FlexPLI was also chosen as verification impactor (compare Chapter 4) and the BTA is well elaborated and established, the expert from Germany reasoned that existing definitions could be applied.

247. The expert from ACEA also referred to current regulatory definitions and proposed to apply the lower leg test area defined in amendment 2 to GTR no 9 as required confirmation of sensing capabilities for DPPS homologation or self-certification (IWG-DPPS-1-08).

248. The expert from OICA suggested to define the outer boundaries of the detection area by the width between the corner reference points (CRPs, the intersections of the side reference lines and the bonnet leading edge reference line), projected to the upper bumper reference line (IWG-DPPS-4-05). It was noted by IWG participants that when a vehicle has multiple or continuous intersections between the BLERL and the SRL, the most outboard point is used as the CRP. It was also noted that the distance between right and left CRPs can be narrowed easily by a minor, cosmetic redesign of the vehicle front end. Such a redesign would have no effect on the legform test zone but could lead to large differences in CRP locations and thus greatly affect the DPPS detection test area. Therefore, the IWG abstained from further discussions on the use of the CRP in defining the detection test area.

249. The expert from BGS proposed a required percentage of the vehicle width (around the longitudinal vertical centreplane as its centre) as detection test area, with a subtraction of no more than 12.5 percent of the vehicle width but a maximum of 250mm at each side of the vehicle. The BGS proposal also stated that the detection test area should be no less than the BTA (IWG-DPPS-5-09). It was explained that with a percentage all vehicles would be equally treated, regardless their effective width; however, big cars should not be allowed to further reduce the detection area, beyond 250mm on each side.

250. The expert from Germany subsequently provided an update to the BGS proposal wherein the vehicle width was defined as the width at the cross-section of the front axle, without rear view mirrors or rear-view mirror substitute systems, so that the proposed detection test area was not linked to the width of the deployed area of the DPPS. (IWG-DPPS-7-10). Examples of four current vehicle models were displayed to show how the detection test area based on the 12.5 percent stipulation was greater than the BTA.

251. Japan investigated the outer most boundary of the detection area proposed by Germany and confirmed that it covers the headform test area for vehicles equipped with DPPS currently available on the market in Japan. Thus, Japan accepted the detection area proposed by Germany. However, it was suggested that in cases where the sensing width is narrower than the width of the detection area, the DPPS would be allowed to only be activated within the sensing width (IWG-DPPS-9-09). Rationale was the lateral offset between the lower extremity impact and the pedestrian head impact after wrap around would be considered as rather small.

252. The group examined indications regarding the possible lateral offset between lower extremities and head in pedestrian accidents with passenger cars.

253. The expert from Japan presented PMHS tests, HBM finite element simulations and dummy tests where the lateral movement of the pedestrian's head until the head impact on

the vehicle front was small. It was concluded that the impact locations of the head and the leg would not differ a lot (IWG-DPPS-10-04).

254. The expert from Germany examined some cases from the German in-depth accident database (GIDAS) for real world trajectories of pedestrians. The sample showed in several cases a significant lateral offset between the first leg impact and the subsequent pedestrian head impact. They concluded that laboratory test conditions with stationary test specimen do not always reflect real world impact conditions in an appropriate way (IWG-DPPS-10-09).

255. The expert from Japan proposed that the pedestrian accidents scenario assumed under current GTR9 is the case when the vehicle impacts the stationary pedestrian from the side, and the pedestrian accidents scenario assumed in the test for DPPS should be the same as current GTR9. Japan found that, for consistency reasons, a consideration of the pedestrian kinematics with significant lateral offset between the pedestrian's leg impact and the subsequent head impact would require such a consideration with modified impact angles also during component tests. However, Japan also showed that this would not be in the scope of the IWG and beyond the minimum requirements as specified in the GTR (IWG-DPPS-11-03).

256. The expert from Germany clarified the objective of the IWG, which was not limited to clarification of the current practice, but also to develop new and more detailed requirements, where needed, to ensure a correct activation and design for vulnerable road user protection. Since the detection of pedestrians is one of the indispensable prerequisites and DPPS needs to be correctly activated, real world conditions under consideration of pedestrian trajectories with a considerable offset between leg and head impact need to be taken into account to provide for at least the same level of protection as conventional systems without DPPS (IWG-DPPS-11-05).

257. The expert from Japan presented a literature review of real-world accident data and concluded that a walking pedestrian hit laterally by a vehicle would be a representative accident scenario (IWG-DPPS-12-07) which is reflected by the current GTR9 test procedures. The expert from Germany found that also a large number of oblique impacts were included in the share of given lateral impacts which need to be taken into consideration with respect to the leg vs. head offset. It was added that GTR9 would not only cover lateral but also oblique impacts, since the outer skin of the vehicle front would be in most cases not parallel to the moving trajectory of the crossing pedestrian and thus not perpendicular to the velocity vector of the impactor during the impact. Regarding the pedestrian accidents scenario assumed for DPPS, other contracting parties supported Germany's proposal, but Japan did not accept it. However, because the detection area proposed by Germany covers the headform test area for vehicles equipped with DPPS currently available on the market in Japan, Japan accepted the detection area proposed by Germany regardless the difference of assumption for the pedestrian accidents' scenario for the tests.

258. The expert from VDA explained possible shortcomings of the BTA definition when applied to the DPPS detection test area. For the lower leg injury assessment, the BTA is defined by the greatest of the following areas: (a) the area limited by the corners of bumper, moving on either side 42mm inboard; (b) the outermost ends of the bumper beam, moving on either side 42mm inboard. The expert from VDA took exception to the use of the bumper beam in defining the detection test area for DPPS applications (IWG-DPPS-14-04). They presented conditions that exist on two production vehicles, in which structures are appended to the bumper beam, but only for certain markets, in order to fulfil corresponding crash test requirements. These structures have the effect of extending the BTA. Hence, if the structures were used to stipulate the DPPS detection test area, there would exist different detection test areas for different markets.

259. Further discussion on bumper beam structures ensued. The expert from OICA described the structures as "optional" and insufficient to serve as a pressure tube backstop. Additionally, they extend outboard into an area in which the fascia covering is curved (outboard to the corners of bumper as defined by the 30-degree gage). These two factors preclude the ability to install a sensing tube that could generate enough signal to trigger a DPPS actuator as described in a previous VDA analysis (IWG-DPPS-12-08).

260. A working subgroup of the IWG analysed current examples of DPPS on the market to guide a decision on how to proceed with a suitable definition for the detection test area. This survey included twelve production vehicles with different sizes and body styles. For each vehicle, following widths were noted: the OEM-reported, width of sensing, a possible detection test area determined by the 12.5 percent/250mm stipulation, and a possible detection test area determined via the lower leg BTA's criteria: the 30-degree gauge and the bumper beam (IWG-DPPS-18-07).

261. The survey revealed that the width of sensing can also extend outboard of the detection test area when defined by the relevant 30-degree corner gauge contact points and into an area where a glancing blow will occur. In the vehicle survey, the 12.5 percent-based width of the detection test area was wider than the corner gauge-based "geometry" in most of the vehicles surveyed. This shows that – at least to a certain extent – it is feasible to overcome the "spin off/low signal" issue brought up in IWG-DPPS-12-08.

262. The vehicle survey showed one instance where the corner gauge-based detection test area was greater than the 12.5 percent-based detection test area. In this case, the reported width of sensing was even greater. This shows that it is feasible to enforce the corner gauge-based detection test area when it is wider than the 12.5 percent-based width.

263. The vehicle survey also showed that some of the vehicles had reported widths of sensing that would not have met the width requirement of the detection test area as determined by the 12.5 percent stipulation or the corner gauge. This means that with phase 3 of global technical regulation no 9, new vehicles will have a greater width of sensing-relative to many vehicles not fulfilling this requirement.

264. Based on the aforementioned discussions, the bumper beam has been excluded from the stipulation for the DPPS detection test area. Furthermore, the exclusion is consistent with a performance-based standard. If it was included, it would partly act to prescribe the sensing tube technology and the form of the bumper beam itself. Originally, the bumper beam was considered because sensing technology that uses a pressure tube typically operates by using the beam as a hard surface to "back up" the tube. It was reasoned that if the beam is of a certain length, it is feasible to require the tube (and the sensing area) to be the same length: in three vehicles of the survey, the width of the bumper beam underlying the fascia exceeded the 75% stipulation. However, this misleadingly assumes that the beam will always be made of a rigid, tubular structure and that pressure tube technology is used. In fact, the survey showed that accelerometers were used in four of the vehicles. A regulation should not prescribe a particular technology or stand in the way of new technologies, such as different sensing technologies or bumper beams that take on different materials, shapes, and functions.

265. The IWG finally agreed upon the minimum width of the detection test area being the vehicle width minus 12.5% (but not more than 250mm) on each side but extending at least up to the points 42 mm inboard of each corner of bumper.

4. TEST PROCEDURES FOR THE SENSING SYSTEMS OF DPPS AND SELECTION OF THE VERIFICATION IMPACTOR

266. For verification of the functionality of the DPPS sensing system, component tests will be performed with the flexible pedestrian legform impactor (FlexPLI), representing the lower extremities of a 50th percentile male for injury assessment of knee and tibia injuries. The use of the FlexPLI as sensing impactor was agreed following extensive investigations.

267. Contact biofidelity was considered to be an indispensable property of such a sensing impactor. The IWG-DPPS found that, when verifying the ability of a contact sensor to detect a pedestrian, the relevant properties of an impactor are the total mass, mass distribution, moments of inertia, centre of gravity, impactor width, bending stiffness and the local stiffness / compression behaviour in impact direction were highly relevant properties of an impactor for the signals in use with contact sensors. While most properties of the FlexPLI were accepted to be very reliable due to its design specifications, two complementary studies were carried out to ensure its biofidelic and repeatable local stiffness.

268. The first study, carried out by Concept Tech, investigated time histories of different pedestrian surrogates and human body models for identical load cases. It concluded the FlexPLI had, in principle, an appropriate contact biofidelity to work as a representative pedestrian surrogate for sensing issues (IWG-DPPS-3-03).

269. The second study, carried out by BAST and Boehme & Gehring GmbH (BGS) in cooperation with ACEA members, focused on the intrusion during inverse tests at impact speeds typical for the lower deployment threshold of DPPS within the typical time interval for detection of pedestrians. Here, two different setups were used, covering the height dimensions as required by RCAR and UN-R 42 which need to be fulfilled by a high number of vehicles. It could be shown that the double integral of the filtered impactor acceleration signal, representing the intrusion, was within a small range with satisfactory coefficients of variation (IWG-DPPS-6-04, IWG-DPPS-7-09 and IWG-DPPS-9-11).

270. The IWG-DPPS concluded that the FlexPLI was currently the best available pedestrian surrogate which could be used as an impactor for the sensing verification of the system for the time being.

271. The IWG emphasized that, due to the complexity of testing the DPPS, the test provisions laid down represent a limited range of typical load cases. It is therefore seen as due care of the vehicle manufacturer that any DPPS would ensure the necessary protection (e.g., for a variation of speeds and pedestrian statures) in order to act as intended in the event of a collision with a pedestrian for a variety of pedestrian statures.

5. DETERMINATION OF HEAD IMPACT TIME (HIT) AND WRAP AROUND DISTANCE (WAD)

272. The pedestrian Head Impact Time (HIT) is defined as the elapsed time subsequent to the time of first contact of the Pedestrian surrogate (neglecting forearms and hands) with the vehicle outer surface and the time of first contact of its head with the vehicle outer surface.”

273. The IWG discussed three methods of determining HIT:

1. Use of human body model (HBM) simulations.
2. Use test dummies and physical testing.
3. Use of a “generic” approach.

274. The IWG ultimately agreed to propose a procedure using HBM simulations based upon a procedure on Euro NCAP TB024, as an initial DPPS amendment.

275. For deployable pedestrian protection systems to work as intended, it is necessary that the system in question is activated in due time.

276. The HIT of pedestrians of the relevant statures needs to be compared with the total response time (TRT) of the DPPS.

277. This comparison provides the basis for whether headform tests to the vehicle front are performed with the DPPS either statically in undeployed or in deployed position, or dynamically onto a deploying system.

278. The IWG DPPS understood human body model (HBM) simulations being the common method for determination of the HIT. In order to ensure comparability and applicability of HBM for that purpose, a qualification procedure for HBMs was developed within a subgroup of the IWG DPPS.

279. Given its limitations, the IWG recognized the qualification procedure being applicable for the determination of HIT and wrap around distance (WAD) only. The simulation procedure described is limited to HBM qualification for the determination of HIT and related WAD and not suited to qualify for injury assessment in any pedestrian or other crashworthiness regulations.

280. In order to create an independent baseline, reference simulations have been used to determine requirements and tolerances described in the Annex 2 "Qualification Process of HBMs for Pedestrian HIT-Determination". The HBMs that were used for these reference simulations have been validated by comparing their simulation responses (HIT, kinematics) with PMHS tests.

281. However, the injury assessment abilities of the HBMs are not validated. Therefore, and as of now, the HBMs may not be used for injury assessment in any pedestrian or other crashworthiness regulation.

282. The simulation procedures with the qualified HBMs and the actual vehicle model for HIT determination are described in Annex 3 "HIT determination simulation".

[283. Linear regression explanation]

[284. At the 14th meeting of IWG, an expert from Japan proposed to add the HIT calculation method currently used by the contracting parties applying UN regulation No.127 and requested to include the following text in GTR as Contracting Party's option (IWG-DPPS-14-03).

"A Contracting Party may choose to alternatively accept to use the (physical or numerical) simulation tools and method for HIT calculation different from the tool and method defined in *.* and *.* of this Annex, respectively, in case the equivalency is shown by the manufacturer and is agreed by such Contracting Party."

However, the Chair and an expert from Germany opposed Japan's proposal in which the calculation method is not specified, and mentioned that objective of the IWG is to clarify the test procedure in GTR. On the other hand, the European Commission and the Netherland expressed no objection to Japan's proposal as it is currently practiced by the contracting parties applying UN Regulation No. 127. At the end of the meeting, the Chair decided to request guidance for the 70th session of GRSP.

285. At the 70th session of GRSP, the Chair of DPPS IWG requested the guidance for Japan's proposal, and GRSP agreed, that the request by Japan to allow optional alternatives could be resolved by including the statement in the preamble (Part A).]

[GRSP, agreed, that the request by Japan to allow optional alternatives could be temporarily resolved by including the statement in the preamble (Part A) in brackets. This to give to Contracting Parties further time to consider and a final decision on removing those brackets could be made when the draft is reviewed by GRSP in May 2022.]

- [
- 6. PROTECTION AT SPEED BELOW LOWER THRESHOLD
 - 7. TRT MEASUREMENT
 - 8. HEADFORM TEST options
 - 9. DEPLOYED POSITION
 - 10. HEAD TEST AREA
-]

11. LIST OF DOCUMENTS DISCUSSED IN THE TF-DPPS and IWG-DPPS[[IWG ON UN GTR NO. 9 – PHASE 3]

<i>Doc. No.</i>	<i>Rev.</i>	<i>Name</i>
DPPS-1-01		1st Meeting Agenda
DPPS-1-02	1	Minutes of the First Meeting
DPPS-1-03		Task Force Outline
DPPS-1-04		Test Procedure of Deployable Systems for Pedestrian Protection (Korea)
DPPS-1-05	1	OICA proposal based on GRSP-58-31 as revised during the meeting – 20170227
DPPS-1-06		Comments on Scope (Japan)
DPPS-1-06-Appe		Comments on Scope – Appendix (Japan)
DPPS-1-07		Euro NCAP Pedestrian Testing Protocol v8.3 December 2016 (Germany)
DPPS-1-08		JNCAP Ped Active Device Test Protocol (unofficial) (Japan)
DPPS-1-09		Testing Deployable Bonnet Systems within Euro NCAP (Germany)
DPPS-1-10		Bonnet Deflection of Deployable Bonnet Systems (Germany)
DPPS-1-11		Industry Understanding on Rulemaking (OICA)
DPPS-1-12		Input bonnet deflection discussion (OICA)
DPPS-2-01	1	2nd meeting agenda
DPPS-2-02	1	Minutes of the 2nd meeting
DPPS-2-02-Annexe		Annex to the minutes of the 2nd meeting: Attendance list
DPPS-2-03	3	Requirements Overview DPPS (Korea)
DPPS-2-04		Prerequisites for Deployable Bonnet Systems in Deployed State (Germany)

<i>Doc. No.</i>	<i>Rev.</i>	<i>Name</i>
DPPS-2-05	1	Comments on OICA proposal (Japan)
DPPS-2-06		Comments on document TF-DPPS/1/05 Rev. 20170227 (Japan)
DPPS-2-07		Comments BAST on OICA Input Presentation (Germany)
DPPS-2-08		OICA comment for static and dynamic test (OICA)
DPPS-2-09		Marking of Deployable Bonnets: Differences of Bonnet Marking Positions and Challenges in Performance Assessment (OICA)
DPPS-2-10		Explanation JNCAP details for Items for DPPS Amendment (Japan)
DPPS-2-11		Development Head Test Procedure (Germany)
DPPS-2-12		Text for validation of simulation methods (OICA)
DPPS-2-13		Comments on document TF-DPPS/2/04 (OICA)
DPPS-2-14		Development of a Head Impact Test Procedure for Pedestrian Protection (Germany)
DPPS-2-15		Validity of a Headform to be used for a Specific Impact Test Speed Condition (Japan)
DPPS-2-16		Comments on document TF-DPPS/2/13 (Germany)
DPPS-3-01	Corr 1	3rd meeting agenda
DPPS-3-02	Corr 1	Minutes of the 3rd meeting
DPPS-3-03		Definition of sensing area (Japan)
DPPS-3-04		Proposal for Definition of Head Impact Test Area (Japan0)
DPPS-4-01	1	4th meeting agenda
DPPS-4-02		
DPPS-4-03		Scope and Limitations of the PDI-2 (OICA)
DPPS-4-04		Static and Dynamic Testing of Deployable Systems (OICA)

<i>Doc. No.</i>	<i>Rev.</i>	<i>Name</i>
DPPS-4-05		Marking + Deployed Position (OICA)
DPPS-4-06		JASIC proposals for document TF-DPPS/1/05-Rev.1 (Japan)
DPPS-4-07		Validity of Applying the Current Headform at Low Impact Speed (Japan)
DPPS-4-08		Dynamic Headform Test (Synchronization) (Korea)
DPPS-4-09		Discussion Issues for DPPS Testing (Korea)
DPPS-4-10		Alternative Determination of Head Impact Time (BGS)
IWG-DPPS-1-01		1st IWG-DPPS meeting agenda
IWG-DPPS-1-02	1	1st IWG-DPPS meeting notes
IWG-DPPS-1-03		IWG-DPPS Terms of Reference
IWG-DPPS-1-04	Corr 1	Presentation of the Euro NCAP CoHerent Project (Tu Graz)
IWG-DPPS-1-05		Comments: Deploy Height vs. Fully Deployed (OICA)
IWG-DPPS-1-06		Comments: Dynamic Testing (OICA)
IWG-DPPS-1-07		Comments: Pedestrian Sensing Impactor (OICA)
IWG-DPPS-1-08		ACEA Input: Definition of Sensing Width (ACEA)
IWG-DPPS-1-09		Summary of Compliance Test Procedure for Pedestrian Protection (Korea)
IWG-DPPS-1-10		
IWG-DPPS-1-11		Head Impact Time of Human Body Models (BAST)
IWG-DPPS-2-01	1	2nd IWG-DPPS meeting agenda
IWG-DPPS-2-02	1	2nd IWG-DPPS Meeting notes
IWG-DPPS-2-03		Summary Report Meeting 14 June 2018 (Sub-group Prerequisites)

<i>Doc. No.</i>	<i>Rev.</i>	<i>Name</i>
IWG-DPPS-2-04	2	Contracting Parties' positions on DPPS amendments
IWG-DPPS-2-05	2	Proposal: Decision on Deployed Testing of DPPS (OICA)
IWG-DPPS-2-06	1	Proposal for a Rev. 4 of Document TF-DPPS/2/03
IWG-DPPS-2-07		Summary of SAE Standard for Full-Scale Pedestrian Dummy (Japan)
IWG-DPPS-2-08		Quick check of proposed logic to not activate DPPS outside of sensing width (OICA)
IWG-DPPS-2-09		2nd IWG-DPPS Attendance list
IWG-DPPS-2-10		JLR Presentation on synchronisation comparison (OICA)
IWG-DPPS-3-01		3rd IWG-DPPS Agenda
IWG-DPPS-3-02		4th IWG-DPPS Minutes
IWG-DPPS-3-03		Leg impactors and HBM simulation comparison for detection (CONCEPT)
IWG-DPPS-3-04		Study of Application of Upper Leg form to sensing test (Japan)
IWG-DPPS-3-05		Principle of a test procedure for Human Body Model numerical simulation (OICA)
IWG-DPPS-3-06		Attendance list
IWG-DPPS-4-01	1	4th IWG-DPPS Agenda
IWG-DPPS-4-02	1	Draft minutes +BAST comments
IWG-DPPS-4-03		Task 27 (deploy bonnet) (OICA)
IWG-DPPS-4-04		System Information Requirement (South Korea)
IWG-DPPS-4-05		Sensing width proposal (OICA)
IWG-DPPS-4-06		Upper Leg Form Sensing Update (JASIC)
IWG-DPPS-4-07		Ped Dummy Test Procedure proposal (OICA)

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IWG-DPPS-4-08		Marking of bonnet deployed/undeployed (OICA)
IWG-DPPS-4-09		Attendance list
IWG-DPPS-5-01		Draft agenda
IWG-DPPS-5-02		Draft minutes
IWG-DPPS-5-03		Marking (South Korea)
IWG-DPPS-5-04		1st tentative draft
IWG-DPPS-5-05		Intended height test condition (JASIC)
IWG-DPPS-5-06		Sensing Impactors comparison (JASIC)
IWG-DPPS-5-07		Basis for General Wording Proposal (Germany)
IWG-DPPS-5-08		GRSP & WP29 report
IWG-DPPS-5-09		Detection Area Width (Germany)
IWG-DPPS-5bis-01		Draft agenda
IWG-DPPS-5bis-02		Draft skype minutes
IWG-DPPS-5bis-03		IDIADA -HIT calculation feedback (Spain)
IWG-DPPS-5bis-04		HIT calculation feedback (JASIC)
IWG-DPPS-5bis-05		ULF study 2013 (Altran)
IWG-DPPS-5bis-06		ULF study 2013-conclusion for detection (Altran)
IWG-DPPS-6-01	2	6th DPPS draft agenda
IWG-DPPS-6-02		6th IWG-DPPS Minutes
IWG-DPPS-6-03		V2 of draft text proposal (IDIADA)

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IWG-DPPS-6-04		Sensing Impactor for DPPS (Germany)
IWG-DPPS-6-05		HIT-WAD calculation (South Korea)
IWG-DPPS-6-06	2	HIT-WAD _Timing (OICA)
IWG-DPPS-6-07		Positioning of Ped HBM-v0 (OICA)
IWG-DPPS-6-08		Draft text proposal- updated (JASIC)
IWG-DPPS-6-09		Marking-up sketches (OICA)
IWG-DPPS-7-01		draft agenda
IWG-DPPS-7-02		IWG-DPPS 7-draft minutes
IWG-DPPS-7-03		Dynamic Static Test (South Korea)
IWG-DPPS-7-04		Test Area (South Korea)
IWG-DPPS-7-05		Draft-Annex (South Korea)
IWG-DPPS-7-06		THUMS Overview (Toyota)
IWG-DPPS-7-07		Positioning of Ped HBM (OICA)
IWG-DPPS-7-08		GHBMC_M50-PS_Mo (GHBMC)
IWG-DPPS-7-08add		GHBMC addendum-publications (GHBMC)
IWG-DPPS-7-09		Flex-PLI as Sensing Impactor for UN-R127 - Contact Fidelity (Germany)
IWG-DPPS-7-10		Detection Area Width (Germany)
IWG-DPPS-7-11		Generic-Vehicle-Models (TU Graz)
IWG-DPPS-8-01		IWG - draft agenda
IWG-DPPS-8-02		Draft minutes

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IWG-DPPS-8-03		Draft text Annex 2 organisation (Korea)
IWG-DPPS-8-04		FlexPLI Biofidelity for Detection - intermediate report (BAST/BGS)
IWG-DPPS-9-01		Draft Agenda
IWG-DPPS-9-02	2	Official minutes
IWG-DPPS-9-03		GTR9 Preamble for FlexPLI as detection impactor (BAST/BGS)
IWG-DPPS-9-04		Proposal GTR9 DPPS Sensor Detection (BAST/BGS)
IWG-DPPS-9-05		UNR127 amendment justification for FlexPLI as detection impactor (BAST/BGS)
IWG-DPPS-9-06		GRSP report
IWG-DPPS-9-07		Dynamic Static Test comparison (Korea)
IWG-DPPS-9-08		Comments on Korea Proposal for Draft Amendment (Japan)
IWG-DPPS-9-09		Proposal for Condition of Activation of DPPS (Japan)
IWG-DPPS-9-10	1	OICA – HIT simulation (OICA)
IWG-DPPS-9-11		Sensing FlexPLI Impactor Final Evaluation (BAST – BGS)
IWG-DPPS-9-12		Comment on IWG-DPPS-9-09 (BAST)
IWG-DPPS-10-01		Draft Agenda
IWG-DPPS-10-02		Draft Minutes
IWG-DPPS-10-03		IDIADA -Explanation_pressure_data-requirement (Spain)
IWG-DPPS-10-04		Leg_Head_Impact_Location_JASIC (Japan)
IWG-DPPS-10-05		HIT-HBM -TB024 simplification for Regulation (OICA)
IWG-DPPS-10-06		Ped-HBM-Certification for HIT Draft (OICA)

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IWG-DPPS-10-07		Decision list
IWG-DPPS-10-08		UN webpages proposals to store Generic Vehicle Models (UN Secretariat)
IWG-DPPS-10-09		Detection Area- Lateral offset of head-Accident Data (BAsT)
IWG-DPPS-11-01		Draft Agenda
IWG-DPPS-11-02		Draft Minutes
IWG-DPPS-11-03		Pedestrian Kinematic Assumptions GTR9 (Japan)
IWG-DPPS-11-04		Suggestion on Introduction of HIT Numerical Simulation (Japan)
IWG-DPPS-11-05		Clarification of IWG-DPPS scope (BAsT)
IWG-DPPS-11-06		Comment for Detection Area (ACEA)
IWG-DPPS-11-07		Decision list
IWG-DPPS-12-01		Draft agenda
IWG-DPPS-12-02	1	Minutes
IWG-DPPS-12-03		Sensitivity Analysis Pressure Data Requirement (IDIADA)
IWG-DPPS-12-04		Sensitivity Analysis Pressure Data Requirement-GTR9 (IDIADA)
IWG-DPPS-12-05		Pressure Data Requirement-UNR127 (IDIADA)
IWG-DPPS-12-06		Comments on Priority of HIT Prediction Method (Japan)
IWG-DPPS-12-07		Pedestrian Kinematic Assumptions GTR9 (Japan)
IWG-DPPS-12-08		Detection Area II (VDA_SMMT-CCFA)
IWG-DPPS-12-09	1	Clarification for HIT Regression (VDA-SMMT-CCFA)
IWG-DPPS-13-01		Draft agenda

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IWG-DPPS-13-02	1	Minutes
IWG-DPPS-13-03	1	Updated Decision_List
IWG-DPPS-13-04		Consolidated draft proposal of DPPS GTR9 amendment -210906
IWG-DPPS-13-05		revised 5-04 Pressure Data Requirement (IDIADA)
IWG-DPPS-13-05	1	Rev1 wording for CP options
IWG-DPPS-13-06		System Specifications Proposal (IDIADA)
IWG-DPPS-13-07		Participant list
IWG-DPPS-14-01	1	Official agenda
IWG-DPPS-14-02		Draft minutes
IWG-DPPS-14-03		Comment on HIT calculation-tool and HIT-WAD diagram (Japan)
IWG-DPPS-14-04		Sensing-width (VDA-CCFA)
IWG-DPPS-14-05		DPPS-HBM qualification procedure status (IWG subgroup)
IWG-DPPS-15-01	1	Draft agenda
IWG-DPPS-15-02		Draft & official minutes
IWG-DPPS-15-03		HBM qualification for GTR draft (TF-HBM subgroup)
IWG-DPPS-15-04	3	Draft1 & 2 technical requirements, then working ECE-TRANS-WP.29-GRSP-2022-02e tech requirements
IWG-DPPS-15-05	1	Preamble
IWG-DPPS-16-01	1	Draft & official agenda
IWG-DPPS-16-02	1	Draft & official minutes
IWG-DPPS-16-03		Draft Preamble

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IWG-DPPS-16-04		Modified ECE-TRANS-WP.29-GRSP-2022-02e tech requirements
IWG-DPPS-16-05		Annex2_pedestrian_Human_Body_Model_qualification
IWG-DPPS-16-06		Annex3_HIT_determination_simulation
IWG-DPPS-16-07		Proposal HIT vs TRT requirement- OZ
IWG-DPPS-16-08		HIT vs TRT Explanation- OZ
IWG-DPPS-16-09		HBM-Simulations_Flow-Chart_AB
IWG-DPPS-16-10		Condition_for_Static_Test_in_Overshoot_Duration_JAMA
IWG-DPPS-17-01	1	Draft agenda
IWG-DPPS-17-02		Draft minutes
IWG-DPPS-17-03		GRSP-71-26e - DPPS status report
IWG-DPPS-17-04		Decision list
IWG-DPPS-17-05		Status_Nr_Simulation subgroup
IWG-DPPS-17-06		Annex2_Pedestrian_Human_Body_Model_Qualification
IWG-DPPS-17-07		Annex3_HIT_Determination_Simulation
IWG-DPPS-17-08		Draft preamble
IWG-DPPS-17-09		modified ECE-TRANS-WP.29-GRSP-2022-02e tech requirements
IWG-DPPS-17-10		Overall Flowchart DPPS_ALIGNED with Annex 23
IWG-DPPS-18-01	1	Draft & official agenda
IWG-DPPS-18-02	1	Draft & official minutes
IWG-DPPS-18-03		Annex2_Pedestrian_Human_Body_Model_Qualification

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IWG-DPPS-18-04		Annex3_HIT_Determination_Simulation
IWG-DPPS-18-05		modified ECE-TRANS-WP.29-GRSP-2022-02e tech requirements
IWG-DPPS-18-06		Deployment test procedure doubts
IWG-DPPS-18-07		Sensing width-anonymised - Industry
IWG-DPPS-18-08		LAB_Pedestrian_DPPS_area detection width.pptx
IWG-DPPS-18-09		Action list
IWG-DPPS-18-10		Draft Wording Preamble GTR9 wrt Detection Area.docx
IWG-DPPS-18-11		Decision list
IWG-DPPS-18-12		Status Annexes 2 3 Subgroup
IWG-DPPS-18-13		Vehicle width additional fender - definition of RVW
IWG-DPPS-19-01	1	Draft & official agenda
IWG-DPPS-19-02	1	Draft & official minutes
IWG-DPPS-19-03		IDIADA wording subgroup results
IWG-DPPS-19-04		Marking undeployed
IWG-DPPS-19-05		Technical requirements 9Nov
IWG-DPPS-19-06		Preamble (17-08 merged with 18-10)
IWG-DPPS-19-07		Action list
IWG-DPPS-19-08		Annex3_HIT_Determination_Simulation
IWG-DPPS-19-09		Annex2_Pedestrian_Human_Body_Model_Qualification
IWG-DPPS-20-01	1	Draft & official agenda

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IWG-DPPS-20-02	1	Draft & official minutes
IWG-DPPS-20-03		Action list
IWG-DPPS-20-04		Preamble 16Nov22
IWG-DPPS-20-05		Technical requirements 16Nov22
IWG-DPPS-20-06		(OZ) Proposal Overshoot Phase
IWG-DPPS-20-07		(BH-IDIADA)_Dynamic Testing Sync