

Annex 7 2020 Updates to the Road & Automotive User Needs and Requirements Report

Introduction

The discussions of the UCP 2020 led to the following main modifications:

- **Validation of previously unreferenced requirements** in Section 6 User Requirements Specifications and revision of other requirements;
- **Updates to the regulatory context** so to take into account the latest EU Regulation.

To reflect the creation of a separate panel on public transport (in light of recommendations from previous user consultations), specific applications have been removed from the road user requirements report.

Rationale for the updates

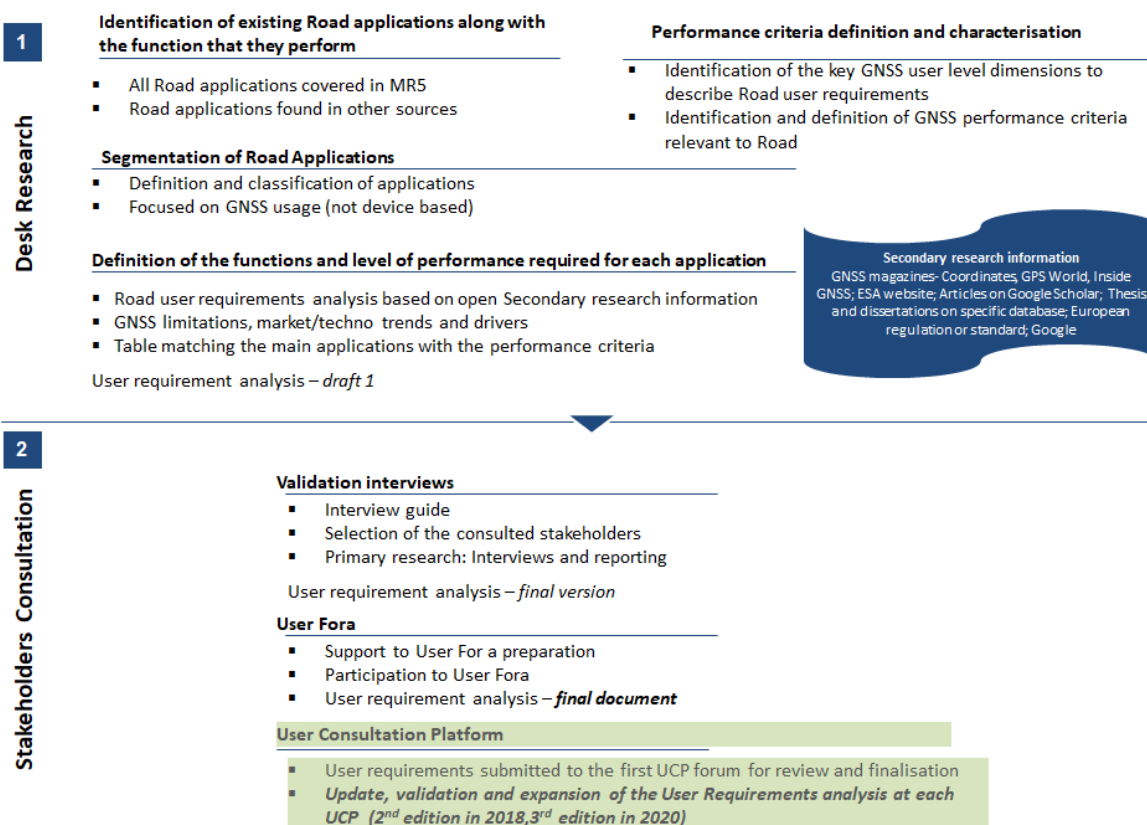
The main sources for these updates are the discussions and decisions taken by the Road & Automotive forum at the User Consultation Platform (UCP) 2020 held online, on December 1st 2020. These findings are recorded in the Road & Automotive panel meeting minutes [RD26].

An additional source of updates is the continuous maintenance work undertaken by EUSPA as part of its normal Market Development and Evolution activities.

Updates to Section 1 “Introduction”

The figure 2 on page 7 is replaced with this new version (2020 update):

Overall methodology



Updates to Section 2 “Executive Summary”

Updates to “*Perspective use of GNSS in road*” section, page 10

The table 1 “Performance Parameters” is updated as follows (new text in *italic*):

Performance parameters							
	Availability	Positioning accuracy	Timing accuracy	Integrity message/risk	Robustness vs. spoofing	Detection of GNSS interferences	Coverage
Safety critical - traffic and safety warning	> 99.5%	< 3 metres (horizontal, Day 1 applications) < 1 metre (horizontal, advanced applications)	< 1 second	Required	Robustness vs. spoofing threats required	Required	<i>Worldwide</i>
Safety critical - automated driving	> 99.9%	< 20 cm (horizontal) < 2 metres (vertical)	< 1 micro second	<i>Integrity Risk 1E-7 / 1E-8</i>	Robustness vs. spoofing threats and notification to the driver required	Required	<i>Worldwide</i>
Payment	> 99.5%	< 3 metres	< 1 second	<i>Integrity Risk: 1E-4</i>	Authentication	Required	<i>National</i>

Performance parameters

	Availability	Positioning accuracy	Timing accuracy	Integrity message/risk	Robustness vs. spoofing	Detection of GNSS interferences	Coverage
critical		(horizontal)			message required		
Regulatory critical	> 99.5%	< 5 metres (horizontal)	< 1 second	<i>Integrity Risk: 1E-4</i>	Authentication message required	Required	<i>EU</i>
Smart mobility	> 99.5%	< 5 metres (horizontal) < 3 metres (horizontal) if payment functions are included	< 1 second	Not required	Authentication message required	Required	<i>Regional</i>

Updates to Section 3 “Reference documents”

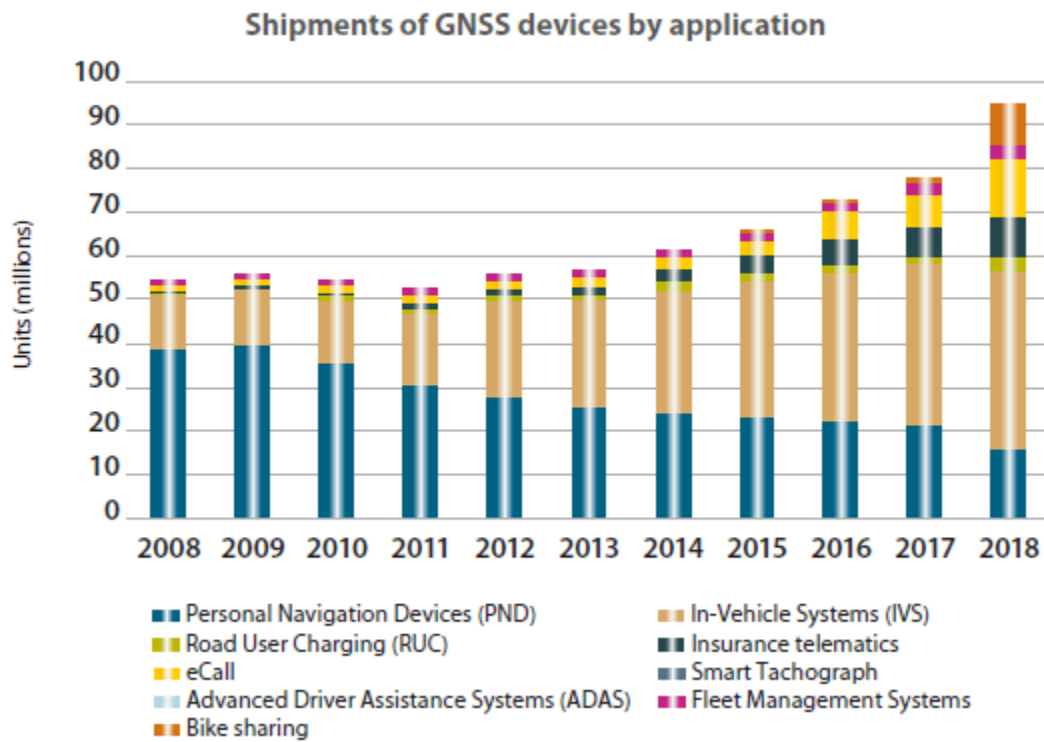
The following reference documents are added to the Reference documents table on page 13.

Ref.	Ref	Title	Date
[RD26]	GSA-MKD-RD-MOM-XXXXX-UCP2020-Road	User Consultation Platform 2020 – Minutes of Meeting of the Road & Automotive Panel	01.12.2020
[RD27]	UNECE	United Nations Economic Commission for Europe, UNECE, Proposal for a new UN Regulation on uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system	23.06.2020
[RD28]	ETSI TS 103 246-5	ETSI TS 103 246-5, Satellite Earth Stations and Systems (SES); GNSS based location systems; Part 5: Performance Test Specification	2020
[RD29]		GNSS Market Report issue 6 (available at: https://www.gsa.europa.eu/2017-gnss-market-report)	2019

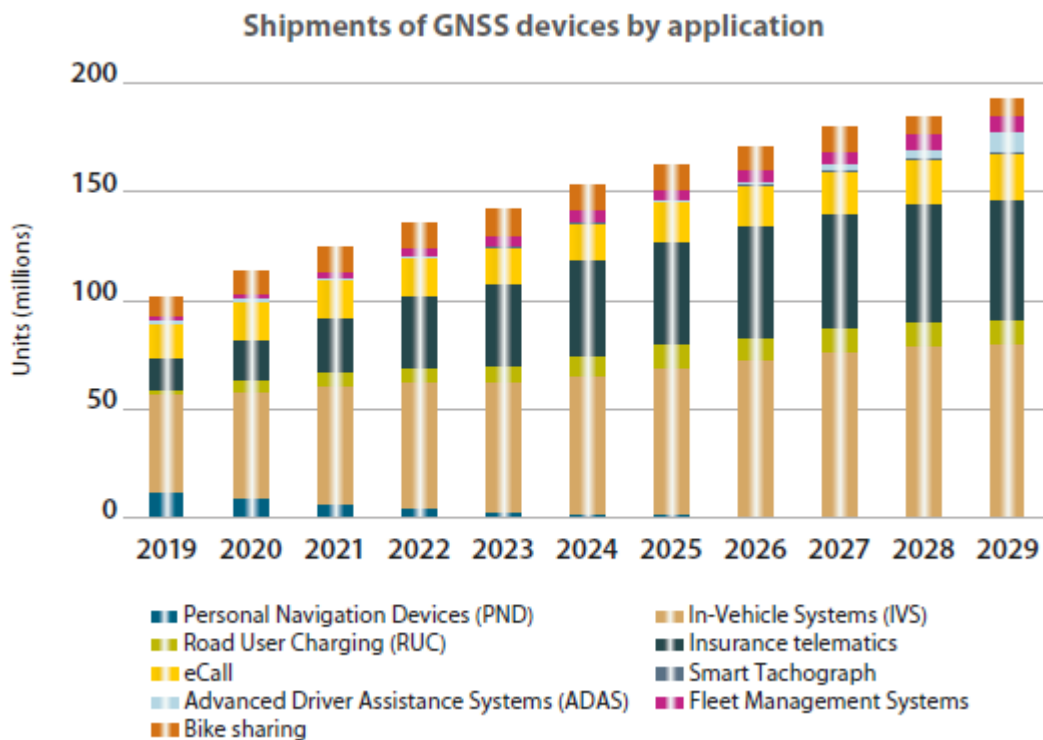
Updates to Section 4 “GNSS Market Overview and Trends for Road”

Updates to section 4.1 “Market evolutions and key trends”, pages 14-15

“Figure 3: Historical GNSS Road market data – shipments”, on page 14 is replaced by latest figure from Market Report 6 ([RD29]), page 38.



“Figure 4: Forecast GNSS Road market data – shipments” is replaced “, on page 15 is replaced by latest figure from Market Report 6 ([RD29]), page 39.



The text on page 14 and 15 is replaced by the following paragraphs to reflect the new figures:

Since 2011, in which the annual shipments reached slightly over 50 mln units, the road GNSS shipments grew by a CAGR of 6% leading to more than 94 mln shipments in 2018. Over the same period, the shipment of In-Vehicle Systems (IVS) has more than doubled from almost 17 mln units in 2011 to more than 40 mln in 2018. In contrast, Personal Navigation Devices (PNDs) has seen a rapid decline since 2009, driven both by the increased share of new vehicles being equipped with an IVS and the growing use of smartphones as a source of navigation.

An expanding collection of telematics devices and services into the automotive sector makes insurance telematics a very promising application, reaching almost 10 mln units in 2018.

Shipments of GNSS devices for bike sharing has contributed to explosive growth between 2017 and 2018 of the road GNSS device shipments in general and the dock-less bike sharing market in particular.

Finally, the growing number of eCall system shipments grew by a factor 5 over the past five years reaching more than 12 mln units in 2018. The doubling of shipments from 2017 to 2018 is greatly linked with the anticipation of the European market to the entry into force of the EU mandatory requirement.

Since 2012, Asia-Pacific has become the largest market (share of 37%) for road GNSS devices. Historical market information on GNSS shipments is provided on the following figure.

In terms of market perspectives, shipments of IVS are expected to reach 63 mln by 2025, effectively doubling the shipments realised in 2015. In some regions such as Europe and North America, the penetration rate of IVS in new vehicle shipments is expected to reach 80% over the period 2020-2030. Through the IVS, OEMs are able to provide Connected Vehicle platforms and services to the customer adding additional revenue models to their portfolio.

Growing with a CAGR of 6% over the next decade, the dominant role of the IVS will continue, leading to annual shipments of 80 mln units in 2029. In 2025, the shipments of **ADAS, which will allow cars and their passengers to enjoy autonomous driving features** (SAE level 4 and 5)¹, are estimated to reach 252,000 units in 2025. By 2029, this application is forecasted to surge to almost 10 mln units, accelerating the deployment of autonomous vehicles. Nowadays, almost 97% of new vehicles are equipped with a GNSS-enabled IVS, which is evolving into the leading source of PNT data for a wide range of in-vehicle applications. As evident from the figures above, the **penetration of GNSS-enabled applications is expected to grow substantially over the next 10 years.**

Updates to Section 5 “GNSS Market Overview and Trends for Road”

The section 5 title, page 18 is replaced by “GNSS User Requirements Analysis”.

Update to section 5.1.3 “Existing and coming EU regulations” on page 20

The paragraph list is updated with the one below, including additional paragraph (additions in *italic*):

- ~~Directive 2004/52/EC on the interoperability of road toll system in the community~~
- Directive (EU) 2019/520 on the interoperability of electronic road toll systems and facilitating cross-border exchange of information
- Directive 2008/68 on the inland transport of dangerous goods
- Delegated regulation 886/2013 for the provision of road safety related minimum universal traffic information follow up of directive 2010/40/EU
- Delegated regulation 962/2015 supplementing Directive 2010/40/EU with regard to the provision of EU wide real time traffic information services
- Regulation 165/2014 and *implementing Regulation EU 2016/799* on tachographs in road transport
- Regulation 2015/758 and 2017/78 concerning type approval requirements for the deployment of eCall in vehicle systems follow up of Directive 2010/40/REU
- 20130418 Commission implementing decision on the protection of animals during transport
- Council regulation N°1/2005 on the protection of animals during transport
- *Regulation (EU) 2019/2144 on type-approval requirements for motor vehicles (...) as regards their general safety*

*Beyond the EU, the UN Regulation No. [155] on uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system, (**UNECE Regulation 155**) approved in June 2020 in relation entering into force Jan. 2021 identifies spoofing as one of the threats associated with use of GNSS and requires GNSS authentication as mitigation. In addition, for **dangerous goods regulation**, high precision referencing GNSS will be implemented in the DATEX II language to anticipate future needs [RD26] with upcoming DATEX II extension is expected to take place in 5 countries.*

Updates to section 5.1.5.4 “Smart Mobility” on page 24-25

In the “Table 5: Smart mobility for traffic managers and transport companies”, on page 24, the “Bus and tram priority at traffic lights” application and its corresponding description are removed.

In the Table 6: Smart mobility for safety and comfort of drivers, on page 25, the “Mobility services” application and its corresponding description are removed.

Update to section 5.4 “Drivers for user Requirements in Road” on page 34-35

The following paragraph *in italics* added before the sentence “In summary, the following drivers for user requirements have been identified”):

Moreover, the requirements of the most stringent use cases of automated driving have triggered the development and deployment of commercial services aimed at providing high accuracy positioning at mass market price for automotive applications.

Updates to Section 6 “User Requirement Specification”

The following tables present the Requirements, which are “de-scoped” (corresponding to Action: “D”), “reformulated” (corresponding to Action: “R”) and new Requirements to be “added” (corresponding to Action: “A”).

Update to section 6.1.1, “Table 8: Requirements for Traffic and Safety Warning applications”, page 36

id	Action	Description	Type	Source
GSA-MKD-USR-REQ-ROA-0202	A	The positioning system shall be available in urban canyons	Performance (availability)	[RD26]
GSA-MKD-USR-REQ-ROA-0222	A	The positioning system shall be available indoors	Performance (availability)	[RD26]
GSA-MKD-USR-REQ-ROA-0212	A	The positioning system shall be available under canopy	Performance (availability)	[RD26]
GSA-MKD-USR-REQ-ROA-0192	A	The positioning system shall provide a worldwide coverage	Performance (coverage)	[RD26]
GSA-MKD-USR-REQ-ROA-0152	A	The positioning system shall provide an Integrity Risk $1E^{-7}/1E^{-8}$	Function (integrity)	[RD26]

Update to section 6.1.1, “Table 9: Requirements for automated interventions and autonomous driving” page 37

id	Action	Description	Type	Source
GSA-MKD-USR-REQ-ROA-0200	A	The positioning system shall be available in urban canyons	Performance (availability)	[RD26]

id	Action	Description	Type	Source
GSA-MKD- USR-REQ- ROA-0220	A	The positioning system shall be available indoors	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0210	A	The positioning system shall be available under canopy	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0190	A	The positioning system shall provide a worldwide coverage	Performance (accuracy)	[RD26]
GSA-MKD- USR-REQ- ROA-0140	A	The positioning system shall provide a continuity of 99%	Function (continuity)	[RD26]

Update to section 6.1.2 “Table 10: Requirements for payment critical applications” page 37

id	Action	Description	Type	Source
GSA-MKD- USR-REQ- ROA-0111	A	The positioning system shall be able to provide a fix rate of 1 Hz	Performance (fix rate)	[RD26]
GSA-MKD- USR-REQ- ROA-0201	A	The positioning system shall be available in urban canyons	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0221	A	The positioning system shall be available indoors	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0191	A	The positioning system shall provide a national coverage	Performance (coverage)	[RD26]
GSA-MKD- USR-REQ-	A	The positioning system shall provide an	Function (integrity)	[RD26]

id	Action	Description	Type	Source
ROA-0151		Integrity Risk $1E^{-4}$		
GSA-MKD- USR-REQ- ROA-0211	A	The positioning system shall be available under canopy	Performance (availability)	[RD26]

Update to section 6.1.3 "Table 11: Requirements for regulatory critical applications" page 38:

id	Action	Description	Type	Source
GSA-MKD- USR-REQ- ROA-0203	A	The positioning system shall be available in urban canyons	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0223	A	The positioning system shall be available indoors	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0213	A	The positioning system shall be available under canopy	Performance (availability)	[RD26]
GSA-MKD- USR-REQ- ROA-0193	A	The positioning system shall provide a EU coverage	Performance (coverage)	[RD26]
GSA-MKD- USR-REQ- ROA-0153	A	The positioning system shall provide an Integrity Risk $1E^{-4}$	Function (integrity)	[RD26]

Update to section 6.1.4 “Table 12: Requirements for smart mobility applications” page 38:

id	Action	Description	Type	Source
GSA-MKD-USR-REQ-ROA-0114	A	The positioning system shall be able to provide a fix rate of 1 Hz	Performance (fix rate)	[RD26]
GSA-MKD-USR-REQ-ROA-0204	A	The positioning system shall be available in urban canyons	Performance (availability)	[RD26]
GSA-MKD-USR-REQ-ROA-0224	A	The positioning system shall be available indoors	Performance (availability)	[RD26]
GSA-MKD-USR-REQ-ROA-0214	A	The positioning system shall be available under canopy	Performance (availability)	[RD26]
GSA-MKD-USR-REQ-ROA-0234	A	The positioning system shall have a TTFF of less than 60 s	Performance (TTFF)	[RD26]
GSA-MKD-USR-REQ-ROA-0194	A	The positioning system shall provide a regional coverage	Performance (coverage)	[RD26]

Updates to Annexes

Updates to Annex 3 “Key standardization bodies and organizations”, page 39

In paragraph on CEN/CENELEC, the third bullet point is modified and an additional one is added:

- On-going work (~~just started~~) for EN 16803-2 and EN 16803-3, with the main effort the main effort is concentrated on security performance including definition and validation of future testing scenarios
- *Transferring work behind EN16803 to ISO level will extend its reach beyond the road domain (standard will not be restricted to road users and applications).*

Updates to Annex 2 “Synthesis of Road User Requirements”, presented on page 44-47

The following applications are removed from the table on page :

- Bus and tram priority at traffic lights

On page 46, the following sentence below table is removed : “Tram priority at traffic lights could be a critical safety application if the traffic management wishes to shorten the duration of green light”.

Suggested update to Annex 2 for clarity: at the end of the paragraph add a sentence referring reader to the table (located after annex 5) presented on page 44-47: “The table is presented on page 44”.

Considerations for further User Requirements Analysis

- In light of the previous recommendations from user consultations, a separate panel on public transport has been created. To reflect this update (and avoid overlaps between the two reports) the following applications (part of smart mobility traffic management) have been removed from the Road user requirements report:
 - Bus and tram priority at traffic lights
 - Mobility services