PAsCAL

Enhance driver behaviour & Public Acceptance of Connected & Autonomous vehicles

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D8.3 –Filled Guide2Autonomy

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Disclaimer

D8.3 – Filled Guide2Autonomy			
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0.1	**10/10/2022**	**Laurence Johannsen**	Creation

0.2	**20/10/2022**	**Laurence Johannsen**	Including reviewers' comments
1.0	**28/10/22**	**Luc Vandenabeele**	Including last comments before submission

List of acronyms	
Acronym	**Meaning**
CAV	Connected and Autonomous Vehicle

Notice

This document partly complies with the European Blind Union's guidelines (http://www.euroblind.org/publications-and-resources/making-information-accessible-all) in order to be accessible to anyone, including blind and partially sighted people, and at the same time and at no additional cost.

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Executive summary

The main aim of the PASCAL project was to develop the "Guide2Autonomy" (G2A), which purpose is to accelerate a user-oriented integration of connected cooperative and automated vehicles in our present transport systems.The G2A addresses important issues relating to the role of humans in this evolution, ranging from real-time driving control to long-term training needs for jobs, in particular appropriate interactions of the autonomous vehicles with different road users including disabled people and non-drivers.
To fulfil these purposes, PAsCAL project has conducted surveys, simulated and real-world experimentations on public acceptance, covering different types of vehicles, different user groups, different levels of automation and different driving experiences.
All the collected data was analyzed and brought together in a systematic and detailed analysis that assesses the potential impacts of various levels of user acceptance on CAVs.

The project results resulted in 109 recommendations, addressing different types of users, targeting different key thematic areas, covering different levels of expected impacts.

The recommendations are available in the Guide2Autonomy, an online toolbox. Users can access the Guide2Autonomy via a multi-criteria search and a chatbot. Service providers can access dedicated recommendations thanks to the Cross Skill recommender system.

1 Introduction

1.1 Purpose and organization of the document

This deliverable describes the Guide2Autonomy (G2A) designed during the PAsCAL project.
G2A is an online toolbox containing 109 recommendations to improve the awareness and acceptance of connected and autonomous vehicles. Its structure, accessibility, navigation, and features are described in chapter 2.

Chapter 3 describes the recommendations composing the G2A: where they stem from, what is their structure and content and how they have been elaborated. The list of all recommendations is included in chapter 3.

The G2A, is accessible from the Pascal project website www.pascal-project.eu.

1.2 Intended audience of this document

The audience for this document is:

(1) The consortium members of the PAsCAL project;
(2) The targets of the guide2autonomy, including policy makers, CAV service providers, product developers;
(3) The general audience wishing to use the Guide2Autonomy

2 the Guide2Autonomy

The Guide2Autonomy (G2A) and its recommendations provide the different CAV stakeholders the means to increase awareness and user acceptance of CAVs. The G2A is set up as open access and data platform which brings together all learnings and recommendations of the PASCAL project, and beyond for an improved awareness and acceptance of CAVs.

109 recommendations - build upon lessons learned and experimentations of the PASCAL project, and from the PASCAL sister projects - constitute the core of the G2A content. These recommendations are aimed at a diverse range of CAV stakeholders.

These recommendations are made accessible through an online open access database that can be accessed through three different points of entry:

1. Browsing through recommendations with the help of a multi-criteria search function integrated within a G2A database functionality;

2. Specifically aimed at CAV service providers the access to the recommendations is provided through an online self-assessment functionality (Cross Skill®). This self-assessment allows them to get specific access to the recommendations in relation to their level of awareness and proficiency in relation to CAVs.

3. A chatbot functionality allows for a more accessible usage of the G2A by browsing the G2A contents through open requests. This chatbot particularly aim at creating access to visually impaired users.

2.1 G2A structure

The structure of the G2A – as described in the deliverable D8.2-Guide2Autonomy framework – is composed of five dimensions: Target user groups, key thematic areas, expected level of impact, type of tool and Source of the recommendation. This structure is embedded in the database of recommendation and constitutes the criteria for browsing recommendations via the toolbox.

The Target user groups of G2A were identified in the Work Package 7:

- Service providers
- Product developers
- Public authorities
- Researchers
- Citizen representatives

The Key thematic areas of G2A were identified in the PAsCAL project deliverable D8.1-Common issues, approaches and lessons learned across all modes for industry and Public Authorities:

- Public policies
- infrastructure and technologies
- ICT development
- Management and local economy

Expected level of impact

- Individual level
- Vulnerable users
- Macro-level (societal, economic, environmental)

Type of tool

- Software
- Research method
- Business Model
- Other

Source of recommendation

- Project finding
- Other projects
- Benchmark/watch

2.2 G2A Access and navigation

The G2A gives access to all recommendations. Its access is free of charge and users do not need to create an account. All recommendations are downloadable in pdf format.

The G2A consists of:

- a Wordpress online open access database, containing the recommendations
- A toolbox enabling to browse the database of recommendations with a multicriteria search
- An online self-assessment functionality (Cross Skill®), allowing service providers to get specific access to the recommendations in relation to their level of awareness and proficiency in relation to CAVs.
- A chatbot functionality allows for a more accessible usage of the G2A by browsing the G2A contents through open requests. This chatbot particularly aims at facilitating access to visually impaired users.

The G2A is accessible from the PAsCAL project directly: https://www.pascal-project.eu/guide-to-autonomy

2.3 G2A toolbox

The toolbox is illustrated as follow:

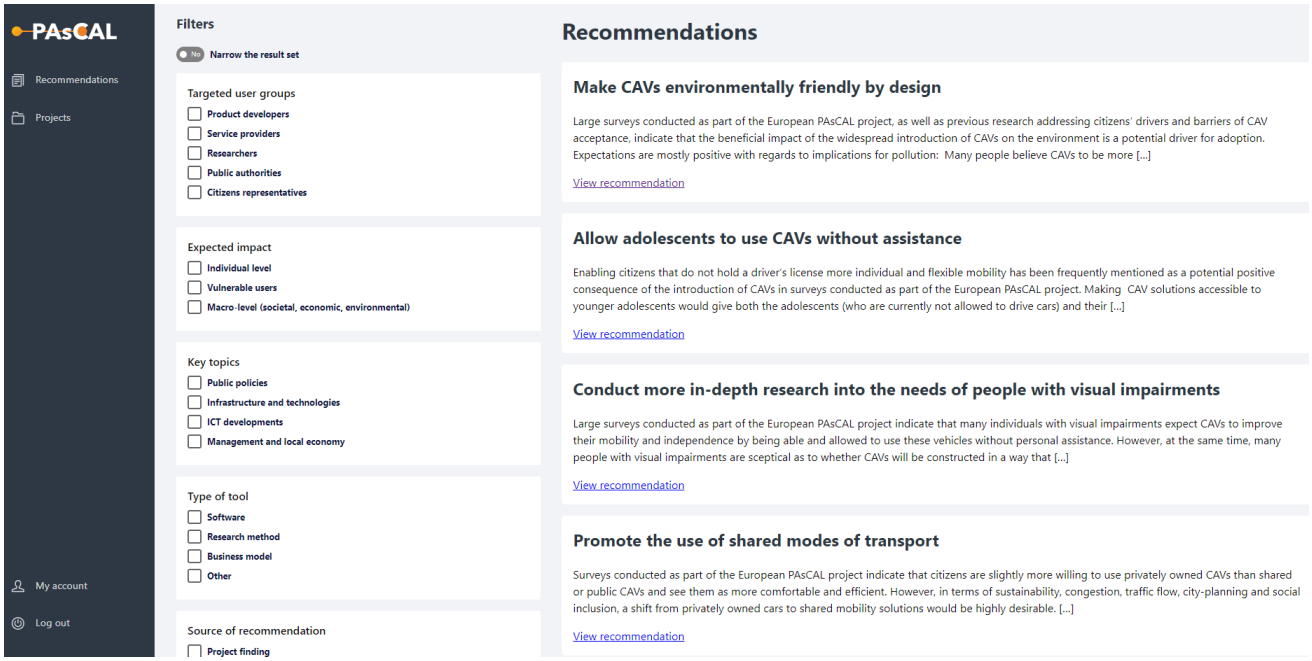


Figure 1 Screenshot of the G2A toolbox homepage

The users can select the criteria they are interested in to browse the recommendations. The criteria reflect the structure of the G2A:

- the group of users targeted by the recommendation,
- the expected level of impact,
- The key topic
- The kind of tool
- The source of the recommendation
-

For example, hereunder, the user has ticked that he/she wants to sort out recommendations addressing researchers (target user groups), having an impact on individuals (level of impact) and concerning public policies (key topics).

The toolbox proposes only recommendations matching these criteria. The user sees the titles of the recommendations and their first lines. as well as a “view recommendation” action.

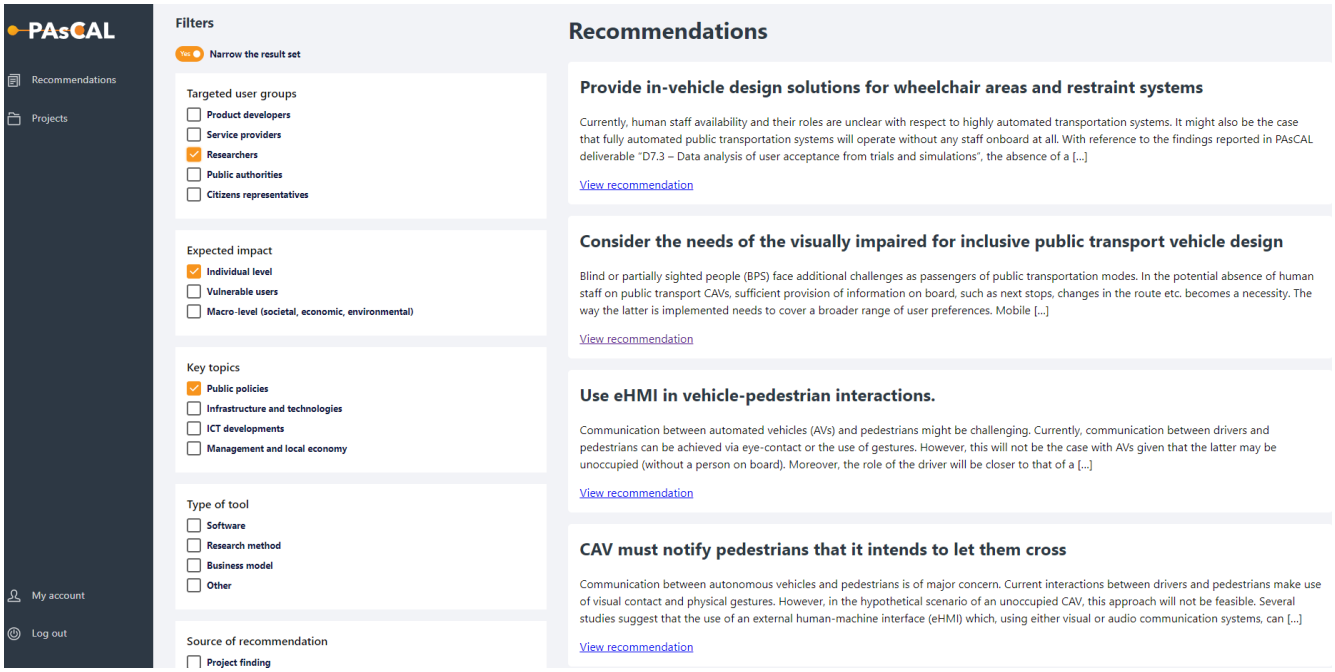


Figure 2 Screenshot of the G2A toolbox multicriteria search

By clicking on "view recommendation", the user enters the contents of the recommendation. Here under the user has clicked on the second recommendation of the proposed list.

Figure 3 Screenshot of the G2A: recommendation page (1/2)

The different paragraphs of a recommendation are its title, description, an example or good practice illustrating the recommendation, the impact the user can expect from implementing the recommendation, some references and useful links should he/she wants to go further, and finally the list of acronyms.

At the end of the page, a pdf button enables the user to download the recommendation in pdf format, as shown on the picture hereunder.

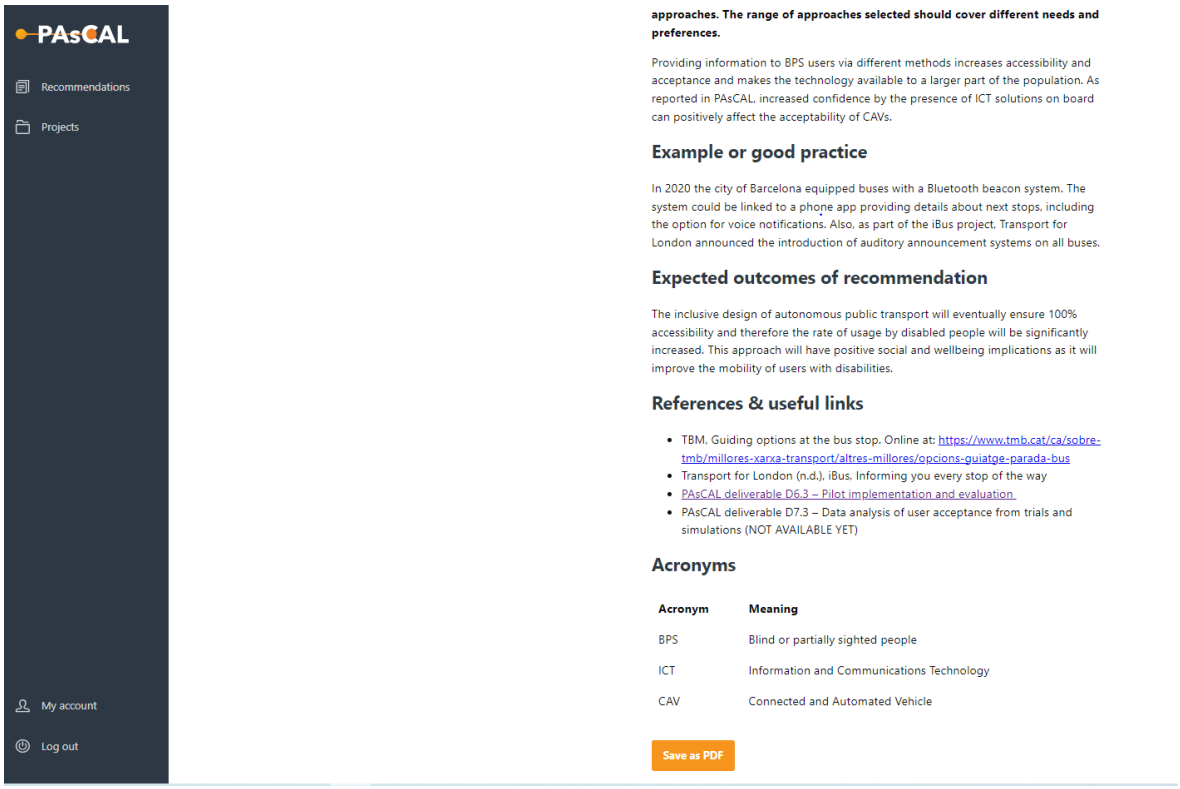


Figure 4 Screenshot of the G2A: recommendation page (2/2)

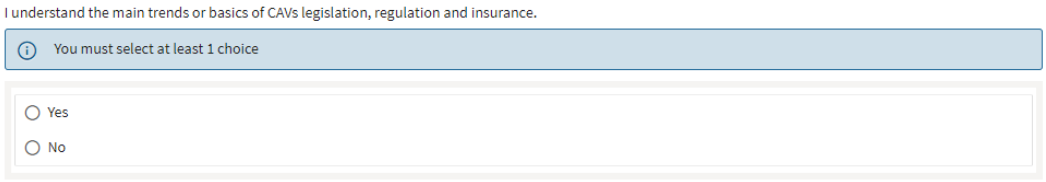
2.4 Cross Skill® self-assessment tool

As described in the PAsCAL project deliverable D3.4-Cross Skill®- a self-assessment tool adapted to PAsCAL needs, the Cross Skill®- a self-assessment tool was adapted and integrated in the G2A toolbox. It is directly accessible from the PAsCAL project website.

In order to improve the findability of the recommendations, Service providers have the opportunity, to take a self-assessment and access a personalised list of recommendations that fit their actual profile.

After asking the service providers to answer questions related to the structure of the toolbox (key thematic area, level of impact and type of tool), the adapted version of Cross Skill® allows them to self-assess their level of knowledge on the key thematic area(s) they selected (Public policies, infrastructure and technologies, ICT development and Management and local economy). The four levels of expertise range from:

- 0: novice
- 1: beginner
- 2: proficient
- 3: expert



Following the self-assessment sequence, each answer is mapped with the corresponding expertise value (e.g., Novice or Expert) and the results are presented on top of the page as shown below:

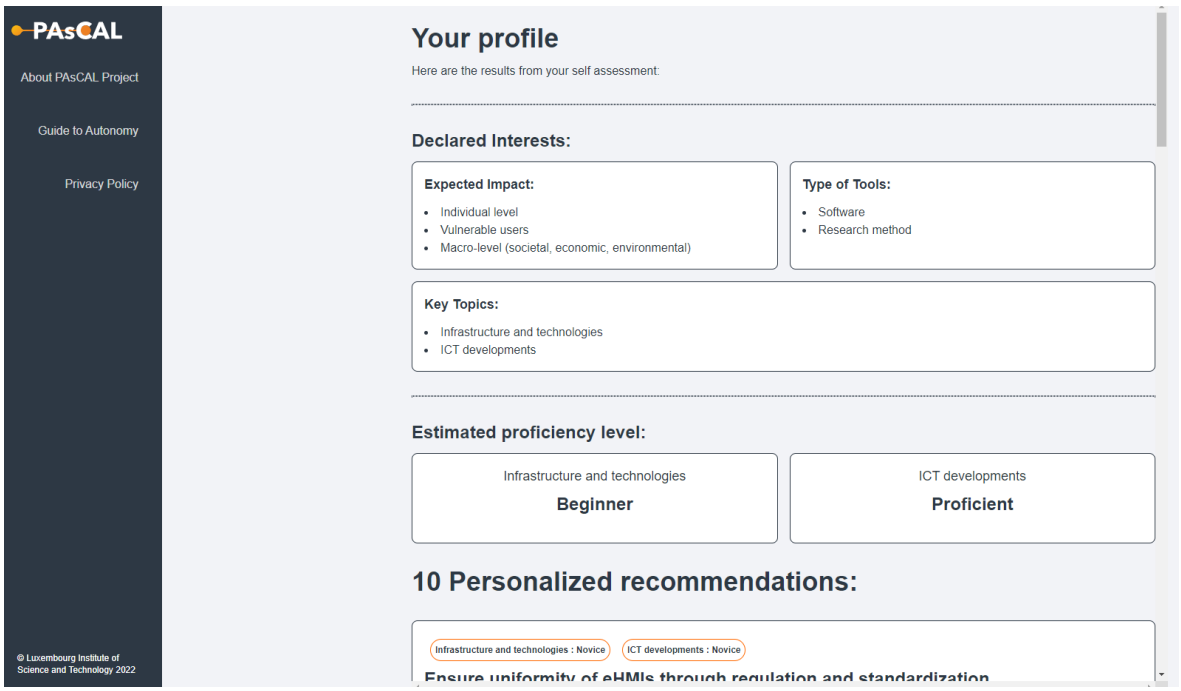


Figure 5 Screenshot of the Cross Skill recommendation page (1/2)

On basis of the results of their self-assessment, service providers are proposed a list of maximum ten recommendations that fits their self-assessment.

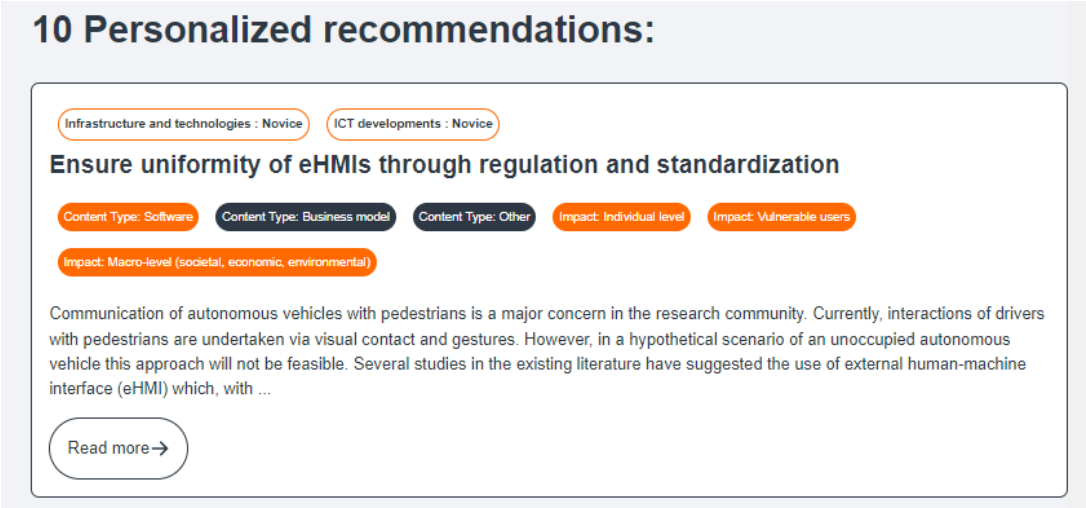


Figure 6 Screenshot of the Cross Skill recommendation page (2/2)

By clicking on the “read more” button, the user directly accesses the recommendation.

The Cross Skill® self-assessment tool and recommender system for the G2A is accessible free of charge at https://recommender.pascal-project.eu

2.5 Chatbot

The chatbot allows the G2A user groups to find the right recommendation for their needs. Focusing on vulnerable user groups, especially blind and visually impaired people, it can be used by all types of users. The chatbot is directly accessible from the PAsCAL project website. The chatbot portal retrieves the list of recommendations, synchronise its internal state with questions and answers and publish them to Microsoft QnAMaker to be able to recognize questions from the list.

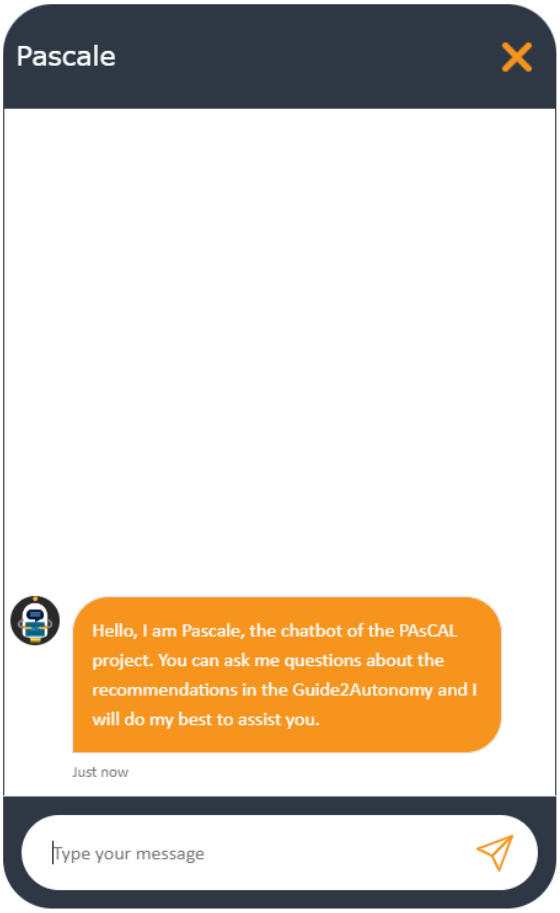


Figure 7 Screenshot of the Chatbot homepage

The users only have to type their question in natural language or even just a word. the chatbot then proposes a corresponding question:

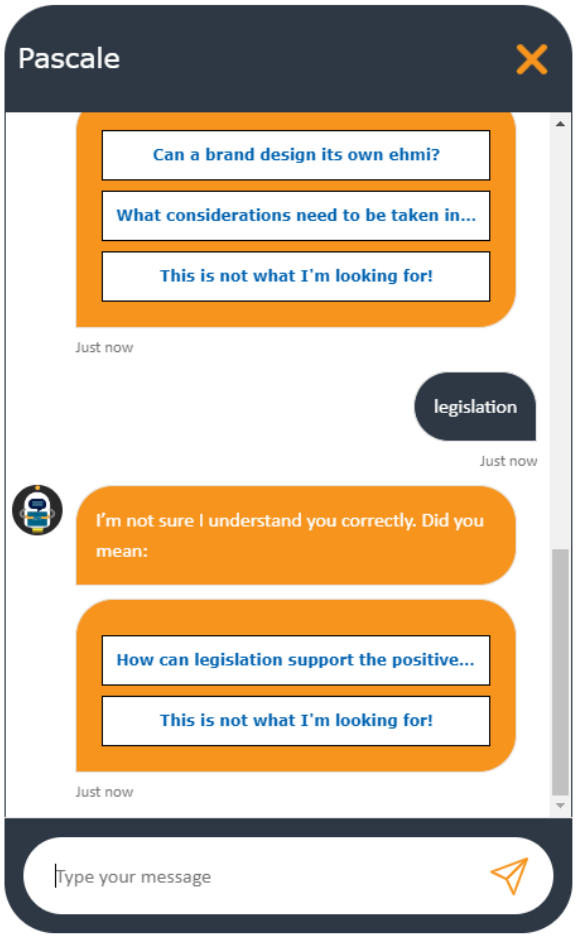


Figure 8 Screenshot of a chatbot dialogue

By clicking on the question, the user accesses an answer and can access a corresponding recommendation:

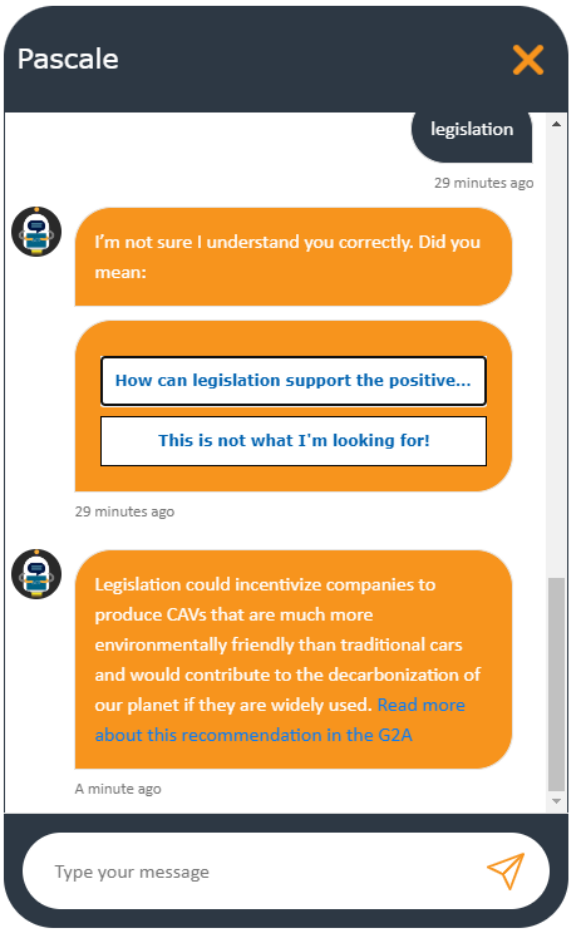


Figure 9 Screenshot of the Chatbot answer

3 Recommendations

109 recommendations compose the G2A.

3.1 Origins of recommendations

In line with the objectives of the PAsCAL project, the scope of the recommendations is CAV acceptance and user awareness, and they stem mainly from the project activities, based on the learnings of cluster analysis of user characteristics, human driving and passenger simulation, real world pilots, shared space simulation with multi-users or vulnerable users, accessible surveys designed for varying abilities, focus groups, stakeholders' hands-on workshops, and system-dynamics modelling tools.

The PAsCAL consortium is in contact with its H2020 sister projects (Trustonomy, Drive2thefuture, SUAAVE). Further recommendations stemming from these projects will be included in the G2A, as soon as the projects are finished, in order to capitalize and create synergies among the projects findings.

3.2 What is a recommendation?

A recommendation is a suggestion or learning as to the best course of action, especially if one is put forward by an authoritative body.

3.2.1 Quality of the recommendations

To ensure the quality and coherence among the recommendations, a template was elaborated, in which project partners could describe the recommendations they draw out of their project activities.

Moreover, the PAsCAL recommendations meet high level of quality. They meet extrinsic criteria of quality:

- They are relevant, that is they should result directly from valid experiences and resulting collected data from the project,

- They are justified, meaning they answer the research questions tackled in the project and are based on validated and document data,
- They are feasible and easy to implement and take into account the human and material resources of the targeted users.
  They also meet intrinsic criteria of quality:
- They are targeted, meaning they addressed specific and identified groups of users, by which they should trigger action.
- They are measurable: the recommendations have clear outcomes and benefits one can expect by implementing them.
- They are unambiguous: written in a simple and precise language, avoiding technical terms and jargon (when technical terms are used, they are always defined), so that they are clear to all readers and can only be understood in one way.

3.3 Structure of recommendations (template)

Each recommendation should contain two types of information:

- Contents of the recommendation

The contents of the recommendations is the text the G2A users will access online: Beyond the recommendation itself, it consists of the title of the recommendation, some contextual elements explaining where the recommendation comes from, some arguments to further explain and develop the recommendation, some good practice or concrete example to illustrate the recommendation and that can come out of the PASCAL project or from an external initiative and finally the description of the outcomes or impact an actor can expect from the implementation. The definition of the acronyms used in the recommendation is also provided.

- Metadata of the recommendation

The second category of information is metadata for tagging the recommendation. it is aimed at categorising the recommendations and supporting G2A users in navigating through the recommendations

The categorisation metadata:

Target users, which were identified in the deliverable D8.2: product developer, service provider, researcher, public authority and citizen representative.

The type of **expected impact**: Here the author can quote the scope impact one can expect from implementing the recommendation: an impact at an individual level, at the level of vulnerable groups level or at a macro-level (social, economic or environmental).

The **key area** the recommendation refers to: public policies & legislation, infrastructure and technology, ICT developments and finally Management & local economy.

The authors had to tick the **source of the recommendation** from PASCAL project findings, from Benchmark or thematic watch or from EU sister projects.

Two more categories of information are aimed at supporting navigating through the recommendation with the chatbot and the recommender system.

- For the chatbot, authors had to imagine three questions and their answer, in natural language, that a user of OG2A would be likely to ask the chatbot when navigating the G2A.

- For the recommender system (i.e. only for recommendations addressing service providers), authors had to estimated the level of proficiency expected from service providers over four domains (public policies, infrastructure and ICT developments and user interest and local economy). The four levels of expertise range from:
- 0: novice
- 1: beginner
- 2: proficient
- 3: expert

Figure 10 Overview of a recommendations writing round

 # Nbr – title , as an explicit sentence

Title of the recommendation ***This should be a single sentence which starts with an active verb.***
Picture/Illustration
Picture/Illustration should have the following dimension: 603 x height 390 and max file size preferably 1 Mb.
Description
Setting the Scene: How did you come to think that we should do this/follow the recommendation? Ideally, this part should describe a situation stemming out of an experiment or a discussion related to the project. A direct reference to the related working package is advised, please keep in mind that the reader is external to the project does not know the contents of the WP. (The description of the WP will be available on the G2A website for readers who would need/want to go further) Please devote a short paragraph to problematize before introducing the recommendation.
Recommendation: *The recommendation should be outlined in one or two sentence and should stipulate what should be done.*
Argument: This part further develops the recommendation: why it is necessary? How does it relate to the overarching goals of PaScal and subsequent working packages? Here it is about making the use of CAV acceptable for impaired people. And if it is acceptable for the less able maybe it is for all the users group in general.
Good practice

How is the recommendation implemented in practice? Please provide a concrete example/case Either from the project or from an external initiative.
Expected outcomes/impacts
This should refer to overarching goals of the project and subsequent work package. The benefits of the measure/recommendation should be described and qualified and when relevant (or possible) also quantified.
References/ links
• References quoted in the text, which hyperlinks when accurate

Acronym	**Meaning**
ABC	Description of acronym

Categorisation & tagging

This section of the template consists of the meta data, which will not appear as such but enable accessing this recommendation by means of:

1)Browsing the toolbox (all users),

2)Asking questions to the chatbot (VRUS),

3)Defining criteria for the Cross Skill access – the self-assessment questionnaire (service providers).

Part 1: Toolbox browsing criteria		
Targeted toolbox user group(s): Which group(s) is this recommendation addressing?		
Toolbox user group(s)	**Relevant to this user group?**	**Refine user group if necessary.**
Product developer		
Service provider		
Researcher		

Public authority		
Citizen representative		
Expected Impact		
Type of impact	**Relevant to this type of impact?**	**Shortly indicate the expected impact.**
Individual level		
Vulnerable groups		
Macro level: social economic, or environmental		

Part 2: Criteria for chatbot access (only recommendations addressing VRUs)

Part 3: Criteria for CrossSkill access (only recommendations addressing service providers)

Quote the required level of expertise required for this recommendation.

0	*Novice*
1	*Beginner*
2	*Proficient*
3	*Expert*

	Public policies	**Infrastructure and technologies**	**ICT developments**	**User interest and local economy**
Level of expertise				

3.4 Process for writing and reviewing the recommendations

The 109 recommendations have been elaborated in three rounds.

In the first round, the template was elaborated and a training session organised for project partners.

To ensure the representativity of recommendations, a follow up excel sheet was elaborated for project partners to submit ideas of recommendations. At each round, the balance between different target users and key thematic areas was checked, based on the follow up excel sheet.

They could then write the recommendations, which were then submitted to other project partners for a quality check and finally to a language check.

Finally, recommendations were uploaded in the G2A database.

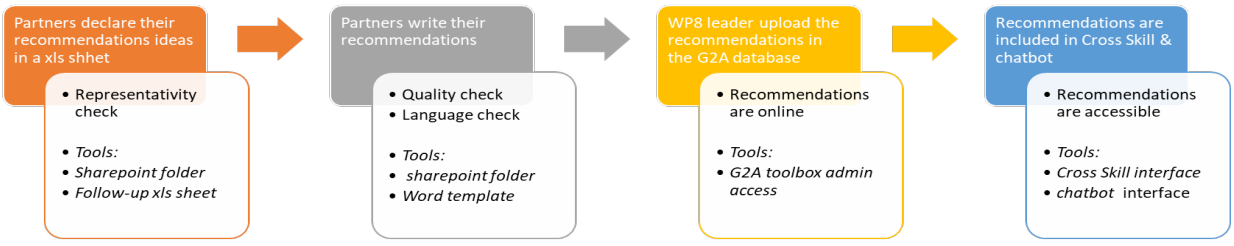


Figure 11 Overview of a recommendations writing round

3.4.1 Round 1 of recommendations writing

Round 1 of recommendations writing was launched on November 30th, 2021, during a project consortium meeting. The objectives of G2A, the

process, dimensions of the recommendations and quality criteria were presented to the project partners.

In addition, a specific training session to writing recommendations was organised on January 21st, 2022, illustrated by an example of a recommendation

On March 24th, 2022, a G2A workshop enabled to review the recommendations and point out different quality problems. The template was adapted and completed to provide more guidance.

Recommendations were then reviewed by peers and submitted to a language check.

33 recommendations were produced in round 1.

3.4.2 Rounds 2 and 3 of recommendations writing

- Round 2 started after round 1 and ended at the consortium meeting of October 6th 2022.

26 recommendations were produced in round 2.

- Round 3 started at the Consortium meeting of October 6th 2022. Based on the recommendations ideas already submitted by partners in the follow-up xls sheet.

Recommendations were produced by November 8th, reviewed by November 15th and uploaded on the G2A by November 30th.

50 recommendations were produced in round 3.

3.5 List of recommendations

Table 1 List of 109 recommendations

	Title of the recommendation	target user of the recommendation		key area of the recommendation		
		primary	secondary	Primary	secondary	tertiary
1	Notify the pedestrian that the automated car has stopped	Product developer	Researcher	In-vehicule CAV ICT developments		
2	ICT Tool Between Public CAV and Traffic Control Centre	Service provider	Public authority	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
3	Accessible Log-In Functionality for Public CAVs	Product developer	Service provider	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
4	Exposure of General Public to Automation via Shared CAVs	Public authority	Citizen representatives	CCAM and local economy, networks, socila inclusion and sustainability	CAVs legislation, regulation and insurance	
5	Accessible CAV Design via Co-Creation	Product developer	Citizen representatives	In-vehicule CAV ICT developments	CCAM and local economy, networks, socila inclusion and sustainability	CAV digital infrastructure & CCAM services
6	Accessibility Information Legislature for European Public Transport Networks	Public authority	Citizen representatives	CAVs legislation, regulation and insurance		CCAM and local economy, networks, socila inclusion and sustainability

7	Enhanced Wayfinding Applications in CAVs for Increased Accessibility	Public authority	Service provider	CAV digital infrastructure & CCAM services	CAVs legislation, regulation and insurance	
8	Innovative and Enhanced Cybersecurity Risk Assessment and Protection	Product developer	Public authority	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
9	Enhanced Privacy Protection and Data Storage Protocols	Public authority	Product developer	In-vehicule CAV ICT developments	CCAM and local economy, networks, social inclusion and sustainability	
10	Notify the pedestrian that the automated car will not stop	Product developer	Researcher	In-vehicule CAV ICT developments		
11	The automated car has to stop approaching a pedestrian crossing	Product developer	Researcher	In-vehicule CAV ICT developments		
12	The automated car has to been easily identified in traffic	Product developer	Researcher	In-vehicule CAV ICT developments		
13	Regulation and standardization of eHMIs are needed to ensure uniformity	Public authority	Product developer	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	
14	All CAV HMI functions must meet the requirements of the two-sense principle	Product developer	Service provider	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	CCAM and local economy, networks, social inclusion and sustainability

15	Passengers must be able to interact with operation centres	Service provider	Product developer	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	CCAM and local economy, networks, social inclusion and sustainability
16	Guarantee user control over personal data processed inside the veichle	Public authority	Service provider	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	
17	Clarify “driver's” responsibilities	Public authority		CAVs legislation, regulation and insurance		
18	Investigate the various needs in vehicle design	Product developer	Citizen representatives	CCAM and local economy, networks, social inclusion and sustainability		
19	Provide devices for users with various disabilities (merged with EBU recommendation “two-senses principle”)	Product developer	Citizen representatives	CCAM and local economy, networks, social inclusion and sustainability		
20	Usages of Living labs and Testbeds in CAV developments	Product developer	Service provider	CCAM and local economy, networks, social inclusion and sustainability		

21	Give vulnerable road users the opportunity for positive interactions with CAVs	Public authority	Product developer	CCAM and local economy, networks, social inclusion and sustainability		
22	Offer citizens opportunities to familiarize with CAV operation prior to actual use	Product developer	Service provider	CAV digital infrastructure & CCAM services		
23	Promote the use of shared modes of transport	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability	CAV digital infrastructure & CCAM services	
24	Conduct more in-depth research on the needs of people with visual impairments	Product developer	Researcher	CCAM and local economy, networks, social inclusion and sustainability		
25	Allow adolescents to use CAVs without assistance	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability	CAVs legislation, regulation and insurance	
26	Make CAVs environmentally friendly by design	Product developer	Public authority	CCAM and local economy, networks, social inclusion and sustainability	CAVs legislation, regulation and insurance	

27	Make CAV user data policy transparent through public information campaigns	Public authority	Product developer	CAV digital infrastructure & CCAM services	CAVs legislation, regulation and insurance	
28	Enable CAV users immediate insight in their user data via apps	Public authority	Service provider	CAV digital infrastructure & CCAM services		
29	Providing in vehicle design solutions for wheelchair securement	Product developer	Service provider	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
30	Considering disabled people in automated public transport services	Product developer	Service provider	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	CCAM and local economy, networks, social inclusion and sustainability
31	The use of eHMI in vehicle-pedestrian interactions	Product developer	Service provider	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
32	Integrate shared CAV services with public transport	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability		
33	Specific training programme for trainers in CAV environment	Public authority	Citizen representatives	CAVs legislation, regulation and insurance	CCAM and local economy, networks, social inclusion and sustainability	

34	Specific training programme for trainers in CAV environment	Public authority	Citizen representatives	CAVs legislation, regulation and insurance	CCAM and local economy, networks, social inclusion and sustainability	
35	The CAV should be entered and left in a safe and convenient way	Product developer	Service provider	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	CCAM and local economy, networks, social inclusion and sustainability
36	Evaluate clarity of existing rules	Public authority	Citizen representatives	CAVs legislation, regulation and insurance		
37	Ensure secure data exchange between CAV and other devices	Product developer	Service provider	CAVs legislation, regulation and insurance	CAV digital infrastructure & CCAM services	
38	Avoid the surveillance of individuals through georeferencing	Service provider	Product developer	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	CAVs legislation, regulation and insurance
39	Protect personal data in case of vehicle sharing	Service provider		In-vehicule CAV ICT developments	CAVs legislation, regulation and insurance	
40	Ensure clear explanation of consent	Service provider		In-vehicule CAV ICT developments		

41	Improve the protection of fundamental rights	Product developer	Service provider	In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
42	CAVs and effect on social inclusion	Public authority		CCAM and local economy, networks, social inclusion and sustainability		
43	Assisting the outdoor navigation of blind and visually impaired people	Public authority	Service provider	CAV digital infrastructure & CCAM services		
44	The role of on-board human staff in automated public transport services	Service provider		CAV digital infrastructure & CCAM services		
45	Training on how to use and interact with automated vehicles	Citizen representative		CAV digital infrastructure & CCAM services		
46	Develop integrated apps for CAV services	Service provider		CAV digital infrastructure & CCAM services		
47	Identify people who are potentially unable to use CAVs and develop solutions	Product developer	Service provider	CAV digital infrastructure & CCAM services		
48	Simplify in-vehicle HMI and allow passengers to conduct most/all operations on their own smart devices instead	Product developer	Service provider	In-vehicule CAV ICT developments		
49	Carefull and gradual design for drivers resuming control of the vehicle	Product developer	Researcher	In-vehicule CAV ICT developments		

50	Informative warning signals without adding extra cognitive load	Product developer	Researcher	In-vehicule CAV ICT developments		
51	Driver's attention detection when takeover request happens	Product developer	Researcher	In-vehicule CAV ICT developments		
52	Raise cyber security awareness	Public authority	Service provider	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	
53	Cocreation of CAV solution with end users	Product developer	Service provider	CCAM and local economy, networks, social inclusion and sustainability		
54	Adopt a specific ADAS module into existing driver training syllabus	Service provider		CAVs legislation, regulation and insurance		
55	Adoption of 'CHAT' routine for automated hand back to help drivers safely resume manual driving in a CAV.	Service provider		CAVs legislation, regulation and insurance		
56	Flying CAVs should be introduced over sparsely-populated areas first	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability		

57	Provide regular and timely reminders to CAV occupants if the autonomy prompts them to make a decision	Product developer		In-vehicule CAV ICT developments		
58	CAV developers should use a blend of autonomous decision making to keep the occupant in the loop	Product developer	Service provider	In-vehicule CAV ICT developments		
59	Use autonomy by exception for occasions when it is more desirable for the occupant to accept the CAV autonomy's suggested course of action	Product developer	Service provider	In-vehicule CAV ICT developments		
60	Develop integrated apps for CAV services	Service provider		In-vehicule CAV ICT developments	CAV digital infrastructure & CCAM services	
61	CAV and job creation	Public authority		CCAM and local economy, networks, social inclusion and sustainability		
62	Promote a security by design approach	Public authority	Product developer	CAVs legislation, regulation and insurance	CCAM and local economy, networks, socila inclusion and sustainability	
63	Regular and consistent visual and audio cues should be given to the user	Product developer	Service provider	In-vehicule CAV ICT developments		

64	Use autonomy by consent to maximise increases in user satisfaction	Product developer	Service provider	In-vehicule CAV ICT developments		
65	Use Simulated Flight Trials to Increase acceptance	Service provider		CCAM and local economy, networks, social inclusion and sustainability	CAV digital infrastructure & CCAM services	
66	Promote awareness of regulatory updates through CAVS	Public authority	Service provider	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	
67	Evaluate the implementation of Advanced vehicle systems legislation	Public authority	Citizen representatives	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	
68	Promote educational campaigns to clarify CAVs legislation	Citizen representatives		CAVs legislation, regulation and insurance		
69	Ensure integration between CAV and other infrastructure networks	Public authority	Product developer	CAVs legislation, regulation and insurance		
70	Promote coherence of public investments	Public authority		CCAM and local economy, networks, social inclusion and sustainability		

71	Ensure secure traffic sign recognition	Public authority		CAVs legislation, regulation and insurance		
72	Promote experiments and pilot studies	Public authority	Researcher	CAVs legislation, regulation and insurance	CAV digital infrastructure & CCAM services	
73	Guarantee a common EU approach to liability rules and insurance	Public authority		CAVs legislation, regulation and insurance		
74	Clarify manufacturer's responsibilities	Public authority		CAVs legislation, regulation and insurance		
75	Evaluate CAV insurance costs	Public authority		CAVs legislation, regulation and insurance		
76	Guarantee a common EU approach to the use of recorded data	Public authority		CAVs legislation, regulation and insurance		
77	Evaluate the impact of Advanced Driver Assistance System legislation on insurance costs	Public authority		CAVs legislation, regulation and insurance		

78	Promote the update of Advanced vehicle safety systems standards	Public authority		CAVs legislation, regulation and insurance		
79	Promote CAV's interoperability with disability certifications	Public authority	Service provider	CAVs legislation, regulation and insurance	In-vehicule CAV ICT developments	
80	Promote the adoption of a secure in-car application platform	Service provider	Product developer	In-vehicule CAV ICT developments		
81	Influence of CAV on travel demand	Public authority		CCAM and local economy, networks, social inclusion and sustainability		
82	Promote Digital Maturity and AI Literacy for data handling through public participation	Product developer	Researcher	CCAM and local economy, networks, social inclusion and sustainability		
83	CAV and shared mobility services/ Mobility as a service platforms/ part of Company Mobility plans	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability		
84	Usage of CAV development to support local economy	Public authority		CCAM and local economy, networks, social		

				inclusion and sustainability		
85	Environmental sustainability and CAV	Public authority		CCAM and local economy, networks, social inclusion and sustainability		
86	Use cost efficient strategies for public engagement	Researchers	Product developer	CCAM and local economy, networks, social inclusion and sustainability		
87	Usage of virtual reality platforms to test autonomious driving (UBFC)	Researchers	Product developer	CCAM and local economy, networks, social inclusion and sustainability		
88	CAV, Urban Air Mobility and Flight Simulators (ULIV)	Service provider	Researcher	CCAM and local economy, networks, social inclusion and sustainability		
89	Development of Cognitive training methods (RDS)	Service provider	Researcher	CCAM and local economy, networks, social inclusion and sustainability		
90	Clarify ambiguities about liability	Public authority	Service provider	CAVs legislation,		

				regulation and insurance		
91	Following a user-centred approach in the development of visual HMI symbols	Product developer	Researcher	In-vehicule CAV ICT developments		
92	Choosing the modality of human-machine interfaces	Product developer	Researcher	In-vehicule CAV ICT developments		
93	Ensuring safe interactions of human drivers with automated vehicles	Product developer	Researcher	In-vehicule CAV ICT developments		
94	CAVs for on-demand service and servicing remote areas	Service provider		CAV digital infrastructure & CCAM services		
95	Multimedia/infotainment embedded services	Product developer	Service provider	In-vehicule CAV ICT developments		
96	Addressing legal liability assignment in crashes involving automated vehicles	Public authority		CAVs legislation, regulation and insurance		
97	Ensuring control and communication in public road transport services	Public authority	Service provider	CAV digital infrastructure & CCAM services		
98	Competitiveness of automated road public transportation vehicles	Public authority		CCAM and local economy, networks, social inclusion and sustainability		

99	Training on resuming control after a takeover request	Service provider	Public authority	CAVs legislation, regulation and insurance		
100	Design mini-buses or vans to enhance CAVs' potential for public transport	Product developer	Service provider	In-vehicule CAV ICT developments		
101	Provide clear and fair recording and reporting of CAV failures on a 3rd party platform	Public authority	Service provider	In-vehicule CAV ICT developments		
102	Make revenue from data generated by CAVs	Service provider		CCAM and local economy, networks, social inclusion and sustainability		
103	Use CAV public transport to promote overall CAV public acceptance and adoption	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability		
104	Develop reskilling programmes ahead of envisaged employment impacts CAVs	Service provider	Public authority	CCAM and local economy, networks, social inclusion and sustainability		
105	Ready2Gomethod and similar education methods (ACI)	Service provider	Researcher	CCAM and local economy, networks, social inclusion and sustainability		

106	Home Study simulator training embedded in driver training (LIST)	Service provider	Researcher	CCAM and local economy, networks, social inclusion and sustainability		
107	Cross Skill for CAV service providers (LIST)	Researchers	Service provider	CCAM and local economy, networks, social inclusion and sustainability		
108	Usage of an immersive arena in CAV research (LIST)	Researchers	Service provider	CCAM and local economy, networks, social inclusion and sustainability		
109	CAV and Apertum (ETELÄTÄR)	Public authority	Service provider	CCAM and local economy, networks, social inclusion and sustainability		

4 Accessibility and Sustainability

A special attention has been paid to the accessibility of the G2A.

The users can access the recommendations through different means: the multicriteria search, the Cross Skill® recommender system and the chatbot. This latter enables vulnerable groups, especially visually impaired and blind people to access the contents of the G2A. The possibility to download the recommendations in pdf format, to access them offline and print them, also contributes to the accessibility of the G2A.

To ensure the sustainability of the project results and impact, the Project website and G2A toolbox will be available during five years after the project end.

Uploading or updating a recommendation on the G2A is made easy thanks to a usable form. Once logged as a administrator, the user only has to click on the “add recommendation button”. This interface also enables to easily download the database.

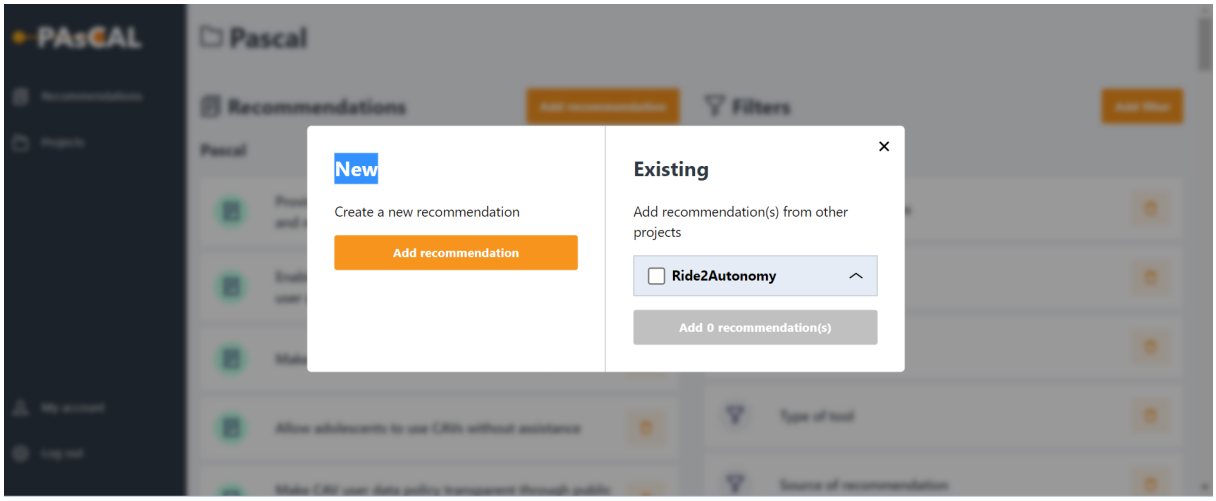


Figure 12 Screenshot of the G2A administrator interface

Then the user accesses the recommendation form and can fill in the contents and tick the corresponding categories of the multi-criteria search engine.

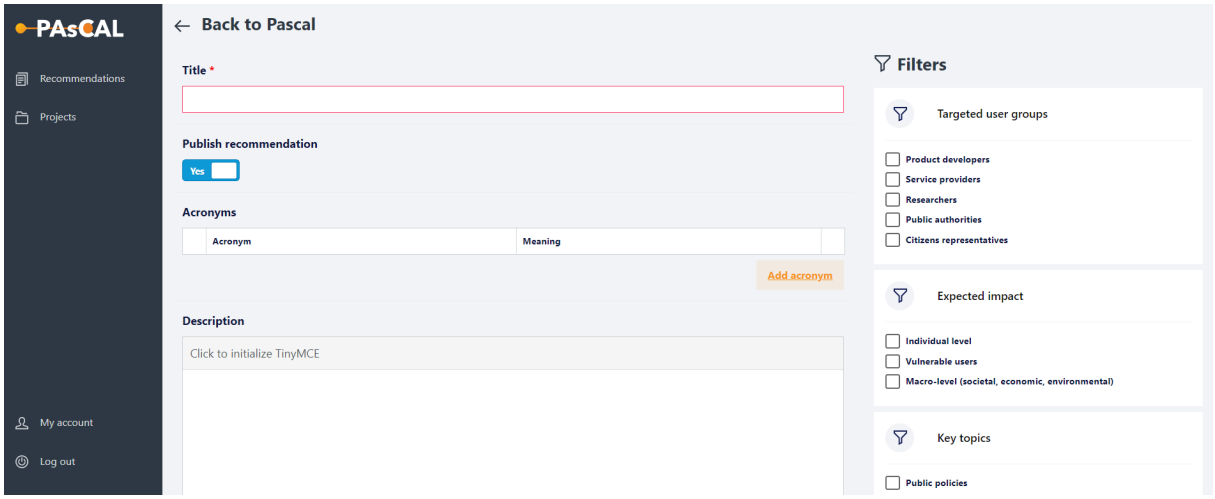


Figure 13 Screenshot of the G2A: uploading a recommendation

5 Conclusion

The G2A is one of the main outcome of the PAsCAL project. The 109 recommendations composing it have been written by all project partners. They stem from all the activities led by partners over the project's duration, which they reflect.
Transforming projects insights into recommendations and ensuring their transferability to the users of the G2A has been a challenge, a real learning process for all project's partners, a strong collaboration.

All project partners have engaged in the process, be it by writing recommendations (WP leaders), by reviewing them or by checking the language. And the WP8 taskleaders, who managed the process, elaborated the templates, trained the partners, reviewed the recommendations, would like to thank all projects partners for their engagement.

The PAsCAL consortium is proud of this achievement, and we have paid attention to give it a large accessibility. Indeed, G2A will be available not only via a multi-criteria search, but also via a chatbot, ensuring its access by visually impaired and blind people, people who will benefit a lot from CAVs. The Cross Skill® recommender system, will enable service providers to self-assess their proficiency in different dimensions of CAVs and to access dedicated recommendations.

We will also upload recommendations from PAsCAL H2020 sister project, in order to create synergies, to ensure the dissemination of all projects findings and achieve our goal of improving awareness and acceptance of CAVs.

6 References

6.1 Bibliography/reference list

[1]. Project Deliverable 3.4_Cross Skill® - a self-assessment tool adapted to PAsCAL needs https://www.pascal-project.eu/deliverable/D3.4
[2]. Project deliverable 8.1_Common issues, approaches and lessons learned across all modes for Industry and Public Authorities https://www.pascal-project.eu/deliverable/D8.1
[3]. Project deliverable 8.2_Guide2Autonomy Framework https://www.pascal-project.eu/deliverable/D8.2

6.2 Links to websites

[Web1]. https://www.pascal-project.eu/

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PAsCAL
Enhance driver behaviour & Public Acceptance of Connected & Autonomous vehicles