

UNIACCESS

Design of Universal Accessibility Systems for Public Transport

Susanne Hoadley, Kristin Ulven Jørgensen*,

POLIS, Rue du Trône 98, 1050 Bruxelles, Belgium

*SINTEF Health Research 7465 Trondheim, Norway

shoadley@polis-online, Kristin.u.jorgensen@sintef.no,

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ABSTRACT

Uniaccess is a 2-year project whose aim is to define concepts for universal accessibility in public transport. The project promotes and supports the networking and coordination of research and innovation activities in the field of universal design of accessibility systems for public transport with a view to achieving equality of access to public transport in the EU. These are the main activities of the project:

1. a **state of the art** exercise to provide a picture of current situation in relation to public transport infrastructure and vehicles and relevant legislation and standards.
2. the establishment of a **Research & Development roadmap**
3. building an understanding of the frequency & intensity of **interaction between the different stakeholders** (designers/manufacturers, operators, authorities and end users)
4. and finally, **awareness raising** activities to sensitise the stakeholder groups, media and public to the Uniaccess project and public transport accessibility in general

WHAT IS UNIACCESS?

Uniaccess is a 2-year project whose aim is to define concepts for universal accessibility in public transport. It is funded by the European Commission through the Sixth Framework Programme for Research and Development.

The project promotes and supports the networking and coordination of research and innovation activities in the field of universal design of accessibility systems for public transport with a view to achieving equality of access to public transport in the EU.

WHY UNIACCESS?

Uniaccess was developed in response to an observation that something was failing in the current system of public transport accessibility:

- Many accessibility devices are too often out of order, typically ramps.
- When a person with reduced mobility has to make a journey with connections (often intermodal), he/she frequently finds discontinuity in the disabled accessibility provisions. This discourages people with reduced mobility from using public transport over long distances.
- Due to the extra deployment time required to (dis)activate current accessibility systems, the use of these systems very often causes anger in drivers and travellers without mobility problems as well as frustration and embarrassment in people with disability.
- A large group of people with minor mobility problems, such as temporary injuries, people with shopping bags, carry babies or children, and elderly people, avoids using public transport because it does not meet their needs. This causes in many cases the use of less sustainable modes of transport such as the private car or taxi instead of public transport.
- Design for all principles have been widely adopted in the built environment, while transport seems to stick to differentiated access systems, ie, a solutions for a specific disability rather than a universal solution address a range of disabilities.

The above problems are compounded by public perception that people with reduced mobility are restricted to the 'conventionally' disabled, e.g., wheelchair users and blind or deaf people, and therefore, implementing 'expensive' devices for such a small group of people (whom one rarely sees on the street) is not an efficient use of resources. This could not be further from the truth. The term reduced mobility does not just encompass the 'conventionally' disabled as described above but also those with difficulties walking, standing, gripping or understanding, expectant mothers, people suffering from temporary injuries and people below the age of 3 and over 65; ie, 26% of the European population.

Therefore, beyond and above meeting basic human rights for all people to be able to use public transport safely and with dignity, a universally accessible public transport system can be justified as follows:

- There is a hidden group of potential public transport users that either do not use it or do it with a variable degree of dissatisfaction.
- Universal accessibility is achievable at low cost and it offers a lot of advantages for everybody. An accessible public transport system benefits all passengers, the quality of a system is often a key factor in modal choice decisions.
- More accessible transport can reduce the need for specialised transport means required by the elderly and disabled people.

MAIN ACTIVITIES OF UNIACCESS

The main activities in the Uniaccess project are summarized in figure 1.

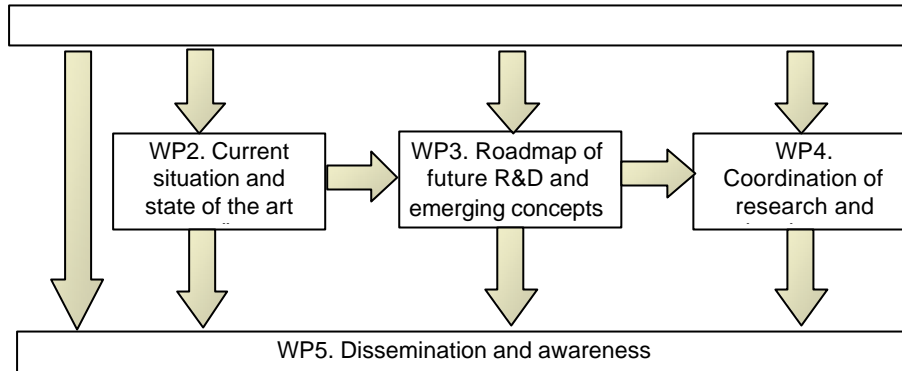


Figure 1. Main activities for the Uniaccess project.

1. a **state of the art** exercise to provide a picture of current situation in relation to public transport infrastructure and vehicles and relevant legislation and standards.
2. the establishment of a **Research & Development roadmap**
3. building an understanding of the frequency & intensity of **interaction between the different stakeholders** (designers/manufacturers, operators, authorities and end users)
4. and finally, **awareness raising** activities to sensitise the stakeholder groups, media and public to the Uniaccess project and public transport accessibility in general

1. State of the art

The purpose of this activity was to establish a picture of the current situation regarding accessibility in public transport in terms of infrastructure, vehicles and legislation and standards. This exercise was accomplished by gathering the viewpoints of the full range of stakeholders, ie, end users, operators, authorities and manufacturers/designers, and also benefited from the input of accessibility experts from around Europe.

a. Infrastructure

This covers railway, metro and bus stations/interchanges as well as bus stops. It deals with the physical environment (doors, walkways, platforms, ticket machines etc) as well as communication (audio and written). It would seem that infrastructure owners are becoming more and more committed to accessibility (partly due to legislation). Progress is quicker for new infrastructure but slower, more expensive and less efficient where retrofitting is concerned.

b. Vehicles

Technological progress with regards to vehicles (buses, metros and taxis) tends to have concentrated on ramps and there are many solutions on the market. However, boarding is still found to be a problem for some passengers due to remaining gaps. Furthermore, this 'solution' is focused on boarding passengers only; there is a need to develop devices to facilitate seating and to provide a safe and comfortable journey. Again the general solution pertained to the cost and

difficulties of retrofitting (particularly pertinent to vehicles with a long life such as trams and trains).

c. Legislation & standards

The existence of national/regional legislation on accessibility in public transport varies widely around Europe and where legislation exists, there is diversity in terms of scope. However, there was a common view that the lack of conformity with legislation and enforcement were important concerns. Also, it was questioned whether legislation was the right tool for ensuring full accessibility.

The absence of standards, especially regarding rolling stock, has resulted in the wide range of technical solutions on the market for devices such as ramps. Manufacturers are currently having to follow national guidelines (where available) but would rather work with standards.

In the course of reviewing existing legislation & standards, it became clear that action was also needed in relation to society awareness. People with reduced mobility face additional barriers to using public transport due to public attitudes for instance (eg, impatience due to the time required for a wheelchair user to board) or irresponsible driving behaviour (eg, pulling away before an elderly passenger is seated).

2. Road map for future research and development

Having built up a picture of the current situation, the next major activity was the construction of the roadmap. This was achieved following the methodology outlined in figure 2.

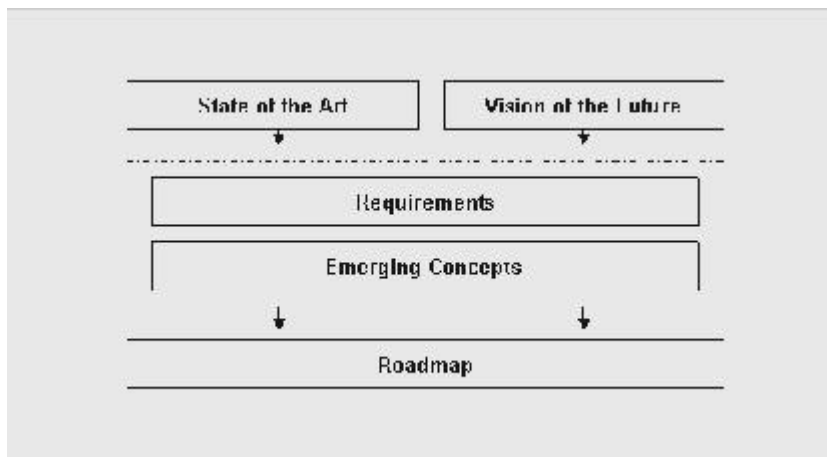


Figure 2. The process for developing the roadmap

Firstly, a series of accessible journey scenarios were prepared in order to define a vision of the future. The scenarios were analysed in terms of strategic moments and strategic physical points in the journey chain and the requirements (technological and other) for the scenario to become a reality were extracted. From these requirements, specific solutions were defined and graded according to their degree of universality in terms of transport mode (bus, metro, tram, train and taxi) and type of mobility impairment of which 9 categories were identified. Finally, the gap between the current situation and proposed solutions was identified, ie, what is missing. A total

of 59 requirements for the entire transport journey were identified which, together with their corresponding solutions and gaps, form the Emerging Concepts on transport infrastructure and means. Two examples of requirements and corresponding solutions and gaps can be found in Annex 1.

A separate task dealing with emerging concepts in legislation, standards, policy and society was also prepared and comprised 15 requirements. An example of one requirement can be found in Annex 2.

The next step concerned the preparation of the Research & Development roadmap. This roadmap was prepared on the basis of an analysis of the Emerging Concepts and specifically the solutions needed to deliver a given requirement. Each solution to a requirement was studied and selected for the road map on the basis of whether it required research and development. The roadmap is organised according to the 5 steps in any journey chain: before the journey (eg, travel information & booking); to the terminal or bus stop; at the terminal, platform or bus stop; getting into/out of the transport vehicle; during the journey. It also contains a separate section on R&D in relation to legislation, standards, policy and society.

The roadmap will be used as a basis for preparing future research and development proposals.

3. Collaborative process

The objective is to define a new improved collaborative innovation process which breaks the communication barriers that prevent us nowadays from taking full advantage of the contributions of all stakeholders to improve accessibility to transport. Our vision is that the innovation process regarding public transportation should involve collaboration from all relevant parties and thereby ensuring that the new or improved transportation solutions coming out of the process will be universally accessible. Based on modern design methodology and insight in collaborative group processes, an integrated process model with relevant stakeholders will be described. A description of the current situation will be input to the development. To find the right way forward, it is useful to try to describe the ideal solution. The ideal situation; a collaborative innovation process is a process with a structure which ensures good solutions.

Experience has shown that accessibility design is a multidisciplinary problem that demands a highly coordinated approach. End users must validate new designs; they must also communicate their needs and assessment of the current situation. Designers and manufacturers must find cost-effective viable solutions. Operators must be taken into account so that what works in the laboratory also works in the real setting. Authorities must legislate and regulate taking all of this into account to achieve maximum effectiveness.

4. Awareness raising

Raising awareness among the key stakeholder groups (designers/manufacturers, operators, authorities and end users) is an important goal of the project. All four stakeholders are represented in the Uniaccess consortium. Additional activities such a newsletter, website, a universal design reference manual and several events have been set up to reach out to the different groups.

Specific actions have also been undertaken to raise society awareness to the important of universal accessibility in public transport. This has mainly been achieved through media activities.

Partners of Uniaccess Project:

AGE (European Older People's Platform, E.U.) Gives the older people requirements in the field of accessibility to transport.

ENIL (European Network of Independent Living, E.U.) Pursues the goal of achieving independent living conditions for people with disabilities.

COCEMFE (Spanish Confederation of People with Disabilities, Spain) Gives the people with disabilities' requirements in the field of accessibility to transport.

SINTEF (The Foundation of Scientific and Industrial Research at the Norwegian Institute of Technology, Norway) Expert in computer aided design and prototyping focused on usability and geometrical shape. It has an experience in coordinating complex research projects among many partners.

GIAT-EUVE (Group of Interest in Accessibility to Transport – EUVE, Spain) Expert in computer aided design and prototyping focused on engineering as well as in managing projects of design of technical aids and in managing large thematic networks.

GIAT-ICAVI (Group of Interest in Accessibility to Transport- ICAVI, Spain) Know-how in the range of technical aids in the market, their distribution by governments, and the training of end-users to use them as well as the dissemination of information to end-users and governments to optimally select the adequate technical aids taking into account both technical and sociological issues.

CRF (FIAT Research Centre, Italy) Expert in full automobile, bus design and manufacture with a focus on ergonomic aspects and their compatibility with vehicle functions.

SIEMENS (STS Siemens Transportation Systems GmbH & CO KG, Austria) Expert on railway and subway rolling stock design and manufacturing.

POLIS (Cities and regions networking for innovative transport solutions, E.U.) It brings into the project the voice of authorities (primary decision makers) in the field of transport as well as the coordination with other innovation initiatives that they work on.

RATP (Régie Autonome des Transports Parisiens, France) It brings into the project the voice of transport operators.

For more information on the project, you can contact project coordinator in uniaccess@euve.org or visit project web page: www.uniaccessproject.org

ANNEX 1: Extract from Emerging Concepts on transport means and infrastructure

EXAMPLE 1:

REQUIREMENT : Information during the journey that is accessible to all

- **SOL 1 :** Communication with the driver and between passengers by means of audio/video systems
- **SOL 2 :** All info given in both visual and sound form / on the cell phone
- **SOL 3:** Make dimensioning, color and contrast features conform to ergonomics criteria
- **SOL 4 :** Height for displays and (both video and tactile based) suitable for all.

REQ.		VALID FOR THE FOLLOWING ToU										VALID FOR THE FOLLOWING MoT					
SOL.	TIME	%	V	PS	H	HH	W	PW	L	C	A	%	BUS	METRO	TRAM	TRAIN	TAXI
1	MT	100	X	X	X	X	X	X	X	X	X	100	X	X	X	X	PNF
2	MT	100	X	X	X	X	X	X	X	X	X	100	X	X	X	X	PNF
3	MT	100	X	X	X	X	X	X	X	X	X	100	X	X	X	X	PNF
4	MT	100	X	X	X	X	X	X	X	X	X	100	X	X	X	X	PNF

GAP FOR SOLUTION 1: Most of already existing devices may be adapted to the context. Ergonomic criteria about dimensioning, colour etc.. are found in literature.

GAPS FOR SOLUTIONS 2 TO 4: Further studies are required to identify the best costs/benefits solution in the case of tactile and/or Braille based devices

EXAMPLE 2:

REQUIREMENT: Information about evacuation and incidents should be communicated in a way perceivable by all.

- **SOL 1:** Transcription through personal devices
Written transcription / sign language translation / speech output on evacuation or disruption announcements through personal devices (evacuation procedure...).
- **SOL 2:** Alternative routes through personal devices

Personal device indicates alternative routes through speech output and visual (map, sign language) according to user's specific needs.

REQ.		VALID FOR THE FOLLOWING ToU										VALID FOR THE FOLLOWING MoT					
SOL.	TIME	%	V	PS	H	HH	W	PW	L	C	A	%	BUS	METRO	TRAM	TRAIN	TAXI
1	LT	100	x	x	x	x	x	x	x	x	x	100	x	x	x	x	PNF
2	LT	100	x	x	x	x	x	x	x	x	x	100	x	x	x	x	PNF

GAP FOR SOLUTION 1: Integration of different technologies. The system has to be very solid

GAP FOR SOLUTION 2: Integration of very different technologies and knowledge

Legend

SOL = solution ToU = types of user MoT = mode of transport
ST, MT & LT = long, medium & short-term PNF = problem not found

V	PS	H	HH	W	PW	L	C	A
Visually impaired	Partially Sighted	Hearing impaired	Hard of Hearing	Wheelchair user	People with walking difficulties	Learning impairment	Carrying luggage/ travelling with children	Older people

ANNEX 2 – Extract from Emerging Concepts on Legislation, standards, policy & society

Requirement: Need to complement legislation, and strengthen its implementation, with other tools

Sub points	Solutions	Short-term	Medium-term	Long-term
Financial - One of the main barriers to the implementation of universal accessibility solutions is the cost. Public procurement	11.1. Tax exemptions			X
	11.2 Other financial incentives		X	
	11.3. Accessibility criteria in public procurement	X		
Organisation	11.4. 'Accessibility Advisor'	X		
	11.5. Certification agency			X
Enforcement - Public transport accessibility rules and regulations do exist in many countries but they are not always respected.	11.6. Improved enforcement and awareness raising		X	
	11.7. Stronger punitive measures	X		
	11.8. Improved enforcement of illegal parking	X		
More guidance on accessibility legislation, standards and other measures intended to promote universally accessible public transport.	11.9. National guidance on legislation		X	
	11.10 More guidance on measures		X	
	11.11. Indicators and benchmarking		X	
	11.12. European programmes		X	

Legislation can go a long way towards delivering accessible public transport but it needs additional tools to facilitate its implementation.

Solutions

11.1: Tax exemptions should be awarded to those investing in accessible public transport systems. These exemptions could relate to the free registration of vehicles, free/reduced-rate of road tax, exemption of reduction in fuel duty, etc. In the energy sector, the EU Directive 2003/96/EC of 27 October 2003 gives Members States the right to reduce duty levied on bio-fuels in a bid to promote the take up of fuels from renewable sources. Some Member States have taken this course of action.

11.2: Other financial incentives, such as grants and loans, should be introduced in order to alleviate the cost of investing in new/retrofitted infrastructure and rolling stock. In the Autonomous Region of Extremadura (Spain), the government offers subsidies to cover up to 50% of the investments made by the companies incorporating inclusive design principles in their products and services.¹

11.3: Public procurement is a powerful tool. "Public procurement transactions account for approximately 16% of the EU's Gross Domestic Product, equivalent to 1500 billion Euros per year".² Therefore, it can drive forward design for all principles throughout societal. In the public transport field, accessibility criteria in public transport tendering is already compulsory in France – see solution 3.1 above.

¹ Build for All reference manual, January 2006, www-build-for-all-net

² Build for All reference manual, January 2006, www-build-for-all-net

11.4: The creation of the post of 'Accessibility Advisor' within all stakeholder organisations would raise the profile of accessibility and support the mainstreaming of the 'Design for all' principle in policy. In the field of sustainable transport, organisations are increasingly recruiting mobility managers to introduce more sustainable transport solutions for its employees/customers. In Italy, mobility managers are required by law in companies with 400+ employees.

11.5: In view of the many design solutions which have already been developed or are under development, there is a need for an agency to test, evaluate and confirm the accessibility of products and services to ensure they are universally accessible. Such an agency could be responsible for managing and awarding the accessibility certification proposed in solution 7.1.

11.6: There should be increased resources for the enforcement of accessibility rules and regulations and these should be accompanied by awareness raising campaigns on current rules through targeted dissemination (local authorities, public transport operators, manufacturing associations, etc).

11.7: Social type legislation can be taken 'less seriously' than legislation in other fields. To ensure compliance with public transport accessibility laws, punitive measures need to be agreed upon and implemented – see solution 2.4.

11.8: Punitive measures should also apply to the general public. Cars parked illegally at bus stops, for instance, are a major impediment. Enforcement of this type of offence could be made by the bus drivers and passengers who should be able to report offenders. Technology also has a role to play here, eg, equipping buses with cameras which takes pictures of offending car number plates or making use of existing traffic infrastructure (traffic wardens, traffic monitoring cameras, speeding cameras, Automatic Number Plate Recognition cameras used in cities with road pricing/access restrictions, etc).

11.9: Against a backdrop of growing legislation on non-discrimination and on public transport accessibility at different levels of government, there is a clear need for guidance. National guides should be prepared setting out which level of government (European, national, local/regional) has which responsibility in relation to accessibility, including existing and proposed legislation, and penalties for non-compliance

11.10: More guidance is also needed on the measures (technological, etc), the tools (financial, standards etc), the targets and the timeframes to support the implementation of legislation. Such guidance could be prepared in conjunction with the previous solution (11.10).

11.11: In order to understand which measures and tools are the most effective in delivering universal accessibility, more work is required on developing indicators in view of performing impact assessments and benchmarking exercises.

11.12: The European Union should create programmes which support local government in experimenting & demonstrating accessibility measures in cooperation with industry (CIVITAS -type initiative) as local actions are often the trigger for national and European initiatives and serve to test the acceptability and feasibility of measures.