

# Mobility barriers in urban transport for the sight or hearing impaired: Solutions help all passengers

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## 1 ABSTRACT

People with visual or hearing impairments represent a significant part of the population. Using public transport services they have to overcome numerous specific problems and obstacles. Quite often they are not even recognized as a group for themselves with special needs and demands but rather mistaken for blind and deaf people. Taking into account that mobility barriers for these groups are completely different, this situation, of course, is not acceptable.

In order to reveal the most common and most hindering specific problems people with sight and hearing impairments are confronted with and to collect proposals to solve them, the Institute for Transport and Logistics Management of the WU Vienna conducted a qualitative short-study based on interviews with persons directly concerned, their representatives, authorities and transport companies as well as on discussions in related internet-fora respectively. Problems at stops and stations, in vehicles, general mobility problems and public perception were taken into account.

Thus the barriers detected and the related solutions proposed were rated according to their technical and financial feasibility as well as to the utility gain for the passengers concerned. It can be shown that numerous measures could be realised at low or even no cost at all as many problems are merely resulting from a lack of awareness, empathy or insufficient training only. Furthermore the implementation of several measures would not only improve access to public transport for the two specific groups but for almost all passengers.

## 2 BACKGROUND

For most of us mobility is an important part of our everyday life and partly even regarded as a basic human right. However, there are many people who have to face different barriers concerning their personal mobility, for instance people with walking disabilities, other physical or mental handicaps, deaf and blind persons, but also two groups which are usually not getting appropriate attention, namely people with sight or hearing impairments. These two groups are in the focus of this report.

The two groups represent a significant part of the population and, unfortunately, they are often mixed-up with the blind and deaf although these groups have completely different need and requirement profiles concerning their personal mobility. Since blind people cannot see at all they must replace the sense of sight by using their other senses or by additional support like guide dogs. Visually impaired persons on the contrary rely on their optical sense, but are of course unable to reach the same level of vision as normal-sighted persons. Analogously deaf persons cannot hear at all, whilst hearing impaired can but need auxiliary means to improve their acoustic perceptions.

Thus measures in public transport which are implemented and regarded as useful for the blind or deaf mostly fail to foster the mobility of visually or acoustically impaired persons. Another important point to be taken into consideration is the large size of the two groups of people with visual or acoustic impairments. From a statistical point of view their number exceeds by far the blind or deaf or other groups with limited mobility: However public awareness of their relative importance is low. At this point it is important to stress, that it is not the author's intention to set the different groups against each other or to achieve a redirection of funds. The intention is rather to increase the sensitivity for the affected groups, to identify problems and to show ways how to solve them in order to significantly improve the mobility of visually and acoustically impaired persons eventually.

## 3 DEFINITION

Before the problems and related solutions for sight and hearing impaired persons can be discussed in detail, it is important to delimit to a certain extent the field of interest.

From a medical point of view the delimitation for visual impairments is based on the visual acuity (*visus cum correctione*, v.c.c; 1.0 = 100% is the average normal eyesight) where a range from 30% down to 10%

acuity can be seen as (moderately) impaired vision and the range from 10% to 2% as severely impaired. Oftentimes the visual field loss is also used to determine the degree of the impairment.

Referring to the WHO International Classification of Diseases (ICD-10) from 2007 visual disturbances and blindness can be found in the groups H53-H54. Table 1 gives the classification of severity of visual impairment which is included in the ICD-10 at the end of the groups H53-H54:

Category of visual impairment	Visual acuity with best possible correction	
	Maximum less than:	Minimum equal to or better than
1	6/18	6/60
	3/10 (0,3)	1/10 (0,1)
	20/70	20/200
2	6/60	3/60
	1/10 (0,1)	1/20 (0,05)
	20/200	20/400
3	3/60	1/60 (finger counting at 1 metre)
	1/20 (0,05)	1/50 (0,02)
	20/400	5/300 (20/1200)
4	1/60 (finger counting at 1 metre)	Light perception
	1/50 (0,02)	
	5/300	
5	No light perception	
9	Undetermined or unspecified	

Table 1: Classification of severity of visual impairment recommended by a WHO Study Group on the Prevention of Blindness, Geneva, 6-10 November 1972. (WHO Technical Report Series No. 518, 1973) The term "low vision" in category H54 comprises categories 1 and 2 of the table, the term "blindness" categories 3, 4 and 5, and the term "unqualified visual loss" category 9. If the extent of the visual field is taken into account, patients with a field no greater than 10 o but greater than 5 o around central fixation should be placed in category 3 and patients with a field no greater than 5 o around central fixation should be placed in category 4, even if the central acuity is not impaired. (Source: World Health Organization: <http://apps.who.int/classifications/apps/icd/icd10online/>)

Level 1 could be referred to as "moderate" visual impairment, level 2 as "severe" visual impairment. This article is focusing mainly on persons with a moderate low vision (acuity 0.3 to 0.1) though, however it has to be made clear at this point, that basically anybody with a visual acuity lower than 1.0 which cannot be corrected by spectacles or contact lenses could be considered as visually impaired. This is a crucial point as measures taken in public transport for people subject to the rather narrow definition above shall also help all other passengers with an acuity of less than 100%.

Hearing impairments (included in chapter VIII, groups H60ff. of the ICD-10) can be measured through many different means. The most commonly used method is the "hearing distance"-test. According to the guidelines the hearing distance is the distance in which at least half of the words spoken by the examiner are repeated correctly by the test person. Another important test to determine the degree of impairment is the quantitative measure of the hearing ability according to Boenninghaus u. Röser (1958). In this test two tables are used, one for the hearing distance for whispered and normal spoken words and the other for the results of an audiometric measurement, to define the degree of acoustic impairment. This article focuses on the group with a medium level of hearing impairment.

There are no detailed official statistics which could help to determine the exact size of the two groups in the population. For Austria, in 2007 a dedicated module focusing on persons with impairments was included in the microcensus by Statistics Austria. According to this survey roughly 3.8% of the Austrian population suffer from a persisting visual and about 2.5% from a persisting acoustical impairment respectively. In both groups the majorities show medium to heavy impairments; women make up the larger parts.

#### 4 METHOD

In a qualitative short study the Institute for Transport and Logistics Management of the WU (Vienna University of Economics and Business) mobility barriers for the sight and hearing impaired have been addressed. On the basis of a literature research a survey guideline with several open questions to be used in structured expert interviews was developed. The interviews were restricted to Austria though, but the results might still be transferable to other countries.

To get a comprehensive picture not only persons directly affected by a sight or hearing impairment were interviewed but also their representatives in associations or support groups as well as public authorities and responsible persons from transport companies (Table 2).

Interview Partners	Count
Visually impaired Persons	11
Acoustically impaired Persons	5
Associations	3
Transport companies	4
Authorities	2

Table 2: Persons interviewed

Furthermore dedicated threads were opened in internet-based discussion fora in order to reach also those affected persons who are not mobile (Table 3).

List of discussion boards	URL
Nahverkehrsforum: Train Simulator	<a href="http://www.tssf-forum.de/yabbse/index.php?board=24">http://www.tssf-forum.de/yabbse/index.php?board=24</a>
Hamburger Nahverkehrsforum	<a href="http://forum.bahninfo.de/list.php?5">http://forum.bahninfo.de/list.php?5</a>
Nahverkehr-FFM	<a href="http://forum.nahverkehr-ffm.de">http://forum.nahverkehr-ffm.de</a>
Hear-it	<a href="http://www.german.hear-it.org/forside.dsp?area=242">http://www.german.hear-it.org/forside.dsp?area=242</a>
Schwerhörigen-Forum	<a href="http://www.schwerhoerigenforum.de/cgi-bin/cutecast/cutecast.pl">http://www.schwerhoerigenforum.de/cgi-bin/cutecast/cutecast.pl</a>
Menschen mit Behinderungen	<a href="http://www.menschen-mit-behinderungen.info/forum/register.php">http://www.menschen-mit-behinderungen.info/forum/register.php</a>
Das Forum für sehbehinderte und blinde Menschen	<a href="http://f24.parsimony.net/forum56094/">http://f24.parsimony.net/forum56094/</a>
Taubenschlag	<a href="http://www.taubenschlag.de/">http://www.taubenschlag.de/</a>

Table 3: List of internet-fora

Table 4 shows the basic structure of the interviews which were slightly adapted according to the respective interview partner.

Subjects
Estimation of the size of seeing and hearing impaired persons in the population
Mobility problems of the affected groups
How are problems detected?
Development of possible solutions
Ways of taking specific measures

Table 4: Contents of the interviews

The interviews were transcribed and detailed lists of the detected problems of hearing and seeing impaired people with regard to their mobility were compiled. The possible solutions raised by interview partners were also included. During several project meetings categories were defined and the problems and solutions were classified accordingly. Furthermore the technical feasibility, the relevant costs and the utility gain for the affected were assessed.

To depict the results a rating system was introduced based on a 5 point scale where a higher score denominates a better result. As an example one point on the “cost-scale” of the following tables would represent high investments whilst five points would mean little to no costs at all.

## 5 RESULTS

The following tables show the results of the short study. To allow easier understanding the problems and solutions have been assigned to the following areas: “stops and stations”, “vehicles”, “other/general mobility problems”, and “public awareness”.

### 5.1 Stops and stations

The following table depicts commonly occurring problems at stations and the surrounding area.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for
Complex use of ticket machines	Possibility to increase the size of text.	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Voice output on demand	😞😞	😞	😊😊😊😊	Sight impaired
Readability of timetables	Timetables placed not too high – legibility has to be guaranteed (e.g. using reading aids, loupes, etc.)	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Pre-printed timetables in large print	😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Decrease of distance between glass and timetable to allow reading with low vision aids	😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Use of antireflection glass for showcases	😊😊😊😊	😞😞	😊😊😊😊	Sight impaired
Displays	Extended information on displays	😊😊😊😊	😊😊😊😊	😊😊😊😊😊	Both groups
	Use of contrasting colours	😞😞😞	😞😞😞	😊😊😊😊	Sight impaired
	Increase of font size	😞😞😞	😊😊😊😊	😊😊😊😊😊	Sight impaired
	Decreased height of mounted displays to eye-level and increased accessibility	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
Incomprehensible announcements at stations	Show announcement on displays and info-screens (“two-senses-principle”)	😊😊😊😊	😊😊😊😊	😊😊😊😊😊	Both groups
	Use of induction technology, especially at larger stations	😞😞	😞	😊😊😊😊😊	Hearing impaired
	Information per SMS upon requests	😞😞😞	😞😞😞	😊😊😊😊	Both groups
	Announcements available through MMS	😞😞😞	😞😞😞	😊😊😊😊	Both groups
	Free hotline with tape-service for important information	😊😊😊😊	😊😊😊😊	😊😊😊😊	Both groups
	Clear, slow and understandable tape-records and announcements	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
Inadequate guiding systems	Installing additional guiding systems	😞😞😞	😞	😊😊😊😊	Sight impaired
	Purpose-check of existing guiding systems by affected persons	😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Including affected in planning process	😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Both groups
	IT-based guiding systems (web-based, cellular)	😞😞😞	😞	😊😊😊😊	Both groups
Multi vehicle stations	Clear splitting of station areas for different lines	😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Clearly visible display of the line arriving next	😊😊😊😊	😞😞😞	😊😊😊😊	Both groups
	Announcements of approaching vehicle	😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
Station signposting	Bigger font sizes	😊😊😊😊	😞😞😞	😊😊😊😊😊	Sight impaired
	Use of clearly visible markings, paying attention to contrasts, height and place	😊😊😊😊	😞😞😞	😊😊😊😊	Sight impaired
Stations in rural areas	Safe footpaths	😞😞	😞😞😞	😊😊😊😊	Both groups
	Speed-limitations for other traffic in the station area	😊😊😊😊	😞😞	😊😊😊😊	Both groups
	Relocation of stations aside from main roads	😞😞😞	😞	😊😊😊😊😊	Both groups
Specially trained staff	Especially at central stations more support personnel	😊😊😊😊	😞	😊😊😊😊	Both groups
Entering and leaving vehicles	No traffic on lanes between vehicle and station while dis-/embarkation	😞😞😞	😊😊😊😊	😊😊😊😊	Both groups
Information at stations	Continuous information through Bluetooth or IR	😊😊😊😊	😞😞😞	😊😊😊😊😊	Both groups
	Downloadable web-based route-planning and on-trip use	😞😞😞	😞	😊😊😊😊😊	Both groups
Elevators at stations	Emergency-button for hearing impaired persons	😞😞😞	😞😞	😊😊😊😊	Hearing impaired
	Acoustic information	😞😞😞	😞	😊😊😊😊	Both groups

Table 5: Problem identification and possible solutions for the stops and station area

The main problem areas identified were missing guiding systems particularly for sight impaired persons, whereas hearing impaired people often had problems with the elevators at stations and with the service

hotlines in a case of emergencies. Other regularly mentioned problem areas were the signposting and the announcements at stations.

## 5.2 Vehicles

The second area of interest were the problems within the means of transport as shown by the following overview.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for ...
Use of ticket machines on vehicles	Voice output on demand	☹☹	☹	😊😊😊😊😊	Sight impaired
	Bigger font size	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Sight impaired
Legibility of network plans	Plans at eye-level, focus on legibility	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Sight impaired
	Driver has plans in large print	😊😊😊😊😊	☹☹☹	😊😊😊😊😊	Sight impaired
	Network plans in large print available	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Sight impaired
Displays on vehicles	Show announcements on displays (“two-senses-principle”)	☹☹☹	☹☹☹	😊😊😊😊😊😊😊	Both groups
	Check used colours with the affected	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Sight impaired
	Font size easily readable	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊😊😊	Sight impaired
Quality of announcements	Optical display of announcements	☹☹☹	☹☹☹	😊😊😊😊😊😊😊	Both groups
	Use of induction-technology	☹☹	☹	😊😊😊😊😊😊😊	Hearing impaired
	On-demand information about next station (Bluetooth)	😊😊😊😊😊	☹☹☹	😊😊😊😊😊	Both groups
	SMS- or MMS-queries	☹☹☹	☹☹☹	😊😊😊😊😊	Both groups
	Free hotline with tape-service for important information	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
	Take employees for test drives to let them perceive the comprehensibility and quality of announcements	😊😊😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
	Pronunciation, clarity and speed of announcements and tape-records	😊😊😊😊😊😊😊	😊😊😊😊😊😊😊	😊😊😊😊😊😊😊	Both groups
Automating	Mobility training for affected supported by transport companies	😊😊😊😊😊	☹☹☹	😊😊😊😊😊	Both groups
Distance vehicle – pavement	Drivers to stop close to pavement	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊😊😊	Sight impaired
	Use of low-floor-vehicles	😊😊😊😊😊	☹	😊😊😊😊😊😊😊	Both groups
Information in the vehicle	Device to be informed about the route, the next stop etc. Upon request	☹☹	☹☹	😊😊😊😊😊😊😊	Both groups
	On-demand general information via bluetooth	😊😊😊😊😊	☹☹☹	😊😊😊😊😊😊😊	Both groups
	Downloadable web-based route-planning and on-trip use	☹☹☹	☹	😊😊😊😊😊😊😊	Both groups
Doors	Large tactile door opening buttons	😊😊😊😊😊	☹☹☹	😊😊😊😊😊	Sight impaired

Table 6: Problem identification and possible solutions for vehicles

The main problem for sight impaired persons was the small print of network plans on the vehicles which forces them to use low vision aids like loupes. On the other hand many of these plans are placed at the roof of the vehicle which inhibits the use of such tools. A simple and cost effective solution would be the printing of network plans in bigger fonts and attaching them at eye-level.

Hearing impaired persons often criticize the bad quality or even the lack of the announcements in the vehicles. Not only are they regularly spoken too fast but also quite often incomprehensibly. The visually impaired also expressed problems with the announcements as they are often unable to read the name of stations and therefore rely on it in order to know where to get off. Thus the use of the two-senses-principle, which means that information should always be available optically and acoustically, should definitely be the standard.

## 5.3 General mobility problems

Some other – rather general – mobility problems could further be identified as shown in table 7.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for ...
Information about transport on the internet	Possibility to increase the size of fonts and inverted colours	😊😊😊😊	😊😊😊😊	😊😊😊😊😊😊	Sight impaired
	On-demand voice output of site	😊😊😊😊	😞😞😞	😊😊😊😊😊😊	Sight impaired
Road signs as barriers	Place on gantries	😊😊😊😊	😞😞	😊😊😊😊	Sight impaired
	Use of max. permiss. height (2.2 m)	😊😊😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Use of protective coatings	😊😊😊😊	😞😞😞	😊😊😊😊	Sight impaired
Bollards, hydrants, advertising pillars, green spaces, cordons	Use signal colours	😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊	Sight impaired
	Double cordons with connecting elements	😊😊😊😊	😞😞😞	😊😊😊😊	Sight impaired
	Replace by fixed railing	😊😊😊😊	😞😞😞	😊😊😊😊😊😊	Sight impaired
Construction site security	At least to crossbars	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Signal colours for scaffoldings	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Solid barriers at building pits	😊😊😊😊	😞😞😞	😊😊😊😊😊😊	Sight impaired
	Barriers with construction fences	😊😊😊😊	😞😞😞	😊😊😊😊😊😊	Sight impaired
Weather conditions	Stricter regulations for snow removal and gritting	😞😞😞	😞😞	😊😊😊😊	Both groups
	Fixed cordons when danger of roof avalanches	😊😊😊😊	😞😞😞	😊😊😊😊	Both groups
	Tree and bush cutting	😊😊😊😊	😞😞😞	😊😊😊😊😊😊	Both groups
Railroad crossings without gates	Installation of gates	😞😞😞	😞	😊😊😊😊😊😊	Both groups
	Tactile floor markings	😞😞😞	😞	😊😊😊😊😊😊	Sight impaired
	Flashlights in the floor before train arrives	😞😞😞	😞	😊😊😊😊😊😊	Both groups
	Tow away parked vehicles	😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊	Sight impaired
	Restaurant menu tables on the wall, restaurant tables not on the pavement	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
Other obstacles on pavement	No placards/advertisements covering signs	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Removal of different levels, gaps	😊😊😊😊	😞😞	😊😊😊😊	Both groups
	Tactile and optically contrasted markings	😊😊😊😊	😞😞	😊😊😊😊	Sight impaired
Cycle tracks	Involvement of seeing and hearing impaired people	😊😊😊😊😊😊	😊😊😊😊	😊😊😊😊😊😊	Both groups
	Distinct separation by advertisements or similar	😊😊😊😊😊😊	😊😊😊😊	😊😊😊😊😊😊	Sight impaired
Architecture	Easily visible handrails	😊😊😊😊😊😊	😞😞	😊😊😊😊	Sight impaired
Glass walls	Use of non-transparent glass	😊😊😊😊	😊😊😊😊	😊😊😊😊	Sight impaired
	Use of safety glass	😊😊😊😊	😞😞	😊😊😊😊	Sight impaired

Table 7: Identification and possible solutions for general mobility problems

In this area railroad crossings without gates were identified as a predominant problem for both groups. Particularly crossings in rural areas are not equipped with optical signals and are therefore dangerous for acoustically impaired persons. In Austria it could already be achieved at least, that an extra sign has to be placed at such crossing requesting people to pay particular attention to acoustic signals of approaching trains.

Another very problematic topic were the security measures around building sites, where sight impaired persons often come into danger because of missing or inappropriate barriers that would prevent them from entering such places. Adequate safety measures would not necessarily cost more than the ones in use but significantly increase the safety for impaired persons.

Many other problem areas could be identified, like glass doors or cycle lanes where accidents leading to severe injuries are likely. Again quite cheap solutions could allow enormous improvements.

## 5.4 Public awareness

The lack of awareness and empathy for sight and hearing impaired persons as well as insufficient training of drivers, service staff and planners is probably the most important and fundamental source of mobility problems of the groups concerned. This is partly due to the fact that they cannot be easily recognized at first sight as having special mobility needs and requirements. The following problems could be detected.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for ...
Inadequate training of staff and planners	Special courses focusing on different disabilities and impairments for architects, planners, drivers and other staff of transport companies	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
	Lobbying by associations	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
	Brochures, information material	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
Unawareness of specific problems	Improve publicity of related information platforms	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
Research & Development	Include affected people in research & development	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	Both groups
Lack of awareness and empathy	Information campaigns	😊😊😊😊😊	😞😞😞	😊😊😊😊😊	Both groups
	Special events like "Dialog im Dunkeln"	😊😊😊😊😊	😞😞😞	😊😊😊😊😊	Both groups

Table 8: Problem identification and possible solutions within the field of public awareness

A need for increasing public awareness for the two groups was one of the major topics raised by affected persons and their representatives both in the interviews and in the internet-discussions. Many people simply do not know about the large size of the two groups and their specific needs and requirements concerning their mobility. This information deficit could be overcome at relatively low costs.

Furthermore it would be useful to include sight or hearing impaired persons directly or their representatives in all major planning processes for new public transport buildings or vehicles and to take their demands into account right from the beginning.

## 6 CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

Sight and hearing impaired persons are two large groups of the population who – each for themselves – have to face specific mobility barriers. It is problematic, that they are often not seen as individual groups but are mistaken as blind or deaf. This inadequate perspective seems to be quite common among transport companies and authorities.

The interviews have shown that in the past too little has been done to improve the mobility of the sight and hearing impaired, but also that the situation has slightly improved over the last years.

Transport companies would like to have clearer and more obvious guidelines on how to design vehicles and stations in an appropriate way. Dedicated guidelines or standards as well as support from official authorities would be regarded as useful.

The most fundamental result was, however, that as a first step public awareness of the two groups and their problems needs to be urgently raised.

The detailed results of the short study show many aspects and problems for visually or acoustically impaired and proposals for their solution. It could be shown, that many measures would not even require large investments but merely the willingness to put oneself in the position of the persons who have to overcome mobility barriers. Thus it becomes evident, that the most common problem is ignorance and rarely scarce funds.

Therefore it seems as if the two groups still do not attract sufficient attention, otherwise solutions which could be taken at low costs but yield significant improvements would already have been realised. Taking such measures would clearly be economically beneficial for transport companies as many people, currently limited in their mobility, would use public transport services again resulting in higher passenger counts and revenues. Moreover the general attractiveness of public transport would rise which helps all passengers to get along with the services provided.

The short-study presented in this article can be seen as an initial step to treat related problems from a research perspective. However, there is a clear need for further research, aiming at a clear definition of specific demands for the two groups and at the development of common standards which can be applied by transport companies and technical suppliers. Recently, a large-scale research project related to these goals has been launched in the framework of the ways2go programme initiative and will be funded by the Austrian

Federal Ministry of Transport, Innovation and Technology (BMVIT) and the Austrian Research Promotion Agency (FFG).

The project, called “MoViH” (Mobility of the sight and hearing impaired in public transport) comprises in detail the following objectives:

- Clear identification and description of special needs and requirements
- Evidence on actual and desired mobility
- Identification of factors enhancing and hindering mobility
- Determination of intrinsic mobility barriers
- Development of new solutions and measures
- Detection of potentials for improvements of existing solutions
- Analyses of the gap between the transport companies’ and the sight and hearing impaired people’s points of view
- Economic assessment of newly developed measures
- Development of a tool for the evaluation of measures (“efficiency indicator”)
- Creation of an internationally applicable standard to be used by public transport companies
- Raise of general awareness by sharing information and dissemination of results

The project partners (universities, associations, transport companies and technical suppliers) hope that the new project will help to better understand the problems of the sight and hearing impaired and to improve their access to public transport services. Any measure taken for these people, however, will not only help them but the total of all passengers and hence make public transport more attractive.

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