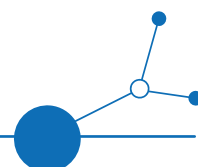


Toolbox on developed services and tools for accessible tourism in the Polish pilot area



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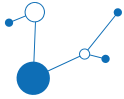
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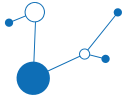
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1. Introduction

This toolbox presents the integrated accessibility solutions developed and validated through the pilot action in the Podkarpackie Region, Poland. The pilot addressed accessibility barriers at cultural heritage sites by introducing practical digital solutions that improve independent access to tourism experiences for persons with disabilities. The developed tools complement each other and demonstrate how innovative technologies can enhance accessibility where structural adaptations are limited or not feasible.

The toolbox documents the tested solutions, explains their purpose and applicability, and assesses their potential for transfer to other tourism destinations in Central Europe. The developed solutions contribute to more inclusive tourism services while supporting independent travel and equal access to cultural heritage.



2. Target groups

The developed solutions address the accessibility needs of two primary target groups: persons with mobility impairments and persons who are hard of hearing. Together, the Virtual Reality (VR) Goggles with 360-degree films and the Tour Guide System improve access to cultural heritage by reducing physical and communication barriers that may prevent visitors from fully participating in tourism experiences.

2.1 Persons with mobility impairments

Persons with mobility impairments, particularly wheelchair users, are the primary target group of the Virtual Reality (VR) solution. Many historic buildings and cultural heritage sites in the Podkarpackie Region contain architectural barriers, such as staircases, narrow passages or protected interiors, which cannot always be removed due to heritage conservation requirements.

To address these challenges, the pilot introduced VR Goggles with immersive 360-degree films that allow visitors to experience inaccessible spaces and activities virtually. By providing access to areas that cannot be reached physically, the solution supports more inclusive tourism and enables visitors to enjoy cultural heritage more independently.

2.2 Persons who are hard of hearing

Persons who are hard of hearing are the primary target group of the Tour Guide System. In museums and cultural heritage sites, background noise, poor acoustics and the distance between visitors and tour guides can make it difficult to hear explanations during guided tours.

The Tour Guide System improves communication by transmitting the guide's voice directly to visitors through wireless receivers, reducing ambient noise and improving speech intelligibility. This enables visitors who are hard of hearing to participate more actively in guided tours and enjoy a more accessible and inclusive visitor experience.



3. Toolbox - developed services and tools

The Polish pilot area developed and validated two complementary accessibility solutions that improve access to cultural heritage for persons with disabilities. Together, the solutions address both physical accessibility barriers and communication barriers, enabling visitors to participate more independently in cultural tourism experiences.

The Virtual Reality (VR) Goggles with 360-degree films provide an alternative way of experiencing areas that remain physically inaccessible because of architectural barriers or heritage protection requirements. By offering immersive virtual access to historic interiors and cultural activities, the solution enables visitors with mobility impairments to experience parts of cultural heritage sites that would otherwise remain inaccessible.

The Tour Guide System improves communication accessibility during guided visits by transmitting the guide's voice directly to visitors through wireless receivers. This enables persons who are hard of hearing to follow guided tours more comfortably, even in noisy environments or buildings with poor acoustics.

Together, these solutions demonstrate how digital technologies can complement physical accessibility measures and support more inclusive tourism. While each tool addresses different accessibility needs, both contribute to the common objective of improving independent access to cultural heritage and providing a better visitor experience for persons with disabilities. The validated solutions also provide practical examples that can be transferred to other museums, cultural institutions and tourism destinations facing similar accessibility challenges.

This introduction prepares the reader for the individual tool descriptions and presents the chapter as an integrated set of developed solutions, rather than two unrelated services. It also responds to the reviewers' request to focus on the solution instead of the implementation activities.

3.1. VR Goggles with 360-degree films

The VR Goggles with 360-degree films were developed to improve access to cultural heritage for visitors with mobility impairments. They provide an alternative way of experiencing historic interiors, exhibitions and activities that cannot be reached physically due to architectural barriers or heritage protection requirements.

Mobility barriers addressed

Many cultural heritage sites contain staircases, narrow passages or inaccessible historic spaces that cannot be adapted without compromising their heritage value. As a result, visitors with mobility impairments are often unable to access important parts of museums and cultural attractions, limiting their visitor experience and participation in cultural tourism.



Developed solution

The Polish pilot developed and validated immersive Virtual Reality (VR) Goggles with 360-degree films that enable visitors to virtually explore inaccessible areas of selected cultural heritage sites. The films present historic interiors and traditional cultural activities that cannot be experienced through a regular visit. By providing an immersive and realistic visitor experience, the solution complements physical accessibility measures and supports more independent access to cultural heritage for persons with mobility impairments.

Participating cultural institutions will continue to maintain and use the VR Goggles with 360-degree films as part of their regular visitor services in the future.

The solution can also be adapted by other cultural institutions facing similar accessibility constraints.

Example of implementation

During pilot validation on **15 June 2025**, a wheelchair user visited the Pottery Centre in Medynia Głogowska. While she was able to participate in the pottery workshops and visit the main exhibitions, the **Gallery of Władysława Prucnal**, located in an inaccessible part of the building, could not be reached. Using the VR Goggles, she was able to virtually explore the gallery and watch two additional 360-degree films presenting traditional pottery craftsmanship and the firing of ceramics in a traditional kiln. The participant evaluated the experience very positively, highlighting the high quality and realistic nature of the immersive films, which enabled her to experience parts of the cultural heritage site that were otherwise inaccessible.

Priority	must have: essential needs
Strenghts	Increased accessibility - people with disabilities have the opportunity to “visit” physically inaccessible spaces. Modern technology - the use of VR attracts attention and can build a positive image of the museum as an innovative and inclusive institution. Immersive experience - 360° videos allow for a very realistic and engaging tour. Improved social image - the initiative is in line with the values of accessibility and equal access to culture.
Weaknesses	Technological limitations - not everyone can comfortably use VR goggles (e.g., people with epilepsy or vertigo). Equipment and maintenance costs - purchasing, updating, and servicing VR goggles can be expensive. Need for technical support - some people may require assistance in using the goggles. Lack of physical interaction - the experience cannot fully replace actually being in each place.
Opportunities	Expanding the educational offer - the possibility of using VR also for educational purposes for schools, seniors, and people with other limitations.



	Obtaining funding - the possibility of applying for grants or financial support for the development of accessibility. Cooperation with foundations and NGOs - establishing partnerships promoting cultural accessibility. Expanding the museum's digital offering - e.g., making VR available online (in a web version or on personal devices).
Threats	Rapid technological obsolescence - VR is developing rapidly, and equipment and solutions may become outdated. Technical problems - equipment failures may affect the continuity of service provision. Low user adoption - some visitors may not be interested in using VR technology. Risk of insufficient reach - if the service is not promoted properly, it may be underutilized.

3.2. Tour Guide System

The Tour Guide System was developed to improve communication accessibility during guided visits for persons who are hard of hearing. It enables visitors to hear the guide clearly, regardless of background noise or the size of the visitor group.

Mobility barriers addressed

Visitors who are hard of hearing often experience difficulties following guided tours because of poor acoustics, background noise or the distance from the guide. These communication barriers can reduce their participation in cultural experiences and limit access to information provided during the visit.

Developed solution

The Polish pilot introduced and validated a digital Tour Guide System consisting of a wireless transmitter for the guide and portable receivers for visitors. The system transmits the guide's voice directly to individual receivers, improving speech intelligibility and reducing the effects of ambient noise. The solution enables visitors who are hard of hearing to participate more fully in guided tours while also improving the visitor experience for other groups, such as older adults and visitors with communication difficulties. The system provides a practical and transferable solution for museums and cultural heritage sites seeking to improve communication accessibility.

Participating cultural institutions will continue to maintain and use the the Tour Guide System as part of their regular visitor services in the future.

Example of implementation

Ulma Family Museum of Poles Saving Jews during WWII received two sets of tour guide



system. This place is very busy during the year and is very often visited by groups of seniors. Most of the groups of seniors use this system now (if they do not have their own one). It is also used by people with disabilities - hard of hearing.

Priority	should have: important, but not essential
Description	Tour guide system is a digital tool which improve the quality of sightseeing for people hard of hearing. It consists of a transmitter for a tour guide explaining the exhibitions and 30 receivers for tourists. There is also a special box for storing and charging transmitters and receivers. It really improves the quality of sightseeing in small busy touristic sights (noisy places) or in places where the acoustic disturb to understand the guide.
Strenghts	Increased accessibility - the device allows hearing-impaired visitors to fully participate in the tour, regardless of acoustic conditions. Direct voice transmission- reducing ambient noise and echo, improving the intelligibility of the guide's speech. Mobility and flexibility- the system operates on the move, allowing for comfortable tours, even in large rooms and open spaces. Increased visitor comfort- not only for people with disabilities, but also for seniors and those with concentration difficulties. Positive museum image- demonstrating a commitment to inclusivity and accessibility, which can be appreciated by visitors and supporting institutions.
Weaknesses	Purchase and maintenance costs - devices can be expensive to purchase and require regular servicing and charging. Required technical support- staff training and ongoing management of equipment rentals and collections are required. Limited number of receivers- in the case of larger groups, there may not be enough equipment for everyone. Potential technical difficulties- coverage issues, interference, or device damage can reduce service quality.
Opportunities	Funding and grants - funding for equipment purchases is available through programs supporting accessibility and inclusion. Collaboration with NGOs - collaborating with foundations



	or associations can promote a museum as a disability-friendly environment. New audiences - the system can attract new visitors, such as the elderly, the hearing impaired, or school groups. Expanded functionality - the system can also be used for simultaneous translation, audio description, or recordings in various languages.
Threats	Damage or loss of equipment - with high tourist traffic, there is a risk of damage or loss of devices. Lack of awareness among tourists- those with hearing impairments may not be aware that the museum offers this solution. Development of competing technologies- the emergence of newer and more advanced systems can quickly render the current system obsolete. Adaptation issues- some people may have difficulty using the devices, especially if they are not intuitive or lack appropriate instruction.

4. Concluding remarks on transferability

4.1. Transferability of services and tools to other target groups

The accessibility solutions developed in the Polish pilot area were designed to address the needs of persons with mobility impairments and persons who are hard of hearing. However, the pilot demonstrated that both solutions can be adapted to support a wider range of user groups through appropriate technical and organisational modifications.

The **VR Goggles with 360-degree films**, originally developed for visitors with mobility impairments, can also benefit blind and visually impaired persons through audio description, as well as deaf and hard-of-hearing visitors through subtitles or sign language interpretation. The solution can also support persons with intellectual disabilities by providing simplified narration and structured content, and visitors on the autism spectrum by enabling them to familiarise themselves with a destination in a calm and controlled environment before their visit. Older adults and people with temporary mobility limitations may also benefit from virtual access to areas that are physically difficult to reach.

Similarly, the **Tour Guide System**, developed primarily for persons who are hard of hearing, has broader applicability. The system can support blind and visually impaired visitors through live audio description, assist visitors with intellectual disabilities by providing clear and easy-to-follow explanations, and improve the visitor experience for older adults and larger visitor groups by ensuring better speech intelligibility. It can also be used for multilingual guided tours or other communication services, increasing its value for cultural institutions.



The pilot confirmed that relatively simple digital technologies can significantly improve accessibility when adapted to the needs of different user groups. This flexibility increases the long-term value of the developed solutions and supports their wider application in inclusive tourism.

4.2. Transferability of services and tools to other pilot areas

Austria-Czech Republic Pilot Area:

VR Goggles with 360-degree Films could be successfully applied in the Austria-Czech Republic pilot area, provided that local tourism providers have the financial resources to acquire and operate the necessary equipment. A concrete example is the network of traditional wine cellars located in the cellar lanes of the Weinviertel region. These cellar lanes are a distinctive cultural attraction and an important tourism asset within the pilot area. Virtual reality could enable visitors with mobility impairments to experience cellars that are not physically accessible, thereby complementing existing accessibility measures. The solution has strong transfer potential and could be successfully adapted to similar heritage sites across the region.

The Tour Guide System could also complement tourism services in the pilot area. It would improve communication accessibility during guided tours in museums, cultural attractions and visitor centres by enabling persons who are hard of hearing to follow explanations more comfortably. The system could be implemented wherever guided interpretation forms an important part of the visitor experience.

Slovenia

Both the Tour Guide System and the VR Goggles with 360-degree films offer significant opportunities for future application in the Pomurje region.

For example, the upper floor of Murska Sobota Castle and the Pomurje Museum, which houses historical exhibitions and art collections, is currently inaccessible to visitors with mobility impairments. Where installing an elevator is not feasible due to technical or heritage conservation constraints, virtual reality could provide an effective alternative for presenting these spaces. Similar applications could be developed for attractions such as Goričko Nature Park or the Rotunda Church in Selo.

The Tour Guide System could enhance accessibility during guided visits at sites where spoken interpretation plays a central role. A particularly suitable location is the Expano Pavilion in Murska Sobota, an interactive tourism and cultural centre where improved audio transmission would benefit visitors who are hard of hearing.

Croatia



The solutions developed in the Polish pilot area can also be transferred to the Međimurje region.

VR Goggles with 360-degree Films could improve access to museums, castles, churches and natural attractions that remain partially inaccessible because of architectural barriers or challenging terrain, such as observation towers or historic buildings.

The Tour Guide System would enhance guided visits in museums, interpretation centres and other cultural attractions by improving communication accessibility for persons who are hard of hearing. It could also benefit older adults and visitors who experience difficulties hearing guides in noisy environments.

The Manuals for Developing Accessibility Guides and the Accessibility Guides themselves could be adapted to local conditions to provide standardised and reliable information on the accessibility of tourism facilities, including entrances, internal circulation and accessible sanitary facilities.

Webinars and on-site consultations could support local tourism providers in assessing accessibility and preparing high-quality accessibility information for visitors.

The format of the promotional leaflets and awareness-raising materials, including the use of QR codes, accessibility icons and route descriptions, could also be adapted for attractions in Međimurje, such as the Mura River, cycling routes and wine roads. Awareness-raising videos could be translated and used locally to increase understanding of the accessibility needs of persons with disabilities.

These solutions are particularly relevant because Međimurje is a rural tourism region with a rich cultural and natural heritage, where parts of the tourism infrastructure are not yet fully accessible. The developed tools provide practical, cost-effective solutions that complement physical accessibility improvements, promote universal design principles and support more inclusive tourism.