Make your Planetarium accessible to the hearing impaired with connected eyewear

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BIOGRAPHIES
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ABSTRACT

Until now, the shows screened in our Planetarium were barely accessible to the deaf and the hearing impaired. Having an interpreter in the theater or including subtitles are not relevant solutions if we want to preserve the immersive impression. La Cité des sciences et de l’industrie’s team (Accessibility Department, R&D, Planetarium’s team) has been working for one year on state-of-the-art augmented-reality glasses. Thanks to this technology, the viewer can freely move his head to look at any part of the dome while having a translation dedicated to him.

I. CONNECTED GLASSES FOR THE HEARING IMPAIRED

I.1 The prototype

The newly upgraded Planetarium of La Cité des sciences et de l'industrie provides an HD 8K resolution. To make our theater accessible to the hearing impaired, we wanted an embedded technology that allows having a translation while preserving the immersive impression.

We decided to use the technology of connected eyeglasses based on the principle of augmented reality (popularized by Google glasses). Last year, we contacted the R&D Department of our museum to work on connected glasses. A first prototype with manual activation was tested thanks to the participation of our deaf colleagues from the accessibility Department.

The device is a connected eyewear storing video sequences with subtitles and an interpreter who is signing. This device was presented at the planetarium conference in Saint-Louis last October. The feedback encouraged us to continue to develop this device.
The model used is Epson's. Indeed, it works with the OLED projection technology. Unlike the LCD technology, it allows very deep black layers and therefore very transparent, which is necessary for the dark images screened in planetariums.

1.2 The finalized device
As he’s wearing the glasses, the viewer can see any part of the dome without losing the immersive impression. The projection onto the glasses is not visible by the other visitors next to him. In other words, you don’t need to plan a specific session. It’s a very cost effective solution.
The control pad device allows the viewer to choose the display: subtitles or translation into sign language.

The other important thing is the synchronization of the translation with the show. It is made possible by interfacing the application with the broadcasting system.

II. CONNECTED GLASSES IN YOUR PLANETARIUM, WHY NOT?

II.1 Automatic activation

Simple! To store videos in the glasses, the technician only has to plug the control pad as (s)he can do when (s)he transfers files from his (her) USB drive or his (her) mobile phone.

![Figure 3 - How does it work?](image)

The activation is automatic thanks to the interfacing with the broadcasting system. This is the same procedure used for audioguides.

We need a computer dedicated to the application which receives the information about the show. Then, the application sends all information into the glasses thanks to the WiFi in the theater.

Our application is designed for interfacing with the RSA system but there are no technical difficulties to adapt it for another supplier.

II.2 Shows available in your Planetarium

From September, the shows “Night lights” and “the Moon” will be available with video including English subtitles.

We can assist you to meet your planetarium’s needs.

If you wish having further information, please feel free to contact us.
Figure 4 - “Night lights”, a show available for the hearing impaired
ACKNOWLEDGMENTS

RSA Cosmos experienced staff assisted us in this project, especially in the interfacing between the application and the broadcasting system.

Epson France facilitated our testing and survey by lending glasses.

REFERENCES