

科学コミュニケーションを促進する高臨場感メディアの有効活用 High presence sensation media for Science communication

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Abstract: In the science museum, the IMAX theater and the planetarium are often used to utilize the image media effectively. However, the museum itself has not evaluated the effect of the image media sufficiently as a tool of transmitting the science to the audience. The mission of MIRAIKAN includes the development of the exhibition technique as a part of the science communications activity. MIRAIKAN pays attention to the high presence media as a tool of promoting scientific communication, and has developed various systems. In December 2008, ultra high-definition stereo dome which is unique in the world was developed and the effectiveness for the scientific communication was evaluated. In this study, examples of the application of high presence media are investigated, and the guideline of the design of high presence media is discussed to utilize them more effectively.

Keywords: High presence sensation media, Super High Definition Image, 4K Stereo, Dome Screen, Planetarium, Science Communication, Science Education, IMAX theater, AR(Augmented Reality), MR(Mixed Reality), Design Strategy, Information Design

1. Introduction

The image media that use the large-scale dome or the large screen have been often used in the exposition to represent the high realistic sensation. Moreover, the IMAX theaters and the planetariums are often equipped in the current science museum to represent the high quality of presence in the display environment. However, some of these theaters have been closed because of the financial problems such as the number of visitors and the expenditure. Though the high presence media are paid attention in the exposition, the exhibition, and the occasional event, it is not easy to spread them widely due to the large scale of the system compared with other image media. However, if the IMAX theater and the planetarium in the science museums were used as a tool that promotes the activity of science communications by utilizing the characteristics of the device effectively, the further use and development of the high presence media would be expected. In Miraikan, as a tool of promoting the activity of science communication, we paid attention to the high presence media, and have been developing a new exhibition technouque by applying them to the science communications.



Fig2: Miraikan dome theater



Fig1: Aichi Expo05 French pavilion (Inside of theater of six screens)

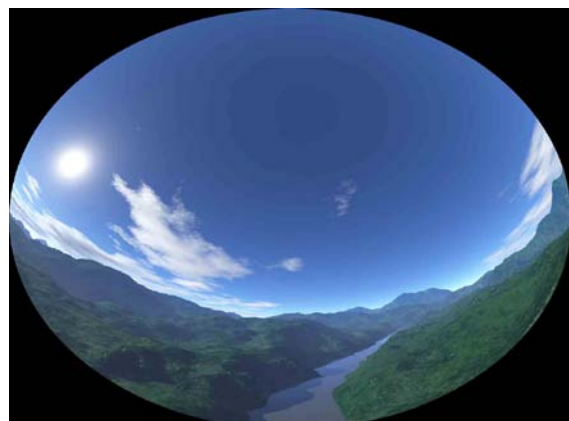


Fig3: Sample Image of dome theater

2. Use of high presence media

2.1 Approach in Miraikan

It is important for each person to obtain "New wisdom" from the advanced science to live wisely and consider the future society. The development of the method of science communication is one of the missions of Miraikan.

Miraikan works on permanent exhibition, special exhibition, floor communication, experiment classroom, external coordinated business, and information dissemination using various media. Therefore, it is necessary to develop an appropriate method and research new activity forms to achieve the effective scientific communication for each activity.

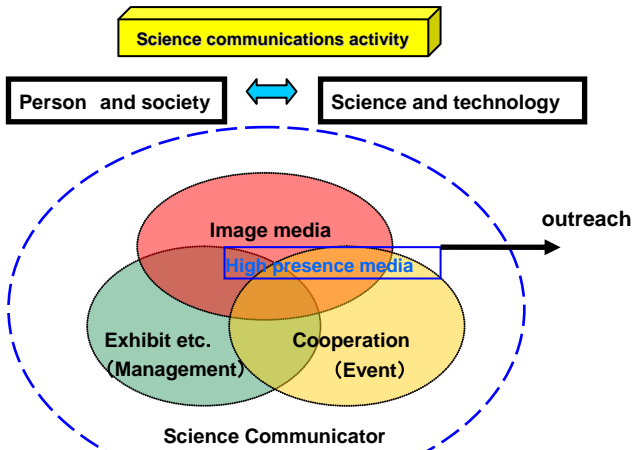


Fig4 Role of image media in science pavilion

As for the development of method that uses high presence image media, the following activities have been performed.

2.2 Example of using high presence media

①Development of exhibition technique: Approach on production process

In the high presence media, it is not easy to imagine the presence felt from the final image. We introduced the facility with which we can preview the high presence image by projecting it onto the wall (8m × 15m) in the medium-scale exhibit hall, and the environment where we can make trial and error to produce the large screen image contents was developed. By introducing the new image projection function in the existing exhibit hall, effective usage of the hall was achieved not only for the verification of image contents but also for the event using large screen image based on the improvement of representing images in the exhibition space.



Fig5 The screen (left) is set up on the exhibition hall wall

② Development of super-large screen exhibition system

Next, the movable large scale screen (20m x 9m) was set up on the wall in the exhibit hall on the first floor. This screen was connected to the 10Gbps broad band network, and was used for the experiment preview of the 4K image and the event using the large screen image.



Fig6 Super-large screen theater concept chart

Development of high presence media room using three large screens

High presence media room using three large screens was developed to represent the huge data concerning the typhoon recorded by the weather satellite and the ground observation post. This interface was designed so that the user can understand the data and acquire knowledge through the experience.. It is expected that this device can be used effectively to transmit the experience of the individual to the society by transmitting the knowledge as an experience.

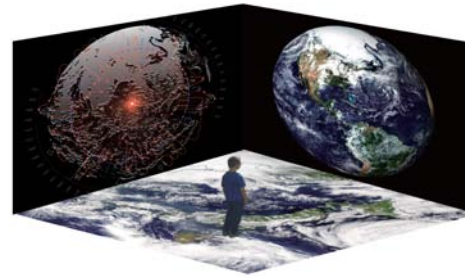


Fig7 Three on large screen use case (Typhoon Memory s)

3. Conclusions

By applying the above mentioned high presence media to promote the scientific communication, it is thought that this kind of media can be applied effectively to understand the following field. In the case of large scale problem such as "understanding of the Earth system" where it is difficult to achieve the real experience, it is thought that the virtual experience using the high presence media is contributed to route the imagination and promote the understanding.

The earth system is understood with three high presence media.

Theme and overhead view of media

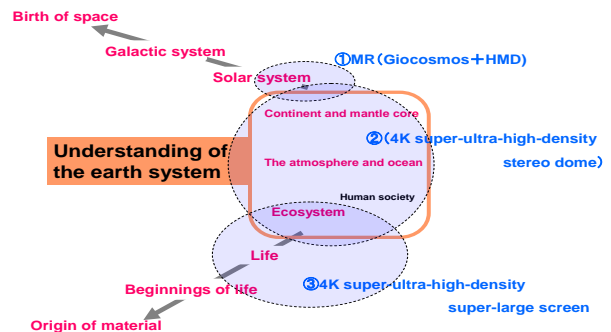


Fig8 This shows the overhead view of the design strategy of the high presence media to understand the Earth system.