NHK STRL’s trials on advanced immersive audio-visual systems

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What is AIAV[*1] systems?

- Allows a user to have impressiveness and presence.
- Enables the user to believe to be somewhere else / somebody else
  - By tricking the low-level perceptual systems of the user's brain
- AR, VR, and XR are main technologies.

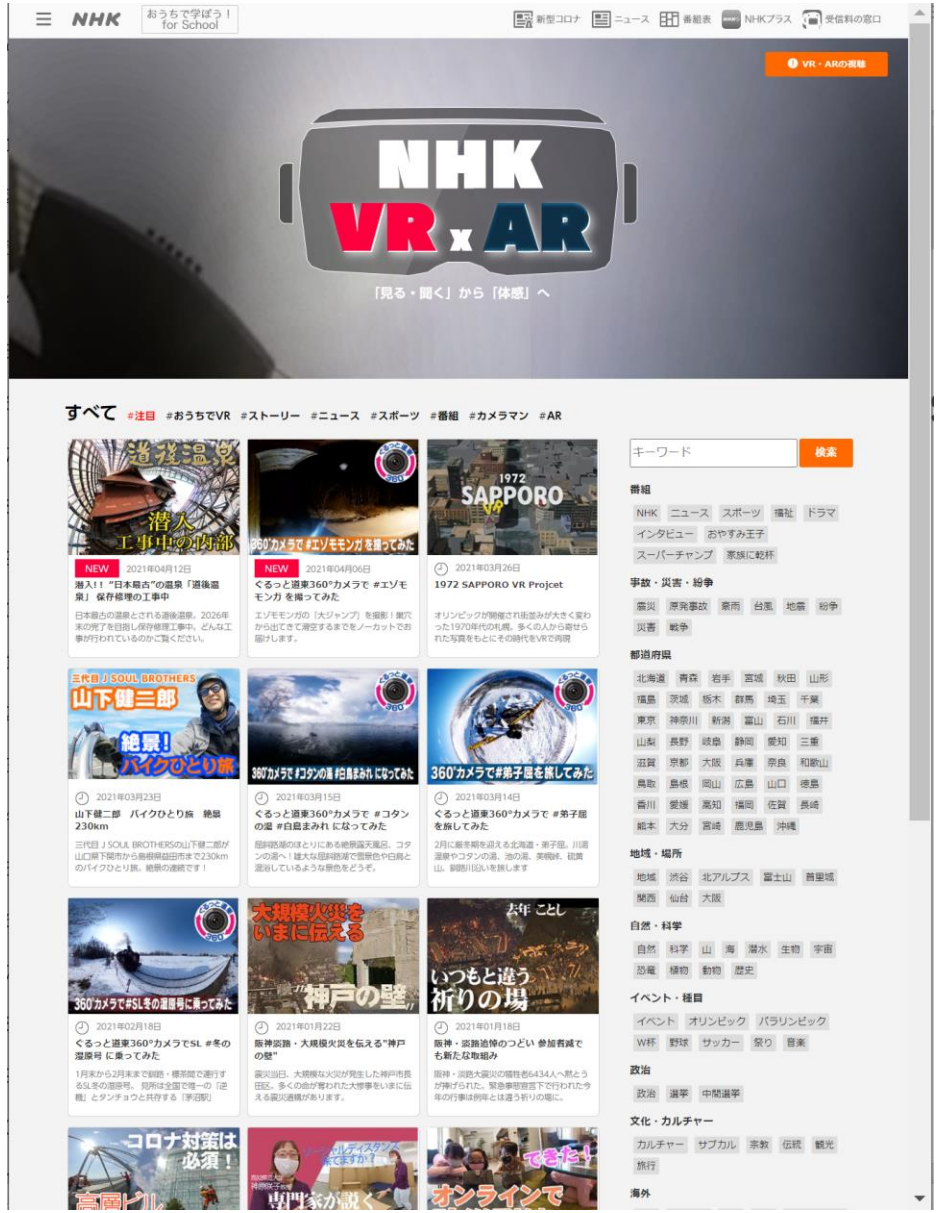
Why are we interested in AIAV systems? Because

- AR/VR headset can be third screen. (TV > Tablet > Headset)
- AIAV systems have potential for future media.
  - Wide viewing angle ・Frameless presentation ・3D presentation

*1 Advanced immersive audio-visual

NHK VR×AR

- NHK started “NHK VR×AR” in Feb, 2016
  - Disasters
  - International affairs
  - Politics
  - Science
  - Sports
- Some news are captured 360 images as well as a news camera.
- 360 images are distributed via network to viewers
- Viewers can watch any direction that they want by controlling on PC.



https://www.nhk.or.jp/vr/

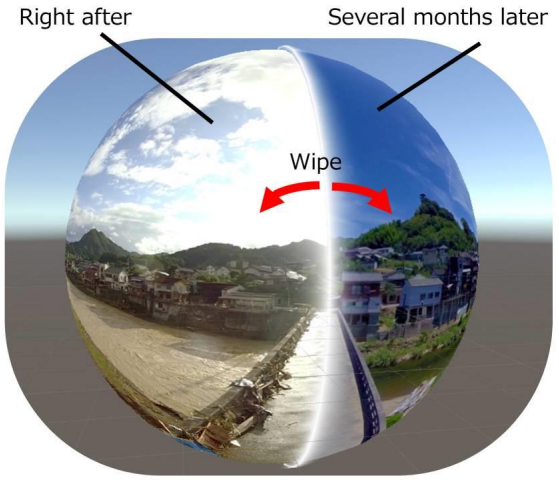
Other application of 360 camera

- Use of 360 camera for capturing images from high position without drone.
- Application is required to use drone in arbane area.

NHK STRL's R&D on AR/VR

NHK

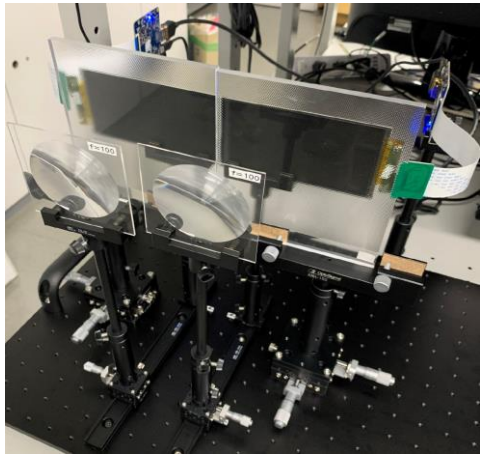
Before/After VR



8K display VR

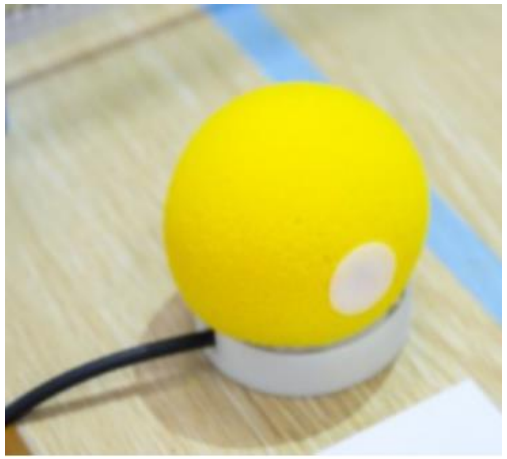
Extremely high-resolution VR

Light-field HMD



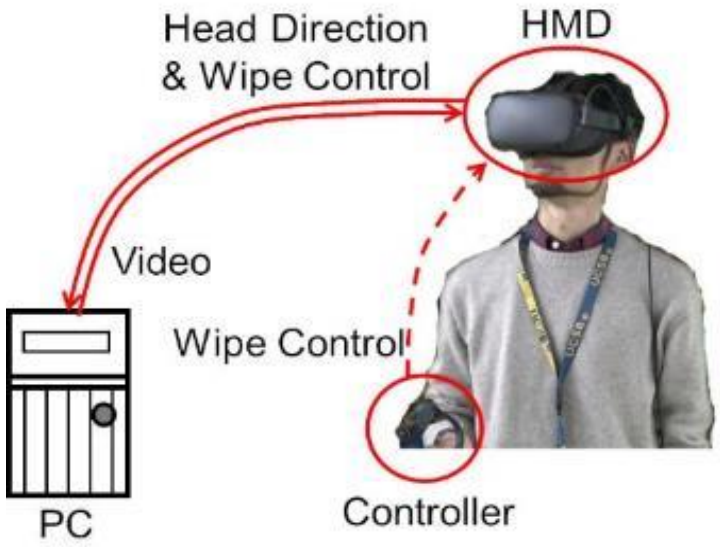
Space-sharing content viewing system

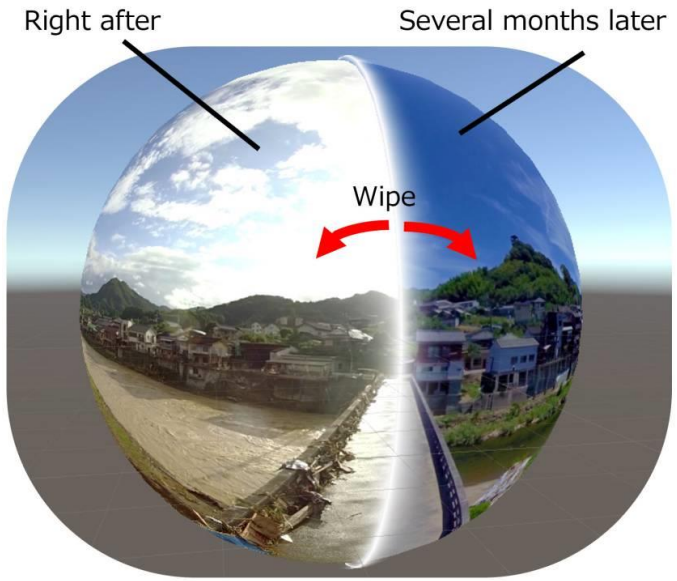
Ball-type haptic device



1) Before/After VR

- The system enables a user to compare two 360 images
  - captured at the same position at two different times
  - right after the disaster and several months later
- The system consists of a workstation, an HMD, and a controller
- Two images were mapped to the sphere





1) Before/After VR

2) Extremely high-resolution VR

- Current VR HMD does not have enough pixels.
- 30K is required for 360 images
  - Considering the design of HD & 8K
- 30K is recommended in Rec. ITU-R BT.2123
  - For production
  - For international exchange

2) Extremely high-resolution VR

- NHK set up a display system that present images of over-8K resolution to design the VR including specification for future design.

Space-sharing content viewing system

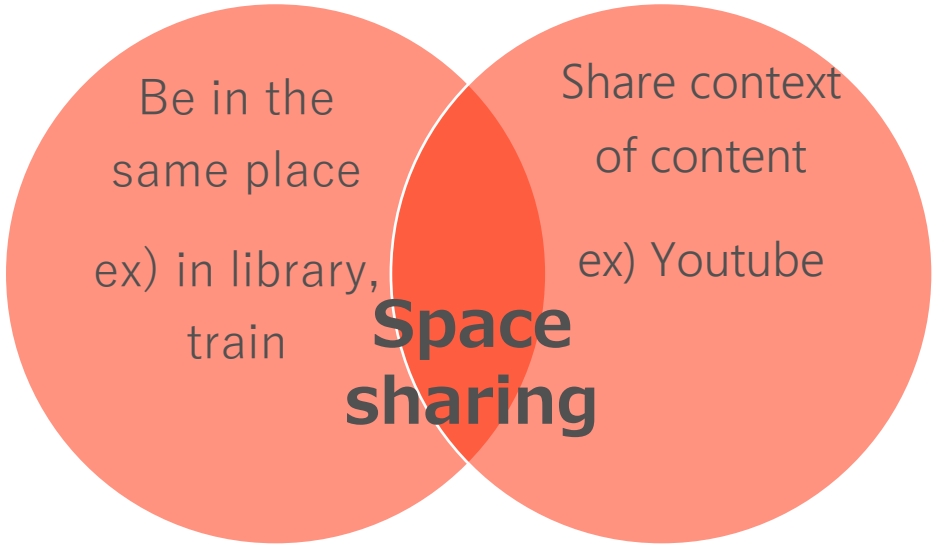
NHK

- Space sharing

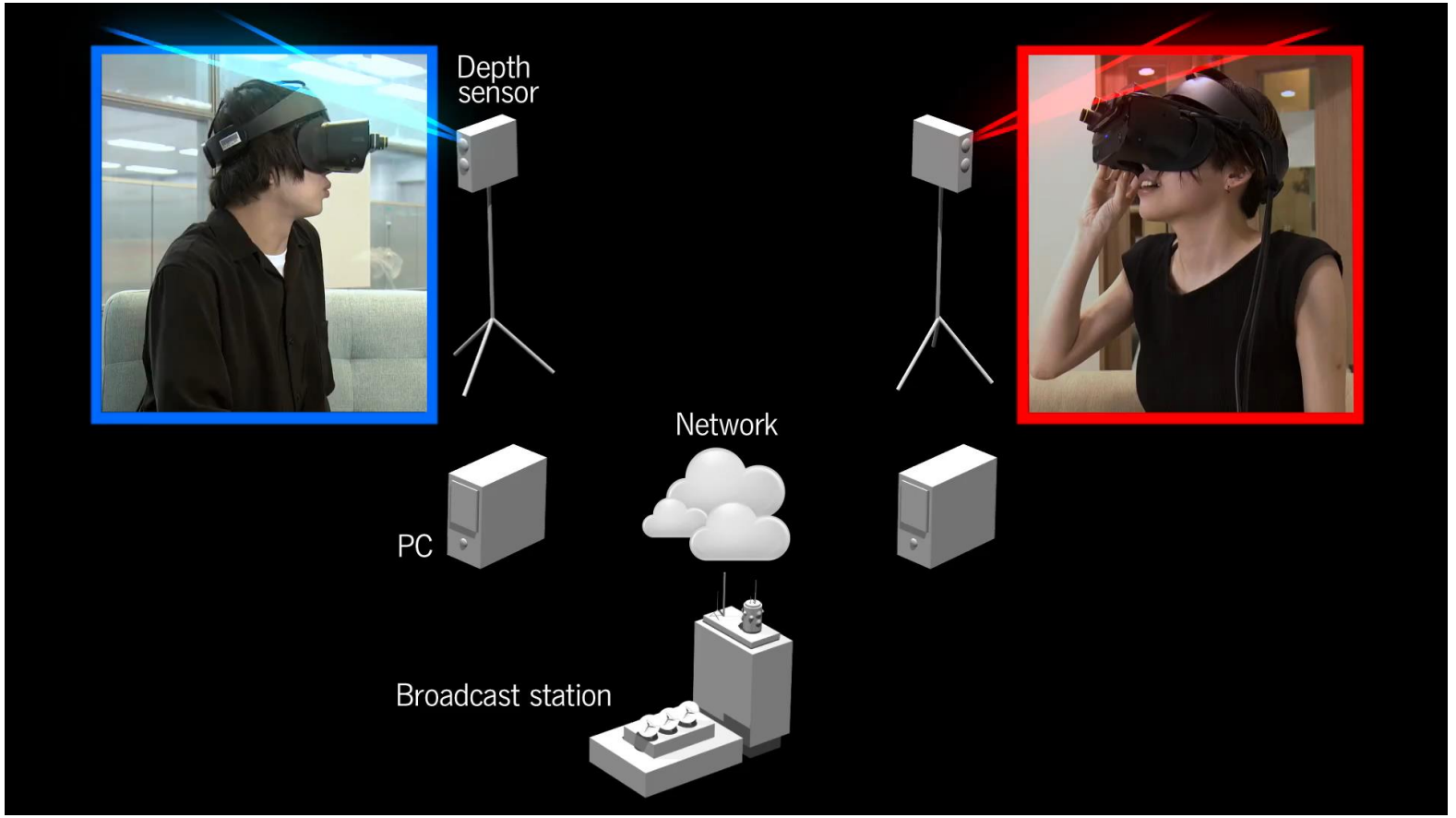
  ≡Be in the same space in real or virtual

  ∩ Share context of content

  - Be in the same place
    - Interest & emotions are transmitted from words, actions & facial expressions
    - High spatial expression of AR / VR
  - Share context of content
    - Sense of belonging thru. common experience
    - Broadcastability & simultaneity give an opportunity



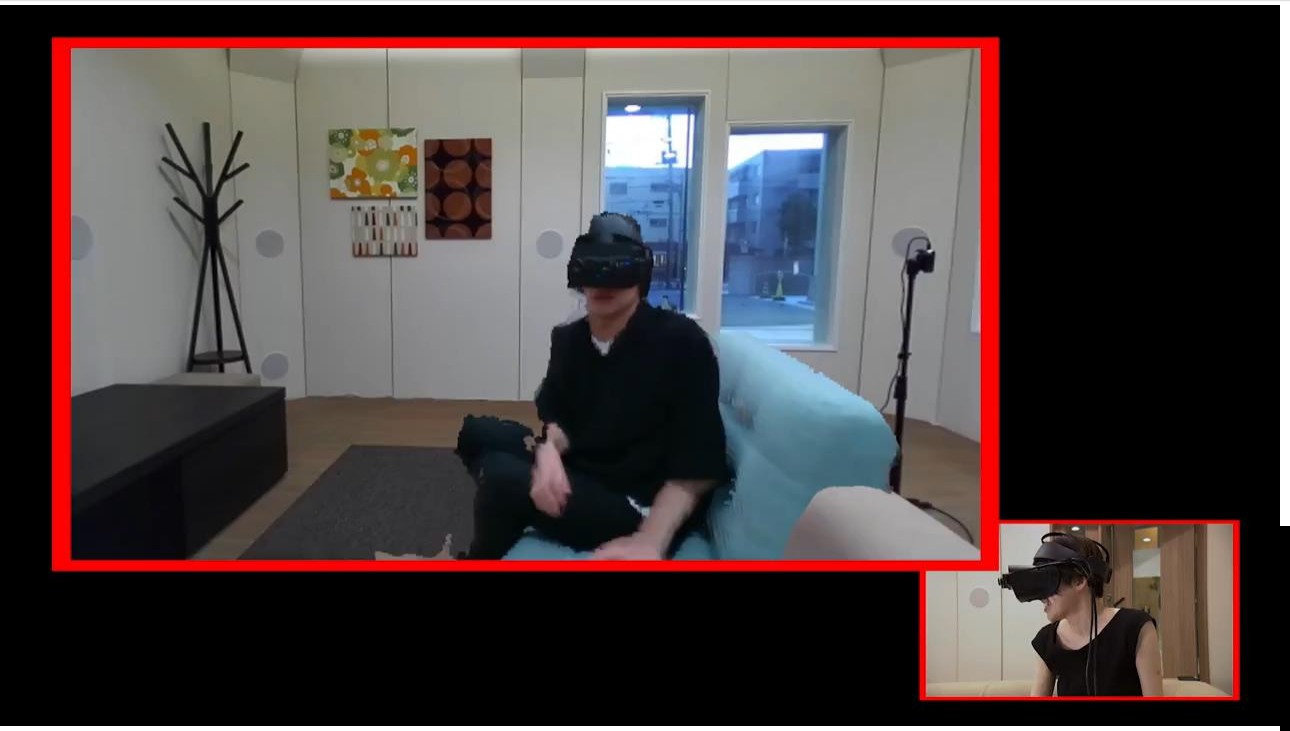
Space-sharing content viewing system



- A depth-sensor captures the depth images of the viewer.
- The depth images are transmitted to the other in real-time.
- The virtual images of person at distant place are reproduced according to HMD's position & direction.

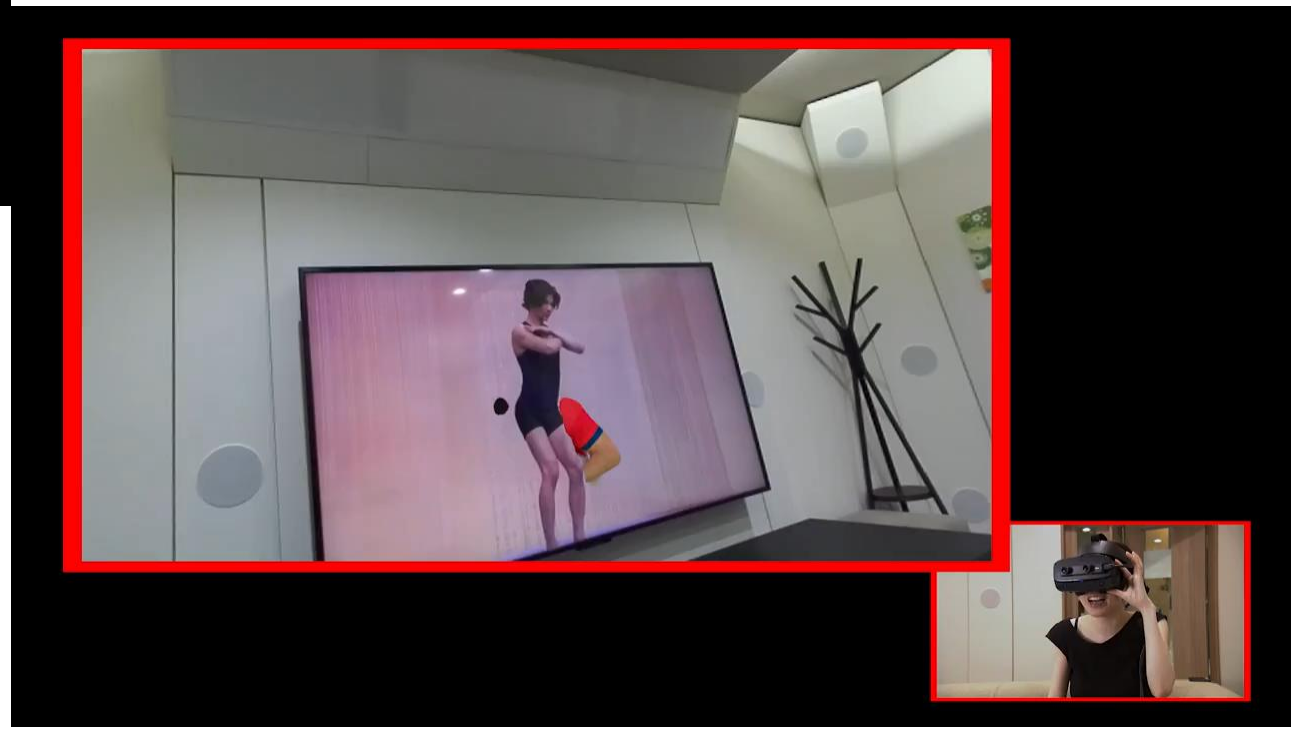
Space-sharing content viewing system

NHK



Sharing VR program

Sharing AR program



Application to TV production

- Performers can also share the experience by this system.
- Applied to produce a scene that family apart sing together.

Conclusion

- NHK & STRL's trial on AIAV systems are introduced.
- Before/After VR
  - An application to Journalism using VR technology.
  - Viewer can compare two 360 images captured at different time by interaction.
- Extremely high-resolution VR
  - For realization of highly immersive experience with a sense of presence and reality
- Space-sharing content viewing system
  - New viewing style that connect viewers by VR technology