

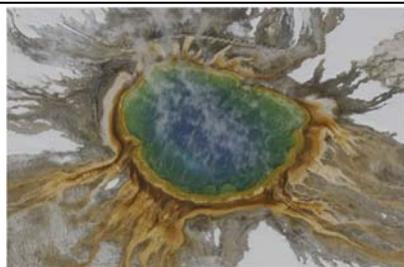


# NHK Exhibits Latest 8K Content and Production Equipment at NAB Show 2018

**TOKYO, April 5th, 2018-** Japan Broadcasting Corporation (NHK) is due to start regular satellite broadcasting service of 4K/8K Super Hi-Vision on December 1st, 2018. In advance of this launch of the world's first 8K service, the latest content and devices will be displayed at NAB Show 2018, the world's largest annual exhibition of broadcast technology.

## © 8K Theater

Shot in HDR (High Dynamic Range) and displayed on a 350" theater screen, the latest 8K content includes *The Amazing Nature of YELLOWSTONE*, exploring the great natural scenery of the U.S. national park on the ground and from the air; and from Russia, the *Nutcracker*, performed by Mariinsky Ballet, one of the world's great ballet companies.



YELLOWSTONE



© NHK, Mariinsky Theatre *The Nutcracker*

## © Home Reproduction Equipment of 8K Super Hi-Vision

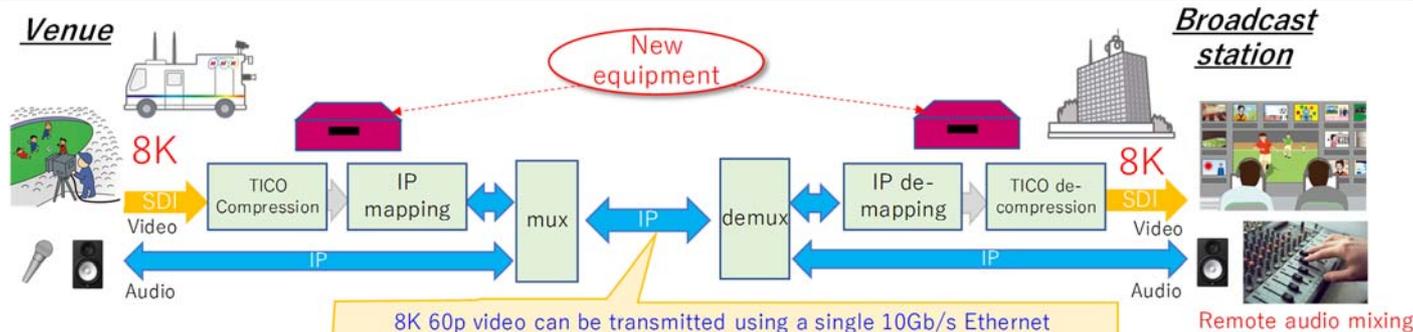
Three types of reproduction equipment of 8K are exhibited, each with a different display and loudspeaker configuration: the 70" display with 2 loudspeakers\*<sup>1</sup>; 85" display with line-array loudspeaker\*<sup>2</sup>; and 98" display with 22.2 multichannel loudspeakers system.



\*<sup>1</sup> Exhibited with the cooperation of Socionext Inc.  
\*<sup>2</sup> Jointly developed by NHK and Sharp Corporation

## 【New】 Transmission System of Mezzanine-compressed 8K over IP

This new transmission system has been developed to send 8K video and audio via a single 10Gb/s Ethernet cable using IP (Internet Protocol) signals. The ultrahigh-definition images are transmitted with low delay. With the capability of 2-way transmission on IP, the system opens the way for new production style such as remote mixing at the broadcast station. (See attachment)



## ◎ 8K/240Hz High-speed Camera & 4x Slow Motion System



8K/240Hz High-speed Camera

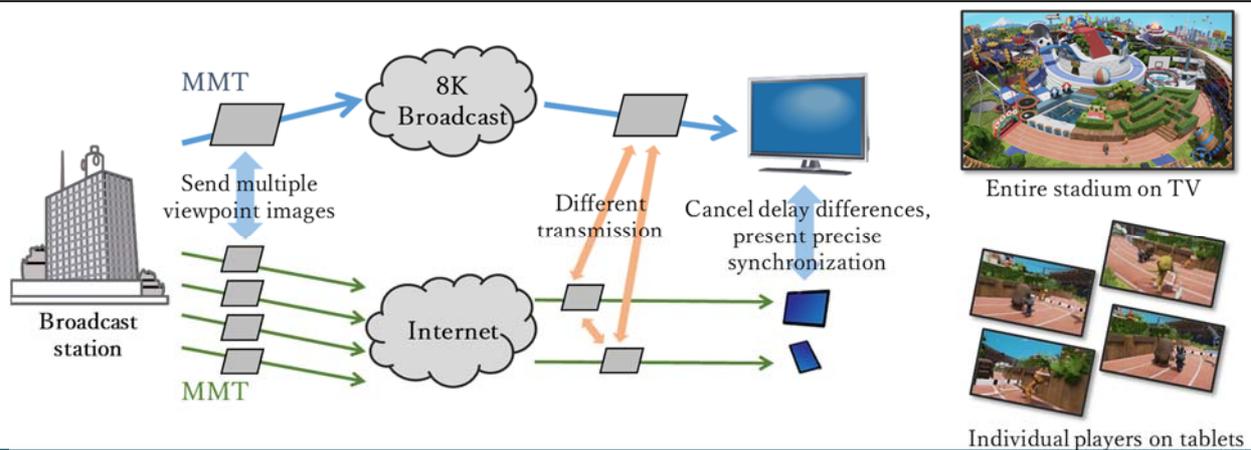


4x Slow-motion System

The newly developed 8K high-speed camera with a single image sensor shoots 240 frames per second for images of fast-moving objects with less motion blur in sports etc. The new 4x slow-motion system is expected to widen video expressions in sports and other programs.

## ◎ Multi-view System with MMT Distribution Technology

MMT (MPEG Media Transport) distribution technology is highly compatible with IP networks and currently employed in 8K test satellite broadcasting. An MMT multi-viewing system which can send multiple images to tablets in synchrony with TV broadcasts is exhibited at the NAB show. Augmented and virtual reality (AR/VR) applications are also anticipated.



## ◎ VR using 8K Display

The conventional VR system using 2K display does not have sufficient resolution and a user can see the pixel structure. This VR system generates high-resolution VR image<sup>\*3</sup> and gives the user immersive feeling by using the 8K display<sup>\*4</sup>.

\*3 The location of VR content: Tsukuba Space Center, Japan Aerospace Exploration Agency (JAXA)

\*4 This exhibit is presented in cooperation with the Semiconductor Energy Laboratory.



## About the NAB Show 2018

The NAB Show is the world's largest annual exhibition for broadcast equipment in Las Vegas hosted by the National Association of Broadcasters (NAB). This year's show runs for 4 days from April 9 through 12 at the Las Vegas Convention Center. Over 1,700 companies engaged in broadcast, film, and digital media fields from around the world, and the show attracts about 100,000 participants.

**NHK Booth: N331FP (North Hall),  
NAB Labs Futures Park**



(Attachment)

## The New Transmission System of Mezzanine-compressed 8K over IP

- ❑ NHK has developed a system for sending 8K video, audio and other program materials by a single Ethernet cable using IP signals. This transmission can be used for 8K program production by connecting the venue and broadcast stations by IP network.
- ❑ To transmit 8K program materials over long distances, such as between Tokyo and Osaka, it has been necessary for 8K signals to compress from the 40 gigabits per second to several hundred megabits per second. The high compression rate causes deterioration to the image quality during program production and the compression and decryption processes also take several seconds, making the system unsuitable for live broadcasting.
- ❑ The newly developed system has been designed for use on commercially available and diffused IP networks of 10 gigabits per second. The 8K video signals are transmitted after they are compressed to about 8 gigabits per second and packetized for IP. The processing times for compression and decryption are also extremely short at only several tens of microsecond. The relayed images retain their ultrahigh resolution and can be transmitted with low delay.
- ❑ Converting the transmission into IP signals also makes it possible to send different types of signal, including internal communication signals as well as 8K video and audio, over the single IP circuit. Further, these signals can be sent in both directions between the broadcast station and venue for flexible 8K program production.



Photo 1 External View of IP Transmission System (Transmitter)

Table 1 Specifications of the New 8K IP Transmission System

8K frame rate	60 frames/sec.
IP signal format	10 gigabit Ethernet
Compression	Tiny Codec (TICO) <sup>*1)</sup>
Compression rate	Approximately 1/5
Synchronization	Precision Time Protocol <sup>*2)</sup>

\*1) Compression technology developed by intoPIX

\*2) Precise synchronization method using IP signals compliant with IEEE 1588