

# Future of Television: 8K Super Hi-Vision

Tomohiro Saito

NHK Science & Technology Research Laboratories (STRL)  
1-10-11 Kinuta, Setagaya-ku, Tokyo 157-8510, Japan  
Phone: +81-3-5494-3104 E-mail: saito.t-gc@nhk.or.jp

## Abstract

NHK has been playing a central role in research and development of the next-generation broadcast medium 8K Super Hi-Vision. The NHK Science & Technology Research Laboratories (STRL) have been doing research on this medium since 1995.

It utilizes super high-definition video and 3-D sound to give the audience an extraordinarily realistic experience. NHK has been speeding up efforts to begin test broadcasting using the technology in 2016, practical broadcasting by 2018, and full-scale diffusion in 2020, the year of the Tokyo Olympic and Paralympic Games.

## 1. Introduction

To implement broadcasting and other services of the highest standard by 2020, the year of the Tokyo Olympic and Paralympic Games, NHK is actively working to create services that can offer viewers new value. Test broadcasting of 8K Super Hi-Vision, the next generation of broadcasting on which the NHK-STRL began R&D in 1995, started over satellite channels on August 1 this year. This is an important step toward the launch of broadcasting to the public in 2018.

To realize 8K test broadcasting, NHK's advanced wide band digital satellite broadcasting system incorporates the latest technologies. They include HEVC (High Efficiency Video Coding), a new compression standard for efficient transmission of high bit-rate video, and MMT (MPEG Media Transport), a multiplexing technology enabling innovative new services that merges broadcasting and the internet. 8K test satellite broadcast is made possible by transmitting signals using a high-efficiency modulation at 100Mbps.

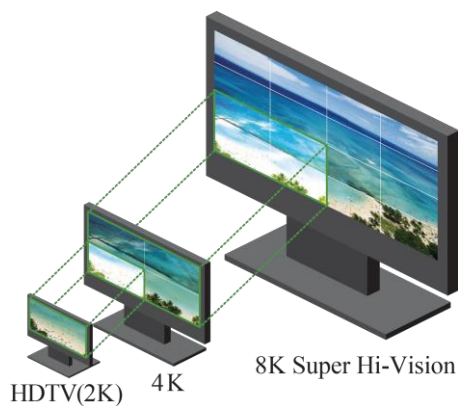


Fig. 1 Resolution Comparisons: 2K, 4K, 8K

## 2. Key features of 8K Super Hi-Vision

8K Super Hi-Vision is a system that conveys scenes in a very realistic, lifelike way. 8K's main features are 33-megapixel ultra-high definition video (16 times as many pixels as current HDTV) and 22.2 multichannel sound. The system's design was based on research into human science including the visual and auditory senses.

### Video

The 8K Super Hi-Vision system supports higher frame rates to enable vivid reproduction of the subject, in addition to ultra-high definition video of approximately 33 megapixels. Also, the wider color gamut and greater bit depth have made it the ultimate TV broadcasting system capable of reproducing bright colors accurately. High Dynamic Range (HDR) refers to technology for expanding the brightness range that can be shown on a TV screen.

Table Major parameter values of 8K Super Hi-Vision image format

Aspect ratio	16:9
Pixel number	7,680 x 4,320
Frame frequency	120, 119.88, 60, 59.98 Hz
Scanning	Progressive
Bit depth	12, 10 bit
Color gamut	Wide gamut system colorimetry

### Sound

8K Super Hi-Vision's 22.2 multichannel sound system soars far above the conventional 5.1 channel system.

NHK is researching and developing ways for people to enjoy the 22.2-multichannel sound experience in limited audio environments, such as those with fewer speakers, displays with built-in speakers, and headphones.

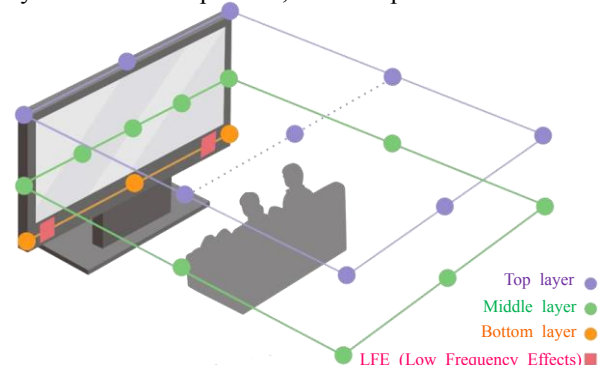


Fig. 2 22.2-multichannel sound system

### 3. History of 8K Super Hi-Vision

Development of ultra-high definition video systems started at the NHK-STRL in 1995. An ultra-high definition video system with 4000 scanning lines and 3D sound reproduction, now called 8K Super Hi-Vision, was first exhibited at the NHK STRL Open House in 2002.

It was first showcased to the world at the 2005 Aichi World Expo. In 2012, it was used for public viewings of the London Olympics at nine sites in three countries. In August 2012, the video signal specifications of 8K Super Hi-Vision were issued as an international standard of television.

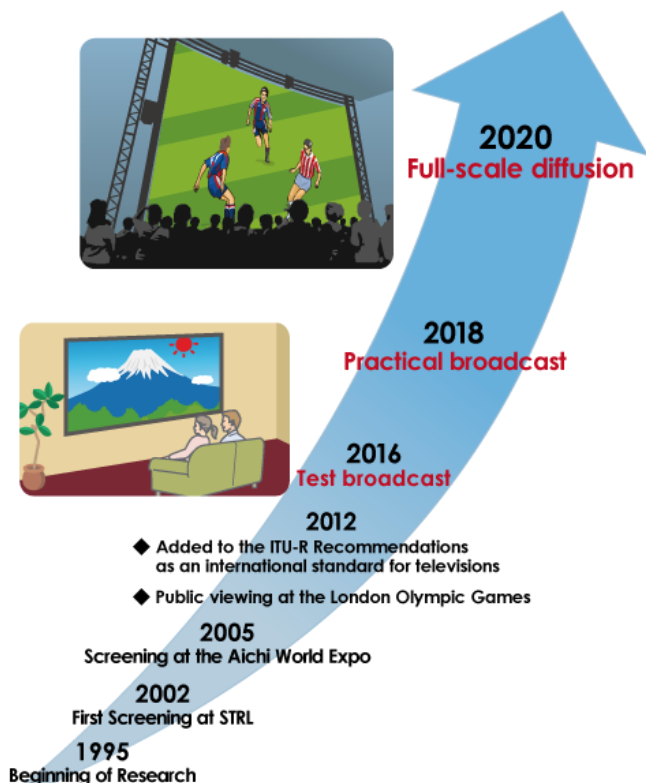


Fig. 3 History of 8K Super Hi-Vision

### 4. R&D

NHK has developed all parts of 8K Super Hi-Vision facilities from production equipment such as cameras and microphones to broadcasting systems through which 8K programs are delivered, to 8K receivers for home use.

While 8K programming with ultrahigh-definition video can be viewed using different screen sizes, a large 100-inch display gives viewers a fully immersive experience, making them feel like they are actually at the broadcasting site. The



Fig. 4 Downsizing of 8K Super Hi-Vision Cameras

advent of lightweight, rollable, large displays will pave the way to introducing large 8K systems into homes. NHK has been working on elemental technologies with the goal of constructing large, flexible-sheet organic light-emitting diode (OLED) displays.



Fig. 5 130-inch Sheet-type OLED display  
(Cooperation with LG Display Co., Ltd. and Astrodesign Inc.,)

### 6. 8K content production and public viewings

High quality content compliments the supremacy of 8K Super Hi-Vision technology. Production teams at NHK try to produce excellent content, covering all subject matter including sports, historic occasions, the beauty of nature, and special filming from the air and under water, delivering the best in 8K.

To provide the broadest audience possible with true-to-life experiences that 8K Super Hi-Vision can offer, public viewings featuring Olympic events, World Cup soccer, sumo tournaments, orchestra concerts, etc. have been held both in Japan and abroad.



Fig. 6 Public Viewing Site (NAB Show)

### 7. Future Plan

NHK will continue its R&D to enhance 8K Super Hi-Vision quality by improving the production system, the reproduction system and display, transmission and various other devices.