



NHK Technology Open House in Tokyo Highlights Advanced Broadcast Research



In April, attendees at the NAB Show in Las Vegas got a glimpse of several of the advanced broadcast technology developments under investigation at the NHK Science and Technical Research Laboratories. However, the exhibits that were brought to NAB in 2006 through 2008 represent only a small part of the ongoing research and development program at NHK. Each May, the NHK Science and Research Laboratories opens its doors to the public for three days and holds the NHK Technology Open House, an exhibition showing the major research efforts underway. The event attracts a total of approximately 20,000 people at the NHK Science and Technical Research Labs (STRL) facility in Tokyo, a 14-story building built in 2002. NHK STRL employs 264 personnel, 239 of which are research engineers, including 71 doctorate holders.



Ultra HDTV was one of several advanced technologies demonstrated by NHK at the 2008 NAB Show.

Nippon Hoso Kyokai (NHK) is the sole public broadcaster in Japan, with network headquarters in Tokyo, operating two terrestrial TV channels, three satellite channels, main stations in eight cities in Japan with a total of 54 stations throughout the country, and 28 overseas network bureaus, with a full offering of news, information, entertainment and educational program content. NHK also operates three national radio channels. With over \$6 billion in annual revenue, approximately 97% of funding comes from "receiving fees" that are paid by every Japanese citizen with a television set (terrestrial viewers pay about \$150 per year and satellite viewers pay about \$250 per year). The first radio broadcasts by Tokyo Broadcasting Station, the predecessor to NHK, were initiated in 1925. The NHK Science and Technical Research Laboratories were established five years later in 1930.

The 2008 NHK Technology Open House, held May 22-25, encompassed 43 separate exhibits, within five general categories as shown below:

Frontiers of Broadcasting

- 1 Frontiers of Broadcasting
- 2 33M-Pixel Image Technology
- 3 Image Sensor using Organic Compounds
- 4 Super Hi-Vision Codec System
- 5 Advanced Digital Transmission System for Satellite Broadcasting
- 6 Dirac: The New Coding Technology
- 7 Super Hi-Vision Home Theater System
- 8 Progress in Terrestrial Digital Broadcasting (ISDB-T)
- 9 Channel Equalizer for Echoes Outside the Guard Interval of OFDM Signals
- 10 Automatic Activation of One-Seg Receivers for Emergency Broadcasting
- 11 One-Seg Combined Retransmission System
- 12 High-Speed Mobile Reception Technique for HDTV Digital Terrestrial Broadcasting
- 13 Ultra Multi-level OFDM Technology
- 14 Activities for International Cooperation
- 15 Super Hi-Vision Theater

Enhanced reality spatial reproduction

- 16 Integral Three-dimensional Television
- 17 Audio Devices for the Ultimate in Sound Reproduction
- 18 Psychological Evaluation of High Presence Sound
- 19 Power Saving Technology for Super Hi-Vision Plasma Displays
- 20 Satellite Broadcasting in the 21-GHz band
- 21 High Dynamic Range Projector with 33-million-pixel Panel

Useful and Universal Services

- 22 AdapTV: A Context-aware Broadcasting Service
- 23 CurioView: New Viewing Style utilizing Information Retrieval
- 24 Broadcasting Security for Content Distribution Services via Communications
- 25 Advanced Receiver Platform for Interactive Services
- 26 TV4U (TV for You)
- 27 New Closed-Captioning System using Speech Recognition
- 28 Interactive Tactile Display
- 29 Flexible Displays

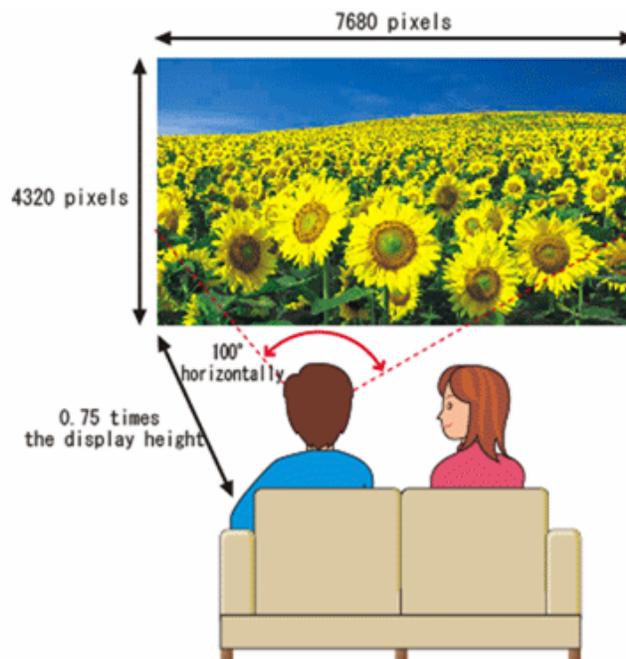
Environment for Producing Advanced Content

- 30 Advanced Studio Production Technology
- 31 Millimeter-Wave Mobile Camera
- 32 New File System for Transferring Program Files
- 33 Millimeter-Wave TV Camera
- 34 Thin Optical Disk
- 35 Ultrahigh-speed, High-sensitivity Color Camera Operating at 1,000,000 fps with 288 Frame Memory
- 36 Multi-view HDTV System
- 37 Multi-joint Manipulator equipped with Extremely Small HD Camera
- 38 New Type of Camera Stabilizer

Utilization and Deployment of Broadcasting Technology

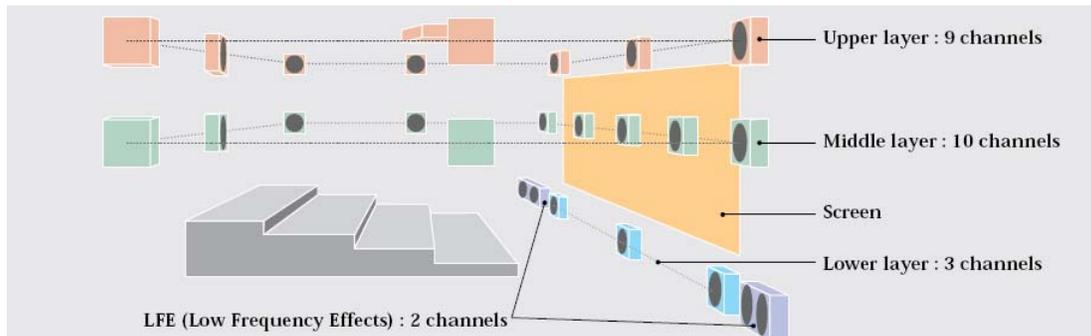
- 39 Ultrahigh-sensitivity HARP Camera
- 40 Watermarking that Survives after Re-shooting a Screen
- 41 Patents and Technical Know-How of NHK
- 42 TV Research at NHK Laboratories from 1930 to 1940
- 43 Digital Broadcasting Reception

A particular highlight of the Open House was the progress shown on the development of Ultra-HDTV (also referred to as Super Hi-Vision), which is the focus of several research projects. The basic picture resolution specification for Ultra HDTV is 7680 by 4320 pixels, or 16 times the resolution of HDTV. As opposed to the optimized 30 degree horizontal viewing angle and viewing distance of 3 times screen height of HDTV, Ultra HDTV is optimized for a 100 degree viewing angle with a viewing distance of 0.75 times screen height.



The Ultra-HDTV format and viewing environment

The high resolution images are accompanied by a 22.2 channel sound system, allowing pinpoint sound localization as well as an immersive sound experience.



Placement of loudspeakers in the Ultra-HDTV 22.2 channel sound specification.

Implementation of Ultra HDTV requires breakthroughs in numerous areas, and progress was shown in the following areas of ongoing active research: small and highly sensitive imagers, large capacity storage devices, efficient coding and transmission capability and compatible display and sound systems for home use. Experimental satellite transmissions in the 21 GHz band are being planned and live satellite transmission of Ultra HDTV will be demonstrated at the IBC convention in Amsterdam in the fall, in conjunction with several European partners.

For more information on the 2008 NHK Technology Open House see <http://www.nhk.or.jp/str/open2008/english/index.html>.

NAB'S SATELLITE UPLINK OPERATORS TRAINING SEMINAR September 29 – October 2, 2008



If you weren't able to attend this week's NAB Satellite Uplink Operators Training Seminar, you still have one more opportunity this year. The course will be offered September 29 – October 2 at NAB's headquarters in Washington DC. This four-day course is designed to instruct students in the proper technical and operational practices that will ensure safe, successful and interference free satellite transmissions. For more information call Cheryl Coleridge at (202) 429-5346 or go to [NAB Satellite Uplink Operators Seminar](#).

