

## Overview of NHK STRL

Since its establishment in 1930, the NHK Science & Technical Research Laboratories (STRL) has promoted research and development related to the advancement of the entire field of broadcasting technology, including research on Hi-Vision (HDTV), satellite broadcasting, flat-screen TVs, and digital broadcasting. In the rapidly changing environment surrounding broadcasting and because of the ever-diversifying demands of our viewers, we must consider the form that broadcasting technology should take. In this new era, our goal is the realization "human-centered" broadcasting systems, which emphasize the concerns and interests of their users, i.e., viewers and producers. As a research institution of NHK, the sole public broadcaster in Japan, we are determined to put the utmost effort into constructing new broadcasting technologies for a new era. Besides our efforts to create a new broadcasting culture, we will also help to fulfill NHK's missions to improve our viewer's welfare and to protect their lives and assets in times of emergency.

## Research Activities

### ■ Ultimate broadcasting systems conveying a strong sensation of reality to the viewer

Ultrahigh-definition TV broadcasting will convey a stronger sensation of reality than can be conveyed with Hi-Vision. The research on Ultrahigh-definition TV includes studies on the psychology of viewing images on a large screen and with a wide field of vision, high-presence audio systems, encoding methods, and transmission systems. The research on super high-resolution imaging/display devices, extra-large storage devices, and electroacoustic transducers is already well advanced. A new type of 3D TV system using electro-holography that can reproduce three-dimensional information on a subject is also being researched.

### ■ Advanced content production and agile news-reporting systems

Contents production technology that enables the use of equipment and content distributed on a network would give producers greater expressive powers. The technology to support new expression and production techniques will incorporate the knowledge, skills, and sensibilities of content production specialists.

Moreover, such as broadcasting system where the various equipment and the program materials are connected by a network would improve the mobility, swiftness, and precision of field reports.

### ■ Ubiquities universal services

Ubiquitous technology will enable broadcasting transmitted by various means, e.g., transmission via communication networks. Viewers will be able to receive services anytime and anywhere and their receivers will act as information lifelines during disasters. A universal broadcasting service that everyone can easily use regardless of handicap, age, language, or region is also being developed, along with security technology to protect privacy and contents and a service that adapts to the viewer's intention and situation.

## ORGANIZATION

### NHK Science & Technical Research Laboratories

#### Planning & General Affairs

Planning and management of research work, public relations, and international/domestic correspondence on research issues. General affairs, human-resource management, accounting, and facilities management.

#### Patents

Patent rights management and technology transfer of NHK's R&D results.

#### Broadcasting Systems

Advanced networked broadcasting systems technologies, digital terrestrial broadcasting technologies, wireless technologies based on millimeter-wave broadcasting and satellite broadcasting systems, collaborative ubiquitous service technologies for broadcasting and communications.

#### Human & Information Science

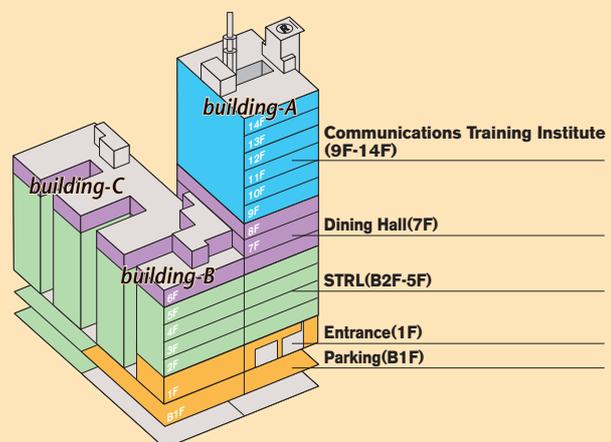
Media and information processing technology based on human science for audio-visual systems conveying a strong sensation of reality, advanced content production systems, and human-friendly universal services.

#### Materials Science & Advanced Devices

Broadcasting-related device technologies for imaging, display, and recording. Materials science for advanced devices.

## RESEARCH FACILITY

STRL occupies the first five floors and basement of the NHK facility in Kinuta, Tokyo. The facility has a variety of special experimental laboratories, including an experimental studio, ISDB laboratory, acoustic-anechoic room, and device foundation laboratory.



*Ultimate Broadcasting System Conveying a Strong Sensation*

**Ultrahigh-definition TV**

The realization of hyper-reality in the form of a broadcasting system would enable viewers to feel as though they were actually at the location shown in the broadcast and would give them the perception that the objects they are viewing are right in front of them. With the aim of realizing such a broadcasting system, we are studying the Ultrahigh-definition TV system called "Super Hi-Vision" (SHV), which has 4,000 scanning lines and 22.2 multichannel surround sound.

To make it feasible to broadcast SHV programming to homes, we are also pursuing research on encoding technologies to compress SHV signals, and satellite broadcasting technologies that use the 21-GHz band.



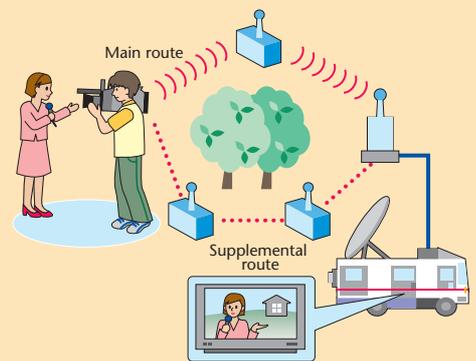
**Integral 3D Television**

The dream of a three-dimensional television is to present the ultimate sensation of presence. Research is underway on an integral 3D television system that is capable of shooting images in real-time and displaying natural autostereoscopic images that can be viewed without special glasses.

*Advanced Content Production and Agile News-reporting*

**Agile News-reporting Relay Technology**

This agile HDTV wireless transmission system will be based on a wireless ad hoc network. Such a system can make prompt program news gathering in emergencies feasible even where camera cables would be too difficult to lay or where a wireless camera would be out of the line-of-sight of its receiving antenna.



**Ultrahigh-speed High-sensitivity Camera**



We are making advances on camera systems that can capture clear images of high-speed phenomena that cannot be perceived with the naked eye or ordinary cameras. Our latest ultrahigh-speed, high-sensitivity CCD and its camera system has a maximum shooting speed capability of one million frames per second.

**Virtual Studio**

Research continues on a virtual studio technology that realizes more natural video composition and shooting of video footage that would otherwise be impossible to shoot. Ongoing research in this area includes a method using a simple device to detect camera location data required for combining computer graphics (CGs) images with actual camera images. We have also developed a system that can present images to program cast members in a form that cannot be captured by the camera.



**Video Retrieval**

We are researching technology to search massive amounts of video footage stored in video archives and large-capacity hard disk recorders. Our technology combines image recognition and natural language processing on closed-caption data attached to programs, and it enables a video segment that contains the search target to be promptly retrieved.

*Ubiquitous and Universal Services*

**Human-friendly Broadcasting**

To make broadcasting services enjoyable for everybody, including the elderly and those with visual/hearing impairments, we are working to develop human-friendly broadcasting services.



**AdapTV**

TV viewing circumstances have become more diverse. We are developing viewer-circumstance adaptive technologies (AdapTV) that adapt the presentation method to the viewing circumstances or preferences of the viewer. AdapTV adapts a single piece of programming to the individual viewer's display size, viewing location (indoors/outdoors), and preferences.

**Flexible Displays**

We are trying to develop an ultra-thin flexible display device that can be rolled up for easy transport and viewed anywhere. Our research presently centers on flexible organic EL displays and flexible liquid crystal film displays, as well as research on organic TFTs that would be used for driving these displays.

