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**NTT Develops single-unit encoder configuration technology for "SHR"  
high-reality large-screen communications**  
**-- Achieves higher image quality, smaller size, and greater economy in  
high-reality large-screen communication systems, surpassing even  
HDTV --**

Nippon Telegraph and Telephone Corp. (NTT; Head Office: Chiyoda-ku, Tokyo; President: Norio Wada) has developed a technology for the configuration of single-unit encoders<sup>\*1</sup> for use in high-reality large-screen (referred to here as SHR: Super High Resolution) image communication.

In the past, in order to compress large images that exceed the resolution of HDTV<sup>\*2</sup>, it has been necessary to divide up the entire screen and process the image in HDTV units. There have been problems, however, with exchanges of information between encoders, and in some images, this has resulted in variations in image quality. For the first time in the world, this newly developed cooperative rate control technology enables real-time exchanges of information between encoders, thus preventing variations in image quality and achieving even better pictures.

The core of the system utilizes a 1-chip HDTV CODEC<sup>\*3</sup> LSI called "VASA," which conforms to MPEG-2<sup>\*4</sup> international standards and enables both smaller size and greater economy than conventional HDTV. The large-screen communication system device offers four times the resolution of HDTV (2,160 pixels high x 3,840 pixels wide), in a unit that is about 1/6th the size of conventional systems and that reduces power consumption by roughly 75%.

In addition to real-time transmissions such as live broadcasts of concerts and soccer matches at "Satellite Stadiums," this system can be used for recording and playback, and so is expected to find applications in SHR image fields of the future, including digital cinema, stereo 3D TV, and multi-angle TV. As a result, the system is expected to add vitality to SHR image distribution services.

### ○Background to Development

For some time now, NTT Cyberspace Laboratories has been developing an MPEG-2 portable HDTV encoder system that will support high-quality image transmission and other services using broadband networks, and has developed an SHR image communication system that combines multiple portable HDTV encoders and decoders. This system has enabled many viewers to enjoy the excitement of live events as though they were actually there. For example, the semi-final match of the 2001 World Cup soccer tournament was shown on a large screen in Yokohama's Yamashita Park, which was used as a closed-circuit stadium, and in the same year a concert held as part of the Saito Kinen Festival in Matsumoto City was relayed in real time to Palette Town in the Odaiba area of Tokyo and to the NTT Musashino R&D Center.

It has been pointed out that in order to promote the proliferation of transmission services using SHR communication, such as those in the sports community and for live music events, it will be necessary to increase the image quality, compactness, and economy of these communication systems.

## ○Keys to Related Technologies

### **1. Achieving high image quality with cooperative rate control technology (see [attachment](#))**

The cooperative rate control technology analyzes, in real time, the encoding characteristics of the multiple HDTV images that make up the SHR images, and processes these images in optimum encoding rate suited to several different HDTV images, thus achieving increased quality with little variation in image quality. Of course, using independent control, the system can also be used as a high-performance 4-channel HDTV encoder.

### **2. Easy recording and playback of compressed SHR images using streaming multiplex function**

In the past, it was difficult for systems with multiple encoders to record and play back compressed SHR images without using specialized external devices, because the images were output in multiple streams<sup>\*5</sup>. Now, using a multiplex function achieved by stacking streams on a VASA chip, it will be possible to output (multiplex) these multiple streams combined into a single stream. In this way, users can easily record and play back compressed SHR images with "stream recorders" or other commercially available devices, thus opening the doors for a wide range of applications not limited to live broadcasts alone.

## ○Future Developments

NTT's goal is to release commercial products based on these technologies and to create an impetus for SHR image distribution services in preparation for the next generation of high-reality, large screen image communications that will surpass HDTV. As part of these activities, the company plans to display the system at NAB<sup>\*6</sup> 2004, which will be held in Las Vegas, Nevada, on April 17, 2004, so that many people will have the opportunity to see the system's capabilities. Furthermore, in order to promote the development of diverse services using optic networks, it will aim for further development of the high-compression, high-quality video encoding technologies and LSI architecture technologies that it has been working on up to now, and will continue its work in the development of next-generation CODEC technologies.

## **Glossary**

\*1: Encoder

A device for compressing audio or video data into a specified stream. Conversely, a Decoder is a device for expanding compressed streams into audio or video data.

\*2: HDTV (High Definition Television)

A form of TV broadcasting that offers far higher resolution than regular (NTSC) TV images. Compared to NTSC, which uses images 480 pixels high x 720 pixels wide, HDTV offers more than six times the resolution, with images 1,080 pixels high x 1,920 pixels wide.

\*3: CODEC

A CODEC device contains the functions of both an encoder and a decoder. Because digital video and audio uses huge volumes of data, it is important to use an appropriate CODEC when compressing data.

\*4: MPEG-2 (Moving Picture Experts Group-2)

MPEG is an international standard related to the compression of video images. MPEG-2 is a standard encoding method for high-quality video, including HDTV and other TV images, and is also used for DVD and digital TV broadcasting.

\*5: Stream

In this context, a "stream" refers to audio or video that has been compressed and encoded into a stream of data for immediate, continuous playback.

\*6: NAB (National Association of Broadcasters)

The National Association of Broadcasters is a broadcast industry organization based in the United States. Each year, the NAB holds the world's largest exhibition for equipment and applications related to TV and radio broadcasting.

- ([Attachment](#)).

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