

Media, Culture and Industry in the 4K/8K Smart TV Era

—The Prospects of Broadcasting—

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1. NexTV Forum

The Next Generation Television & Broadcasting Promotion Forum (NexTV Forum Japan) is a unique organization.

It was established in May 2013 by a group of 21 companies related to Japan’s media industry, including broadcasters, telecommunications carriers, manufacturers of consumer electronics and broadcasting equipment, cable TV operators, advertisers and trading companies. Since then, other organizations have joined, including Internet service providers and overseas news agencies and manufacturers, and the forum now has expanded to 40 members (as of February, 2014).

NexTV Forum Japan is not simply a consortium for the promotion of UHDTV (4K and 8K television). The forum holds discussions on the technology needed to implement UHDTV broadcasting and develop receiver equipment, and studies the standard technical specifications needed by broadcasting services centered around satellite broadcasting. At the same time, it will act as a broadcaster of experimental services during the initial stages of UHDTV broadcasting in Japan. (Figure 1)

2. Action plan of NexTV Forum Japan

In June 2013, the Ministry of Internal Affairs and

Communications published its road map for the enhancement of broadcasting services such as 4K/8K television and Smart TV. This road map was the culmination of half a year’s discussions among technology and media business experts, consumer electronics manufacturers, telecommunications carriers, broadcasting stations and other organizations representing Japan.

It included the following statement: “We aim to commence satellite broadcasting trial services of 4K television in 2014 and 8K television in 2016, and to introduce and promote commercial 4K and 8K services for households and other users in 2020”. Our forum is a consortium of voluntary private sector organizations that aim to implement the road map drawn up by the Ministry of Internal Affairs and Communications.

The schedule for the introduction and growth of commercial services was set before the decision made by the International Olympic Committee in September 2013 to hold the 2020 Olympics and Paralympics in Japan’s capital city Tokyo. It is hoped that the spread of new and interesting television services will be timed to coincide with this global landmark sporting event.

In August 2012, the International Telecommunication Union (ITU) published recommendation BT-2020, which standardizes the technical parameters relating to UHDTV.

■ Figure 1: Overview of NexTV Forum Japan

Name	Next Generation Television and Broadcasting Promotion Forum	
Location	Akasaka Minato-ku, Tokyo, 107-0052, Japan	
Establishment	May, 2013	
Founder Members (21 Companies)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>DENTSU INC. Fuji Television Network, Inc. FUJITSU LIMITED Japan Broadcasting Corporation Jupiter Telecommunications Co., Ltd. KDDI CORPORATION NEC Corporation NIPPON TELEGRAPH AND TELEPHONE CORPORATION Nippon Television Network Corporation Panasonic Corporation</p> </div> <div style="width: 45%;"> <p>Sharp Corporation SKY Perfect JSAT Corporation SoftBank BB Corp. Sony Corporation SUMITOMO CORPORATION TOHOKUSHINSHA FILM CORPORATION TOKYO BROADCASTING SYSTEM TELEVISION, INC. TOSHIBA CORPORATION TV Asahi Corporation TV TOKYO Corporation WOWOW INC.</p> </div> </div>	
Honorary Chairman	WATANABE, Katsuaki	Former Vice Chairman of Japan Business Federation (KEIDANREN)
Director-General	SUDOH, Osamu	Professor & Dean, The University of Tokyo
Advisers	ITOH, Susumu	Professor, Tokyo University of Science
	MURAI, Jun	Professor & Dean, Keio University
	SUZUKI, Yôiti	Professor, Tohoku University

Coincidentally, 2020 is also the year in which Tokyo will host the Olympics and Paralympics, and the fortunate timing of this event has provided us with an excellent opportunity to push ahead with the full-scale implementation of next-generation television media services.

Although details such as the schedule for starting broadcasts and the initial editing plans are still being studied, we plan to start regular 4K television broadcasting in mid-2014 by using a satellite broadcasting platform.

In parallel with the 4K satellite TV broadcasts, the major providers of IPTV and cable TV in Japan are also eager to launch 4KTV services, and may start their own trials of 4K broadcasting and VOD services during 2014.

The road map makes it clear that UHD TV and advanced Smart TV are to be promoted as an integral package. (Advanced Smart TV is an integrated service with higher added value that simultaneously links broadcast programs and information with services, content and information delivered via the Internet.) Japan's broadcasting stations are currently in the process of expanding their HDTV programs and Internet collaborative services. In the future, it is expected that an even fuller range of services will become available, such as UHD TV services with higher resolution, services that combine displays with diverse network services and content, and services that combine personal terminals such as tablet PCs with large-screen UHD TV displays. One of the key roles of our forum is to conduct research aimed at popularizing these new services and provide a forum for mutual collaboration between related broadcasting stations, network service providers, terminal manufacturers and the like.

3. Differences between 2014 and 2016

Here we present a brief description of the differences in the technical specifications of the 4K broadcasts planned for 2014 and the 8K broadcasts planned for 2016. In both cases, the detailed specifications are still under investigation, although the specifications for 2014 will soon be finalized. The satellite broadcasting specification for 2016 will be discussed by broadcasters, receiver manufacturers and the like for about one year during 2014.

For the 4K satellite broadcasts of 2014, we plan to use the HEVC (H.265) next-generation video compression technology. However, we plan to keep the other technical parameters the same as for existing satellite broadcasting. This is because we have to develop the broadcasting and receiving equipment as quickly as possible.

On the other hand, for the 8K (and 4K) satellite TV broadcasts scheduled for 2016, we are not only planning to use HEVC but are also considering the introduction of various new technologies including modulation schemes, multimedia coding and multiplexing technology. This is because in addition to increasing the video picture resolution, it will also be essential to implement interesting advanced Smart TV services based on collaboration between broadcasting and network communications.

4. Advantages and issues of 4KTV program production

4K program production trials have already been started by

members of NexTV Forum Japan who can draw on their expertise in broadcasting and video culture, including organizations such as NHK and major terrestrial commercial broadcasters, prominent satellite broadcasters and leading cable TV companies.

These broadcasters are continuing to take on the challenges of program production in the various production techniques of their specialized genres, including sports such as golf, soccer, baseball and motor racing, live music, dramas, documentaries, travel programs and programs about Japan's traditional arts. Many pioneering producers, directors and engineers have discovered new creative possibilities when using new tools for 4K video. Specifically, 4K video can convey details that are lost in conventional HDTV, such as the undulations of a grassy lawn or shadows at night time, the fizzing motion of water droplets, atmospheric shots showing the movement of the wind, sunlight filtering through the leaves of trees, and the muscular movements of sports players. It can also reveal subtle color tints and gradations in vivid detail, and allows producers to depict images with a wide dynamic range that would be lost in conventional video. It is expected that producers at each broadcaster will benefit from the increased screen display area and the expanded creative possibilities that this technology offers in all genres, including video journalism, entertainment and the avant garde.

On the other hand, through repeated trials of actual program production, NexTV Forum Japan provides a forum for the exchange of discussions and the sharing of program production issues that arise with 4KTV. 4K is a system that originates from Hollywood movie production companies and the introduction of digital movie distribution methods. Although the movie and TV industries are both cultural institutions that produce moving images, they differ significantly in terms of the production and representation methods that they typically use. Movies are generally produced by individually filming a series of carefully staged shots, which are then edited over a period of time while applying processes such as color grading to produce the final product. On the other hand, most TV programs (especially live sports events, music events and studio shows) are basically shot simultaneously by multiple cameras, switching between the signals from these cameras to assemble the best shots into video that is broadcast live or recorded for subsequent transmission.

At present, most 4K camera equipment and post-production equipment is geared towards use in movie production, and is rarely compatible with multi-camera live broadcast set-ups. There is also a lack of suitable zoom lenses, and those that are available tend to have a shallow depth of field that makes focusing difficult. It has become clear that there are still many production issues such as these.

For the successful launch of a broadcasting service, it is necessary not only to develop and maintain technical systems, but also to facilitate the mass production of high-quality content and reduce the costs of program production by making the equipment easy to use. The production of interesting 4K programs featuring live sports and music events requires a system where shooting and production can be performed while switching between the video signals from multiple cameras in real time. Our forum includes equipment manufacturers and operation businesses among its members, bringing in the latest know-how on program

production equipment and post-production work. Members also share and discuss production issues that have arisen when broadcasting stations start producing 4K programs, while working on improvements to the production equipment, systems and road map. This is another key role of NexTV Forum Japan.

5. Possible applications beyond home entertainment

4KTV and 8KTV technology is spreading into the world of home entertainment such as broadcasting and VOD Internet delivery, but there are growing industry expectations that this technology can also make a public contribution in many other fields.

Japan is rapidly advancing into an era of low birth rates and an aging society. 4K and 8K technology is expected to make an important contribution to this situation in public fields such as medicine, education, disaster prevention and mitigation, advanced machinery and architectural design.

It is also expected to make significant contributions to industries such as signage and advertising, publishing, ODS (Other Digital Stuff: using large screens at cinema complexes to show non-movie content like music and sports events), and tourism by creating new industries with high added value, and in art and culture where it could be used as a new way of displaying and preserving objects and for the creation of new art works in museums, art galleries and the like.

We believe that we can make a global contribution by developing and creating state-of-the-art services and technologies while collaborating with specialists in each of these fields on aspects such as technologies, content and service models.

6. Improving broadcast services and culture

We believe that it would be wrong to begin UHDTV broadcasting merely for its own sake. It is essential that it is used to create a new video culture and to further stimulate video-related industries. As for broadcasting stations, their basic objective and mission is to enhance the “creative” and “journalism” aspects of their work, and this remains the most important concept even in the rapid flow of digital technology.

We must bear in mind that the use of digital technology, Internet collaboration, and the new expressive capabilities of UHDTV provide a way of further enhancing these sorts of concepts and functions.

7. Improved picture quality or improved functionality? — The road to next-generation TV

Next year, 2015, marks the 90th year since the start of radio broadcasting in Japan. During this time, broadcasting has exploited the products of state-of-the-art technology in each era, and has made itself an essential part of our everyday lives by offering better services in the form of journalism and entertainment.

At the last Tokyo Olympics in 1964, color TV relays and satellite relay technology were put to practical use, and in the same year, work began on the research and development of HDTV and flat-screen televisions that are considered the norm in today's digital era.

At the 2012 London Olympics, Japan's public broadcaster NHK held live public viewings of 8KTV (called ‘Super Hi-Vision’ in Japan) in three countries — the US, UK and Japan — with the cooperation of organizations including the BBC. The 2012 Olympics were also called the “Social Olympics”, since highlights of many events were shown worldwide on YouTube, and social media services like Twitter were used to connect athletes directly with their fans.

At the 2020 Tokyo Olympics and Paralympics, what sort of services will television and the Internet be able to deliver to viewers and users in Japan and around the world?

Broadcasting should be made even more engaging by making the fullest possible use of the digital and network technology that is currently emerging from intense technology development and service development.

These changes could bring about the sort of revolution that only comes once in five centuries, like the development of Gutenberg's movable type printing press. Whereas traditional media are reliant on paper or radio waves and only support one-way traffic, it is now becoming easy for users to connect to networks in large numbers at the same time, and to publish their own material via two-way services. We should keep this sort of idea in mind when working on the development of UHDTV services.

People sometimes ask which is more important — improving picture quality or increasing functionality. We think both are important.

A big difference from 20 years ago when HDTV first started to spread around the world is the spread of the Internet and the rapid growth in popularity of services and terminals that use it, resulting in major changes in people's expectations of television and broadcasting. As the younger generation of “digital natives” drifts away from television, it will be difficult to drag them back to conventional linear TV viewing simply by increasing the resolution of video beyond HDTV.

On the other hand, the features of UHDTV such as its high picture resolution, wide dynamic range and extensive color gamut should make it suitable for exploring new genres and new entertainment fields.

That is why we think that the increased resolution of UHDTV and the enhanced features of SmartTV are both equally important.

There are still many issues that remain to be solved. These include reforming the workflow of program and content production in response to technical innovations, constructing a “business model” that facilitates the expanded reproduction of high-quality content, supports proper licensing of material, offers training in various systems and business fields, and supports archive storage with the creation and management of metadata, and developing systems for the education, management and non-technical aspects of people skilled in journalism and creative genres. By continuing to meet challenges such as these, we will find the way to gaining society's acceptance of and support for UHDTV broadcasting and services.