



The promised 8K/16K industry in Japan

A 8K/16K bottleneck is transmission technology.

The established theory "the best effect is realized of highly definition broadcast being consistent high performance from cinematography to post production, transmission, and broadcasting" is a universal fact. Although cinematography is coming to the level of 16k in fact, terrestrial wireless transfer is not more than 2k.

Japan has proceeded in a Complementary assistant type metal oxide semiconductor (CMOS) image sensor technology and 8K technical development in camera for broadcast. "What is core set of a growth strategy is an image sensor and camera module which carries an image sensor in the device field of Sony. It was reported that their world market share amount to 47% of the whole device field in the 2013 fiscal year, they predict to make it expanding even to 63% in the 2017 fiscal year, they expected growth higher than whole device field." (Source Nikkei trendy net July, 2015). Evolution of an image sensor enables highly definition of a camera. Even though the professional use 16K camera for broadcaster is not ready yet, many products are already on the market for consumer usage.

The bottleneck to the spread of 8K is on transmission part in technically. If we utilized cable or the empty transponder of a satellite, a certain amount of frequency zone will be securable. However, for wireless communicates infrastructure realization, a frequency becomes insufficient overwhelmingly.

As the solution, development of new compression technology and development of a new multiplexing technology are needed. In Japan, We adopt the H.265 [new] (HEVC) as an image encoding method towards formation of 8K. Compared with the present MPEG-2 or H.264 (MPEG-4 AVC), they are about twice, and 4 times can be coded efficient about an image, respectively. In addition, adopt more flexible broadcast / communication cooperation by adopting MMT (MPEG Media Transport) as a new multiplexing scheme in a future. The expectation whose transmission of 8K 1ch or 4K 3ch is attained by one transponder by using 16APSK of a MMT base is high. If these new technology cannot be found, full-scale deployment of terrestrial realization is difficult.

Further, in order to ensure the prospects of this field, assistance governmental administrative support becomes indispensable. Although in terms of technology demonstration has already been stacked, unless broadcasting, communication industry and the advertising, the electrical industry feel it attractive as a new business base, widespread of 8k will be delayed, or would derail.

4. OUTLOOK 8K impacts digital industry

The Ministry of Internal Affairs and Communications announces starting full-service broadcasting for 8K in 2018. By satellite broadcasting or etc., It will be started experimental broadcast of "8K" in 2016. It is expected that Broadcast of "4K" and "8K" will spread completely in 2018, and also expected that viewing will become possible on home television.

It seems that it depends on future progress whether these meaning of being full-scale become as a universal service by a terrestrial or only added value service like foreign countries.

I considered the impacts and marketability of 8K from its characteristics so far such as big-screen support, highly-minute-izing, mass information, multiplexing of data, a raise in presence, and high-quality-sound. So, what kind of meaning and opportunity we can find out through the promotion of 8K in the future broadcast and communication industry? Moreover, Can it create a new market?

CDI assumes that there are the following three major issues.

- ① What kind of business is changeable with 8K technology?
- ② Does a new market and products rise really in the spread of 8K technology?
- ③ Is there any internationalized infrastructure export model in relation to 8K?

High potential field : Medical

From the viewpoint of High-definition, which enable capture the actual detail situation more accurately with respect to 8K equipment, 8K technology is adopting medical care industry increasing rapidly.



In the development of 8K endoscope, Japan has continued to attempt for the first realization in the world. Small blood vessels and nerves was hard to see with conventional endoscopes, the boundary between the organ becomes clearer, improvement in safety of the operation can be expected.

8K endoscopic surgery adopted successes in the December 7, 2013 animals (pigs) laparoscopic surgery (the National Center for Child Health and Development Institute) . Image.

Source:<http://optronics-media.com/special/20150206/29614/>

The world's first human case was carried out at Kyorin University hospital on Nov. 10, 2014. Implement the cholecystectomy surgery as clinical studies confirm the efficacy and safety. Surgeon Toshiyuki Mori Professor of Kyorin University says "rich image information of 8K is more secure and can lead to advanced surgery,". However, it weighs of the camera about 2.2 kilograms at the time. Unlike endoscopes that are currently used, there is a problem just cannot be operated with one hand. In the future, improvement is expected, such as lighter in order to spread in the general hospital as a general-purpose equipment, aimed at as early as two or three years within the practical use .

Moreover, in addition to 8K endoscope, it is supposed that the application field of expanding an operation part with a highly exact 3D projection for support of an operation of details is also high promising.

High potential field: Digital Sinage

Digital signage is the maximum promising field which the big screen of 8K and 16K must be introduced at an early stage. The investment to a station, a hotel, the conference hall has a very high contact point with a televiewer, and there are many scenes on which a high-resolution image

functions effectively. It is a use-case which can be expected that an initial cost is recoverable at an early stage.

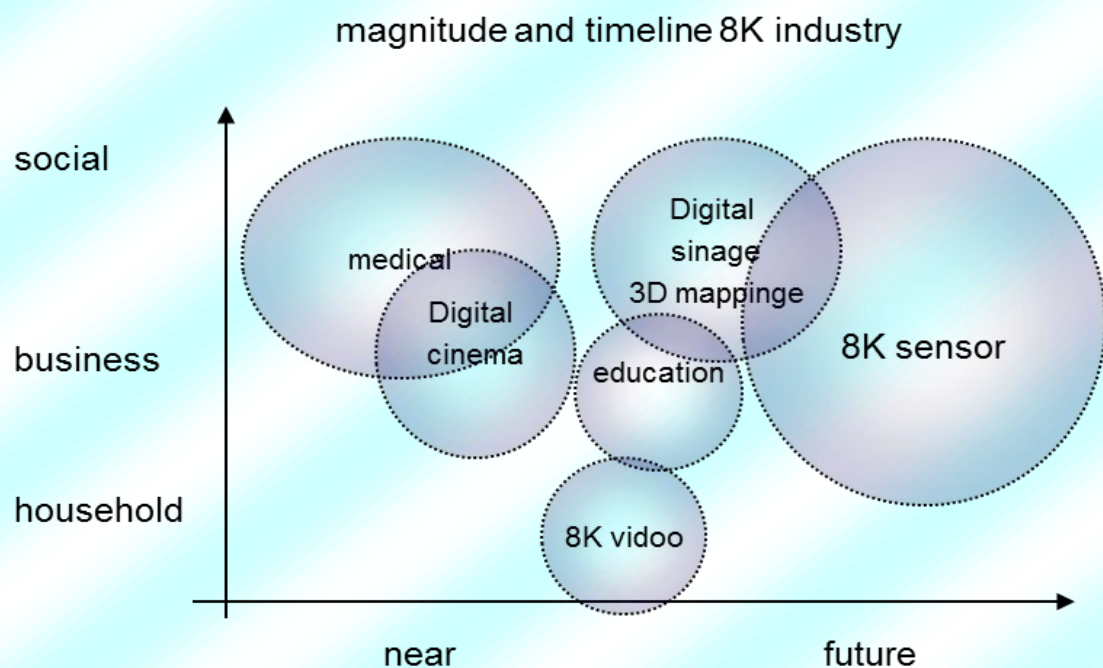
The digital green board by 4K is developed in education fields. Panasonic is advancing cooperation with it, so that the educational purpose can also use 4K pad which used in the art museum. Moreover, in the coaching school, They started creating and distributing the contents for correspondence courses by 4K in 2015.

There is a value as some 4K and 8K exhibition demonstrated as a work of art. In 2013, celebrates Cappella Sistina 500-year commemoration, held in the National Museum of Western Arts In the Michelangelo exhibition, TBS showed the image photo with 4K digital cinema camera of Sony on a 250-inch large-sized screen. It obtained good evaluation with high presence also in Japan.

There is an example which used 4K digital signage also in the art museum. In Moreau and the Rouault exhibition (Panasonic Shiodome museum), It projected 4K realistic higher-resolution image by the 4K smart TV that in 2013. The trial using many 4K -- art appreciation experience which used 4K the works (Tokyo National Museum) of the figure outside the Kyoto, and a wall painting.

As mentioned above, in the features of detailed imaging, it seems that I permeate promptly industry like 8K endoscope that a more exact picture influences the quality of business, as equipment of the specific purpose with low-pricing by mass production of equipment. Furthermore, growth is expectable as an ICT solution export model by combining the component engineering and parts.

Fig. 5 Industrial impact image of 8K



Promising field: Communication, a digital cinema, 3D 3D projection mapping

On the other hand, in respect of maintenance of the cost and the distribution infrastructure of rich contents used as the trigger, a business model is hard to be discovered, and, under the present circumstances, spread to consumers is facing a lot of difficulties in the future. There are various questions. "Do It develop 8K-ization of broadcast? Do it progress to one set to 16K? Do the killer contents/service unique to 8K appear?"

About the consumer market, It does not build a new commercial model without the advancement of use experience unique to 8K. That is, It will not come to build the turnkey solution which was

consistent from manufacture to transmission, broadcast / communication without killer contents or an application. Developing commercial broadcast / distribution model pattern of 8K on its own initiative is required strongly.

As a subject to the formation of 4K/8K of broadcast, as a social infrastructure, the determination of the positioning of whether to include in a universal service or as rich (added value) service is the most important. If the problem of a narrow zone assumes that the outlook brightened by compression technology/multiplexing technology temporarily, the following problem will become the profitability of the reinvestment which upgrade a transmitting network overly high definition.

However, consider to the differences. The U.S. where the cable TV has spread, that 4K-ization can solve the problem of the profitability of spread by comparatively little investment conversely. Moreover, if an internet delivery also assumes what 8K-ization will follow by the further enhancement of broadband, and low-pricing of 8K camera, 8K will progress with a cable quickly.

only the terrestrial television consumer of Japan is left behind 2k while where many of basic 8K technology has been owned as a country. You should examine the risk of the aversion of a user that you leave many with 2K -- isn't it? At the point, the broadcasting industry of our country, which formed a market in the big success in the world, the first, very big crossroads are awaiting.

Summary - 8K market - CDI assumes that a standup is not come from home television. Price decline of the home receiving set will require long time. The 8K rapidly succeeding injection from 4K confuses consumers' purchase has also come out. Probably, standup is in respect of super big-screen, also contribute to low-pricing of the theater type image service outdoor of 3D projection mapping and digital cinema which are assumed to be a 500 billion markets.

Moreover, if a wireless transmission way serves as a bottleneck, telecom company using 5G will become main servicer of 8K and broadcast is not initiative until the bottleneck is canceled. Naturally, a telecom company will run short of the engineers who can operate creation equipment and the next-generation imaging technique of 8K, and it is assumed that the strategic cooperation of a telecom company and a terrestrial office (including a contents aggregator in and outside the country) accelerates towards maintenance of 4K/8K abundant contents.

In the above sentence, reeducation of a communications system and a highly definition system is indispensable to a broadcast engineer. The education of net security especially becomes indispensable.

Big expecting field: The IoT-related sensor system

IoT-related system base-related industry is a field of the expectation into which 8K equipment is introduced most. A highly exact camera will agree with the big demand of imaging sensors, since it raises the accuracy of an image recognition function.

The camera which can be take 16K (16384 pixels) is marketed. 8K/16K is by no means enough in our world which ask for more detail level, such as medical treatment and a sensor camera. I assume that the technology of highly-exact-izing will not terminate.



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