

Switching On to ISDB-T Digital

What are the technological aspects of the Japanese standard of digital terrestrial broadcasting? Miho Kawasaki spoke with **Dr. Toru Kuroda** from the Science & Technology Research Laboratories of NHK (Japan Broadcasting Corporation), which was involved in the development of digital terrestrial broadcasting.



Dr. Toru Kuroda

In Japan, preparations have been underway toward a July 2011 finish for transition to digital terrestrial TV broadcasting; a changeover also taking place in many other countries. Image quality is higher with digital broadcasting than with analog broadcasting owing to the high-performance computers built into the receivers. There are three international standards of digital terrestrial broadcasting: Japanese standard (ISDB-T), U.S. standard (ATSC) and European standard (DVB-T). The U.S. standard was the first to be announced, and was applied mainly in North America, while the European standard

has prevailed among European countries. The Japanese standard was developed and standardized the most recently of the three, but the later start enabled it to incorporate state-of-the-art technologies and, as a result, the number of countries that adopted the Japanese standard has increased. In 2006, Brazil became the first foreign country to apply ISDB-T. It was followed in 2009 by Peru, Argentina, Chile and Venezuela. And in June this year, the Philippines become the first Asian country other than Japan to adopt the ISDB-T standard.

Global Expansion of the Japanese Standard

“The most significant feature of the Japanese standard is its superior resistance to poor reception conditions, including interference caused by reflection of radio waves from buildings and moun-



A man watches television on his mobile phone while commuting on a train in Tokyo.

REUTERS/AFO

tains,” says Dr. Toru Kuroda, director of the Broadcasting Networks Research Division of NHK’s Science & Technology Research Laboratories. “This was enabled by a transmission technology called time interleave.”

Technologies used for the other standards are susceptible to interference causing disruption of transmitted data, which results in interrupted images on the TV screen. This does not happen with time interleave, because it breaks down the image data and rearranges them in time-sequential order before restoring them to the original state during reception. Even if data errors are generated by interference during transmission, the subsequent noise does not occur because the data are averaged at the time of reception.

Another feature of the Japanese standard is its ability to allow mobile reception of TV signals with mobile terminals and other such devices. The Japanese standard divides the frequency band of one channel into thirteen segments, twelve of which are received by fixed receivers and one is used for mobile receivers such as cell phones. This allows broadcast stations to simultaneously transmit single-frequency signals to fixed and mobile terminals. Simultaneous transmission also lets mobile devices display high-definition images by receiving twelve-segment signals, even when in motion, when the reception environment is good. Even when a user moves to an area of poor reception, the devices will continue to display images by automatically switching to reception of one-segment signals.

Brazil was initially expected to adopt the European standard, but ultimately it chose the Japanese one. The decisive factor was said to be

that Brazilians, noted for their love of soccer, wanted to be able to watch soccer games with outstanding picture quality anytime, anywhere.

“Our first objective in pursuing functions such as interference resistance, high picture quality and mobile reception was to respond to Japanese users’ obsession with high image quality and their desire to watch TV while moving and outside their homes,” Dr. Kuroda says. “Our response to these Japanese demands turned out to meet a wide variety of needs stemming from the cultural backgrounds and economic statuses of other countries.”

Another advantage of the Japanese standard made it even more valuable for South American countries during negotiations on its adoption—technologies for responding to disasters, such as an emergency warning system. When an earthquake or tsunami warning is issued, this function automatically turns on TV sets or mobile terminals to provide warnings to users.

“As you know, a major earthquake hit Chile in late-February of this year. South America is actually as prone to natural disasters as Japan,” says Dr. Kuroda. “The Japanese standard is the only one that incorporates disaster-related functions as a standard feature. This point was highly valued by those countries.”

Brazil customized the Japanese standard when it started digital terrestrial broadcasting. One example is the improved quality of TV images received by cell phones. Japan will cooperate with Brazil, which has a high level of technologies, in spreading the Japanese standard in African countries as well.

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